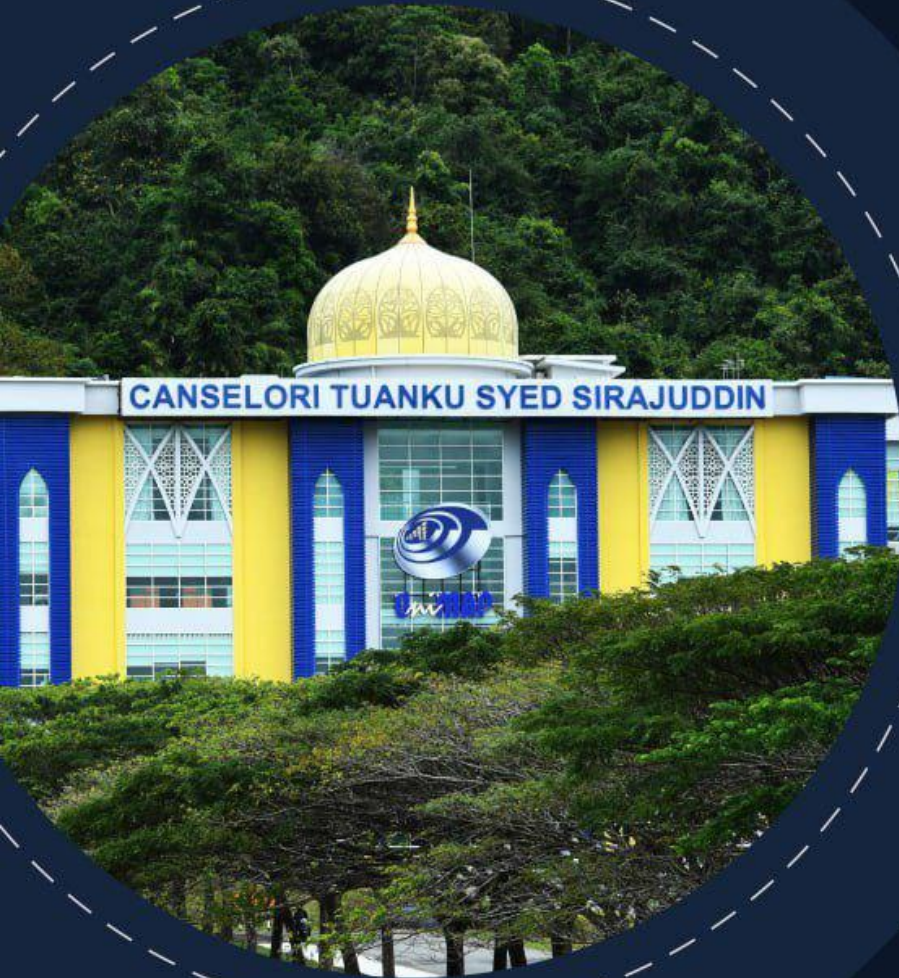




# ACADEMIC GUIDEBOOK

**BACHELOR DEGREE PROGRAMME  
ACADEMIC SESSION  
2024/2025**

Universiti Malaysia Perlis

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Puan Siti Nur Idayu binti Alias  
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Puan Zehan binti Mat Saad  
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**dan/and**

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*all Deans and Directors of Centres/Institute in Universiti Malaysia Perlis.*

**serta/and**

kepada semua staf di Pusat Pengurusan Akademik (AMC), Universiti Malaysia Perlis.  
*all the staff at Academic Management Centre (AMC), Universiti Malaysia Perlis.*

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## PENGENALAN

Buku Panduan Program Sarjana Muda ini disediakan untuk membantu pelajar baharu dalam memahami proses dan prosedur yang berkaitan dengan pengajian mereka di UniMAP. Pelajar perlu menggunakan buku ini sebagai panduan utama dalam merancang dan membuat keputusan mengenai kursus yang akan diambil dari semester pertama sehingga semester akhir pengajian. Buku panduan ini juga memberikan beberapa maklumat asas mengenai sistem akademik, struktur program, senarai kursus yang ditawarkan bersama-sama dengan sinopsis, sumber rujukan, senarai kakitangan dan maklumat berkaitan yang lain. Diharapkan pelajar akan mendapat manfaat daripada maklumat yang diberikan dalam buku panduan untuk merancang pengajian mereka di UniMAP.

### Senarai Fakulti:

1. Fakulti Kejuruteraan & Teknologi Elektrik
2. Fakulti Kejuruteraan & Teknologi Elektronik
3. Fakulti Kejuruteraan & Teknologi Mekanikal
4. Fakulti Kejuruteraan & Teknologi Kimia
5. Fakulti Kejuruteraan & Teknologi Awam
6. Fakulti Perniagaan & Komunikasi

## INTRODUCTION

*The Academic Guidebook for Bachelor Degree Programme is prepared to assist newly-enrolled UniMAP students in understanding processes and procedures that are related to their studies in UniMAP. Students should use this book as the main guide in the planning and selection of courses to be taken starting from the first semester until the final semester of their studies. This guidebook also provides some basic information on the academic system, programme structures, list of courses offered (with the synopsis), references, list of staff members and other related information. It is hoped that students will benefit from the information provided in this guidebook and use the information to plan their studies in UniMAP.*

### List of Faculties:

1. Faculty of Electrical Engineering & Technology
2. Faculty of Electronic Engineering & Technology
3. Faculty of Mechanical Engineering & Technology
4. Faculty of Chemical Engineering & Technology
5. Faculty of Civil Engineering & Technology
6. Faculty of Business & Communication



## Senarai Program Sarjana Muda / *List of Degree Programmes:*

1. Sarjana Muda Kejuruteraan Mikroelektronik dengan Kepujian / *Bachelor of Microelectronic Engineering with Honours*
2. Sarjana Muda Kejuruteraan Elektronik dengan Kepujian / *Bachelor of Electronic Engineering with Honours*
3. Sarjana Muda Kejuruteraan Komputer dengan Kepujian / *Bachelor of Computer Engineering with Honours*
4. Sarjana Muda Kejuruteraan Mekatronik dengan Kepujian / *Bachelor of Mechatronic Engineering with Honours*
5. Sarjana Muda Kejuruteraan Mekanikal dengan Kepujian / *Bachelor of Mechanical Engineering with Honours*
6. Sarjana Muda Kejuruteraan Elektronik Bioperubatan dengan Kepujian / *Bachelor of Biomedical Electronic Engineering with Honours*
7. Sarjana Muda Kejuruteraan Elektrik dengan Kepujian / *Bachelor of Electrical Engineering with Honours*
8. Sarjana Muda Kejuruteraan Pembuatan dengan Kepujian / *Bachelor of Manufacturing Engineering with Honours*
9. Sarjana Muda Kejuruteraan Bahan dengan Kepujian / *Bachelor of Material Engineering with Honours*
10. Sarjana Muda Kejuruteraan Polimer dengan Kepujian / *Bachelor of Polymer Engineering with Honours*
11. Sarjana Muda Kejuruteraan Kimia dengan Kepujian / *Bachelor of Chemical Engineering with Honours*
12. Sarjana Muda Kejuruteraan Pertanian dengan Kepujian / *Bachelor of Agricultural Engineering with Honours*
13. Sarjana Muda Kejuruteraan Alam Sekitar dengan Kepujian / *Bachelor of Environmental Engineering with Honours*
14. Sarjana Muda Kejuruteraan Awam dengan Kepujian / *Bachelor of Civil Engineering with Honours*
15. Sarjana Muda Teknologi Kejuruteraan Kimia (Bioteknologi Industri) dengan Kepujian / *Bachelor of Chemical Engineering Technology (Biotechnology Industry) with Honours*
16. Sarjana Muda Teknologi Kejuruteraan Elektronik (Reka Bentuk Rangkaian Elektronik) dengan Kepujian / *Bachelor of Electronic Engineering Technology (Electronic Network Design) with Honours*
17. Sarjana Muda Teknologi Kejuruteraan Elektrik (Kuasa Industri) dengan Kepujian / *Bachelor of Electrical Engineering Technology (Industrial Power) with Honours*
18. Sarjana Muda Teknologi Kejuruteraan Mekanikal (Pemesinan) dengan Kepujian / *Bachelor of Mechanical Engineering Technology (Machining) with Honours*
19. Sarjana Muda Teknologi Kejuruteraan Mekanikal (Sistem Pertanian) dengan Kepujian / *Bachelor of Mechanical Engineering Technology (Agricultural Systems) with Honours*
20. Sarjana Muda Teknologi Kejuruteraan Awam (Pembinaan) dengan Kepujian / *Bachelor of Civil Engineering Technology (Construction) with Honours*
21. Sarjana Muda Teknologi Kejuruteraan Mekanikal (Reka Bentuk Produk) dengan Kepujian / *Bachelor of Mechanical Engineering Technology (Product Design) with Honours*

22. Sarjana Muda Teknologi Kejuruteraan Mekanikal (Pemprosesan Bahan) dengan Kepujian / *Bachelor of Mechanical Engineering Technology (Materials Processing) with Honours*
23. Sarjana Muda Teknologi Kejuruteraan Elektrik (Teknologi Robotik dan Automasi) dengan Kepujian / *Bachelor of Electrical Engineering Technology (Robotic and Automation Technology) with Honours*
24. Sarjana Muda Teknologi Kejuruteraan Elektronik (Sistem Elektronik) dengan Kepujian / *Bachelor of Electronic Engineering Technology (Electronic Systems) with Honours*
25. Sarjana Muda Teknologi Kejuruteraan Elektronik (Rekabentuk Telekomunikasi Elektronik) dengan Kepujian / *Bachelor of Electronic Engineering Technology (Electronic Telecommunication Design) with Honours*
26. Sarjana Muda Teknologi Kejuruteraan Kimia (Proses Kimia Industri) dengan Kepujian / *Bachelor of Chemical Engineering Technology (Industrial Chemical Process) with Honours*
27. Sarjana Muda Teknologi Kejuruteraan Kimia (Teknologi Makanan) dengan Kepujian / *Bachelor of Chemical Engineering Technology (Food Technology) with Honours*
28. Sarjana Muda Teknologi Penyelenggaraan Sistem Elektrik dengan Kepujian / *Bachelor of Technology In Electrical System Maintenance with Honours*
29. Sarjana Muda Teknologi Automasi Elektronik Industri dengan Kepujian / *Bachelor of Technology In Industrial Electronic Automation with Honours*
30. Sarjana Muda Teknologi Automotif dengan Kepujian / *Bachelor of Technology in Automotive with Honours*
31. Sarjana Muda Teknologi Kimpalan dengan Kepujian / *Bachelor of Technology in Welding with Honours*
32. Sarjana Muda Teknologi Pemesinan Industri dengan Kepujian / *Bachelor of Technology in Industrial Machining with Honours*
33. Sarjana Muda Teknologi Pembinaan Bangunan dengan Kepujian / *Bachelor of Technology in Building Construction with Honours*
34. Sarjana Muda Perniagaan (Keusahawanan Kejuruteraan) dengan Kepujian / *Bachelor of Business (Engineering Entrepreneurship) with Honours*
35. Sarjana Muda Perniagaan (Perniagaan Antarabangsa) dengan Kepujian / *Bachelor of Business (International Business) with Honours*
36. Sarjana Muda Komunikasi Media Baharu dengan Kepujian / *Bachelor of New Media Communication with Honours*
37. Sarjana Muda Teknologi Media Interaktif dengan Kepujian / *Bachelor of Interactive Media Technology with Honours*

**MISI / MISSION:**

Melahirkan insan kamil yang menyumbang kepada agenda pembangunan dan daya saing industri negara.

*To produce exemplary individuals who contribute to the nation's development and industrial competitiveness agenda.*

**VISI / VISION:**

Universiti Teknikal yang berdaya saing di persada antarabangsa.  
*An internationally competitive technical university.*

**NILAI TERAS / CORE VALUES**

Ilmu, Keikhlasan, Kecemerlangan  
*Knowledge, Sincerity, Excellence*

**LAGU UniMAP / UniMAP ANTHEM:**

**WAWASANKU**

Universiti Malaysia Perlis  
Alam Kejuruteraan  
Ilmu Keikhlasan Kecemerlangan  
Wawasan Jiwa Kita

Berdikari rohaniah  
Berteknologi  
Pemimpin Berbestari  
Untuk Bangsa Insan Dan Umat dunia  
Negara Yang Tercinta

Universiti Malaysia Perlis  
Alam Kejuruteraan  
Ilmu Keikhlasan Kecemerlangan  
Wawasan Jiwa Kita



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**KALENDAR AKADEMIK SARJANA MUDA / BACHELOR DEGREE ACADEMIC CALENDAR  
SIDANG AKADEMIK / ACADEMIC SESSION 2024/2025**

| AKTIVITI / ACTIVITIES                                                                                  | SEMESTER PERTAMA / FIRST SEMESTER<br>14 Oktober 2024 – 23 Februari 2025 (19 minggu / weeks) |                   |                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                        | JANGKA MASA / DATE                                                                          | TEMPOH / DURATION | CATATAN / NOTES                                                                                                                                                  |
| Pendaftaran Pelajar Baharu & Minggu Suai Kenal / <i>New Intake Registration &amp; Orientation Week</i> | 5 – 13 Oktober 2024                                                                         | 1 minggu / week   | -                                                                                                                                                                |
| Kuliah / <i>Lectures</i>                                                                               | 14 Oktober – 1 Disember 2024                                                                | 7 minggu / weeks  | <b>Hari Deepavali / Deepavali</b><br>31.10.2024 [Khamis / Thursday]                                                                                              |
| Cuti Pertengahan Semester / <i>Mid Semester Break</i>                                                  | 2 – 8 Disember 2024                                                                         | 1 minggu / week   | -                                                                                                                                                                |
| Kuliah / <i>Lectures</i>                                                                               | 9 Disember 2024 – 26 Januari 2025                                                           | 7 minggu / weeks  | <b>Hari Krismas / Christmas</b><br>25.12.2024 [Rabu / Wednesday]                                                                                                 |
| Minggu Ulangkaji / <i>Revision Week</i>                                                                | 27 Januari – 2 Februari 2025                                                                | 1 minggu / week   | <b>Israk Mikraj</b><br>27.01.2025 [Isnin / Monday]<br><br><b>Tahun Baru Cina / Chinese New Year</b><br>29 – 30.01.2025<br>[Rabu - Khamis / Wednesday – Thursday] |
| Peperiksaan / <i>Examination</i>                                                                       | 3 – 23 Februari 2025                                                                        | 3 minggu / weeks  | -                                                                                                                                                                |
| Cuti Antara Semester / <i>Mid Semester Break</i>                                                       | 24 Februari – 23 Mac 2025                                                                   | 4 minggu / weeks  | <b>Nuzul Al-Quran</b><br>17.03.2025 [Isnin / Monday]                                                                                                             |

**KALENDAR AKADEMIK SARJANA MUDA / BACHELOR DEGREE ACADEMIC CALENDAR  
SIDANG AKADEMIK / ACADEMIC SESSION 2024/2025**

| AKTIVITI / ACTIVITIES                                   | SEMESTER KEDUA / SECOND SEMESTER<br>24 Mac – 4 Ogos 2025 (19 minggu / weeks) |                   |                                                                                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------|------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                         | JANGKA MASA / DATE                                                           | TEMPOH / DURATION | CATATAN / NOTES                                                                                                                                                                                                                                                                                                                                            |
| Kuliah / Lectures                                       | 24 Mac – 1 Jun 2025                                                          | 10 minggu / weeks | <b>Hari Raya Aidilfitri / Eid-ul Fitr</b><br>31.03.2025 - 01.04.2025 [Isnin – Selasa / Monday – Tuesday]<br><br><b>Hari Pekerja / Labour Day</b><br>1.05.2025 [Khamis / Thursday]<br><br><b>Hari Wesak / Wesak Day</b><br>12.05.2025 [Isnin / Monday]<br><br><b>Hari Keputeraan Raja Perlis / Birthday of DYMM Perlis</b><br>17.05.2025 [Sabtu / Saturday] |
| Cuti Pertengahan Semester / Mid Semester Break          | 2 – 8 Jun 2025                                                               | 1 minggu / week   | <b>Hari Keputeraan YDP Agong/ Birthday of YDP Agong</b><br>2.06.2025 [Isnin / Monday]<br><br><b>Hari Raya Haji / Eid-ul Adha</b><br>6 - 7.06.2025 [Jumaat – Sabtu / Friday - Saturday]                                                                                                                                                                     |
| Kuliah / Lectures                                       | 9 Jun – 6 Julai 2025                                                         | 4 minggu / weeks  | <b>Awal Muharram</b><br>27.06.2025 [Jumaat / Friday]                                                                                                                                                                                                                                                                                                       |
| Minggu Ulangkaji / Revision Week                        | 7 – 13 Julai 2025                                                            | 1 minggu / week   | -                                                                                                                                                                                                                                                                                                                                                          |
| Peperiksaan / Examination                               | 14 Julai – 3 Ogos 2025                                                       | 3 minggu / weeks  | -                                                                                                                                                                                                                                                                                                                                                          |
| Cuti Akhir Sidang Akademik / End of Academic Year Break | 4 Ogos – 5 Oktober 2025                                                      | 9 minggu / weeks  | <b>Hari Kebangsaan</b><br>31.08.2025 [Ahad / Sunday]<br><b>Hari Malaysia</b><br>16.09.2025 [Selasa / Tuesday]                                                                                                                                                                                                                                              |



## SISTEM AKADEMIK

Tahun Akademik Universiti dibahagikan kepada dua semester lazim iaitu Semester I dan Semester II. Setiap semester ini mengandungi 14 minggu pembelajaran. Universiti juga menawarkan semester khas iaitu Semester Tambahan dan Semester Pendek pada cuti akhir sidang akademik. Peperiksaan akan diadakan pada hujung semester. Pelajar juga perlu lulus semua kursus dan mendapat jumlah kredit yang diperlukan mengikut program pengajian masing-masing serta PNGK sekurang-kurangnya 2.00 untuk berijazah.

## PRA-PENDAFTARAN KURSUS

- Pra-pendaftaran kursus membolehkan pelajar membuat pra-pendaftaran atas talian untuk kursus-kursus di semester seterusnya pada tempoh masa yang lebih awal. Tempoh masa yang ditetapkan untuk pra-pendaftaran ini adalah sebelum bermula cuti semester pada semester semasa. Semua pelajar adalah **DIWAJIBKAN** untuk melakukan pra-pendaftaran kursus ini.
- Pelajar **DIKEHENDAKI** mendaftar pada tarikh yang ditetapkan. Kursus yang perlu didaftarkan adalah kursus yang akan diambil pada semester akan datang (semua kursus termasuk kursus Ko-kurikulum). Pelajar digalakkan berjumpa Rakan Pendamping Siswa (RPS) terlebih dahulu sebelum membuat Pra-pendaftaran kursus secara atas talian. Pelajar yang gagal mendaftar dalam tempoh yang ditetapkan, akan menyebabkan pendaftaran rasmi kursus bagi semester hadapan terjejas berikutan keutamaan pendaftaran kursus diberi kepada pelajar yang membuat proses pra-pendaftaran. Pelajar digalakkan untuk mencetak slip pra-pendaftaran ini sebagai bukti pendaftaran.

## ACADEMIC SYSTEM

*The University Academic Year is divided into two regular semesters, namely Semester I and Semester II. Each semester contains 14 learning weeks. The University also offers special semesters consists Additional Semester and Short Semester on the end of the academic year break. Examination will be held at the end of the semester. To graduate, students also need to pass all courses and obtain the required number of credits according to their respective study programmes as well as a GCPA of at least 2.00.*

## PRE-REGISTRATION

- *Pre-registration enables student to pre-register their courses online for all the courses to be taken in the following semester at an earlier period. The pre-registration period is set before the semester break of each semester. All students are **REQUIRED** to perform the course pre-registration.*
- *Students **MUST** pre-register before the end of the pre-registration period. Courses to be registered are courses to be taken in the following semester (all courses including Co-curriculum Courses). Students are encouraged to consult with their Rakan Pendamping Siswa (RPS) before pre-registering their courses online. Students who fail to pre-register their courses within the set time will risk their official registration being adversely affected, as priority will be given to those who have pre-registered. Students are encouraged to print their pre-registration slip as a proof of registration.*

## PENDAFTARAN KURSUS

- Semua pelajar yang aktif adalah diwajibkan mendaftar kursus untuk setiap semester. Pendaftaran kursus ini dilakukan secara dalam talian (online) oleh semua pelajar. Pendaftaran kursus mesti dibuat mengikut tarikh yang telah ditetapkan seperti hebahan yang dikeluarkan oleh Unit Kemasukan dan Rekod Pelajar melalui emel dan portal.
- Pelajar adalah diwajibkan untuk bertemu dan berbincang dengan Rakan Pendamping Siswa (RPS) berkaitan kursus-kursus yang perlu didaftar. Selepas mendaftar, pelajar perlu membawa bersama slip pendaftaran kursus untuk disahkan oleh RPS dalam sistem pada sesi tersebut. Kursus-kursus yang didaftarkan tanpa mendapat pengesahan dari RPS adalah dianggap **TIDAK SAH**.
- Sekiranya berlaku perubahan pada pendaftaran kursus sama ada pelajar menambah kursus, menggugurkan kursus atau tarik diri kursus dalam tempoh yang ditetapkan, pelajar perlu mendapatkan pengesahan semula daripada RPS.
- Pelajar yang gagal mendaftar kursus dalam tempoh masa yang ditetapkan adalah tertakluk kepada penalti berjumlah RM50. Pendaftaran lewat tidak boleh melebihi minggu ketiga (3) semester. Pelajar perlu mengisi Borang HEA(B)-02[b] (Borang Pendaftaran Kursus Lewat) dan mesti memperoleh kelulusan daripada Dekan Fakulti.
- Manakala pelajar yang baru mendaftar bagi satu-satu sidang akademik baru akan mendaftar secara online pada tarikh yang dinyatakan pada Minggu Suai Kenal mengikut Fakulti masing-masing. Pelajar akan diberi taklimat tentang kursus, dalam Minggu Suai Kenal di Fakulti masing-masing.

## COURSE REGISTRATION

- *All active students are required to register for courses allocated for each semester. The courses should be registered online by all students. Course registration must be completed within the dates specified by the Student Admissions and Records Unit via email or the UniMAP Portal.*
- *Students are required to discuss with their Rakan Pendamping Siswa (RPS) regarding courses that they will have to register for each semester. After registration, students must bring the registration slip for verification by the RPS in the system during the discussion session. Course registration without RPS verification is considered **INVALID**.*
- *If there are any changes in student course registration, i.e. add, drop or withdraw courses within the prescribed period, the student must also obtain verification from the RPS.*
- *Students who fail to register within the prescribed period shall be subject to a penalty of RM50. Late registration must not exceed the 3rd week of the semester. Students must complete the HEA(B)-02[b] Late Registration Form and obtain approval from the Dean.*
- *New students will register online on the specified date during the orientation week according to their school. Students will be briefed by their school on their programme courses during the orientation week.*

- Adalah menjadi tanggungjawab pelajar untuk menyemak dan memastikan bahawa semua butir-butir yang dinyatakan dalam Slip Pendaftaran Kursus adalah betul. Sebarang permohonan pendaftaran kursus/penambahan kursus/pengguguran kursus/tarik diri di luar tempoh yang ditetapkan tanpa sebab-sebab yang boleh diterima oleh Universiti, boleh dikenakan denda kecuali pelajar yang mempunyai alasan yang tertentu sahaja akan dipertimbangkan oleh Dekan Fakulti. Pelajar tidak dibenarkan membuat pendaftaran kursus/penambahan kursus/pengguguran kursus / tarik diri kursus semasa minggu peperiksaan.
- Pelajar yang tidak mendaftar kursus maksimum 2 semester berturut-turut tanpa sebarang alasan boleh ditamatkan pengajian dengan menggunakan Borang HEA(B)-09 (Borang Penamatan Pengajian Pelajar).
- Pelajar yang telah ditamatkan pengajian dan merayu untuk menyambung semula pengajian perlu menulis surat rayuan permohonan kemasukan kepada Naib Canselor melalui Dekan Fakulti (perakuan Dekan diperlukan). Penalti RM100 akan dikenakan kepada pelajar bagi setiap rayuan kemasukan semula yang diluluskan.

- *Students are responsible for checking and ensuring that all the particulars stated in their Course Registration Slips are correct. Student who applied to add/drop/withdraw registration after the prescribed period without reasons accepted by the university may be fined. Registration after the prescribed period will only be considered by the Dean of the Faculty for students with specific reasons. Students are not allowed to register add/drop/withdraw during the examination weeks.*
- *Students who do not register for a maximum of 2 consecutive semesters without any reason can be terminated through the submission of the HEA(B)-09 Termination of Study Form.*
- *Students who have been terminated and wish to place an appeal to resume their studies may do so by submitting an appeal letter to the Vice-Chancellor through the Dean (Dean's verification required). A penalty of RM100 will be imposed on students whose application for re-admission has been approved.*



#### i. Pendaftaran Kursus Pelajar Berstatus Aktif

- Pelajar berstatus Aktif boleh mendaftar kursus secara atas talian tidak melebihi 20 kredit dan tidak kurang daripada 10 kredit kecuali pelajar yang mengikuti Latihan Industri (LI), Projek Tahun Akhir (FYP) dan pelajar Semester Akhir yang akan menamatkan pengajian. Pelajar yang ingin mendaftar melebihi 20 kredit perlu mendapatkan pengesahan daripada RPS dan kelulusan daripada Dekan Fakulti.
- Keterangan mengenai Pendaftaran Kursus pelajar berstatus Aktif diringkaskan seperti Jadual 1.

#### i. Active Student Course Registration

- *Students who do not take FYP or LI can take more than 20 credits but with the approval from the Dean. All Active students are allowed to register for not more than 20 credits and not less than 10 credits except for those who are involved in Industrial Training and the Final Year Project. Student who wish to register for more than 20 credits, need to obtain verification from their RPS and approval by the Dean.*
- *Table 1 summarises the credits that students can register for each semester based on their status.*

**Jadual 1 : Ringkasan Pendaftaran Kursus Pelajar Berstatus Aktif**  
**Table 1 : Summary of Credits for Active Student**

| Status Pelajar / Student Status | Kredit Minimum / Minimum Credits | Kredit Maksimum / Maximum Credits |
|---------------------------------|----------------------------------|-----------------------------------|
| Pelajar Aktif / Active Student  | 10                               | 20                                |



## ii. Pendaftaran Kursus Pelajar Percubaan [P]

- Pelajar dengan status Percubaan tidak dibenarkan untuk mendaftar sendiri secara dalam talian (online). Pelajar ini perlu bertemu dengan RPS untuk mendapatkan nasihat dan mengisi Borang HEA(B)-02[a] (Borang Pendaftaran Kursus: Status Percubaan) sebelum menyerahkannya kepada Penolong Pendaftar Fakulti untuk didaftarkan. Hanya Penolong Pendaftar Fakulti atau Unit Kemasukan & Rekod sahaja yang boleh mendaftarkan kursus bagi pelajar ini. Jumlah kredit yang dibenarkan untuk Pelajar Percubaan adalah seperti Jadual 2 dibawah:

## ii. Probation Student Course Registration [P]

- *Student with the “Probation” status are not allowed to register online by themselves. The students must meet their RPS to discuss about the course registration and to complete the HEA(B)-02[a] Course Registration Form: Probation Status before handing it to the Assistant Registrar. Only the Assistant Registrar of Faculty/Admissions and Student Records Unit is allowed to register the subjects for the students in this case. The numbers of credits allowed is as in Table 2 below:*

**Jadual 2 : Ringkasan Pendaftaran Kursus Pelajar Percubaan [P]**  
**Table 2 : Summary of Credits for Probation Student [P]**

| Status Pelajar / Student Status | Kredit Minimum / Minimum Credits | Kredit Maksimum / Maximum Credits |
|---------------------------------|----------------------------------|-----------------------------------|
| Percubaan / Probation (P1)      | 10                               | 12                                |
| Percubaan / Probation (P2)      | 8                                | 10                                |
| Percubaan / Probation (P2*)     | 8                                | 10                                |

## **PENAMBAHAN, PENGUGURAN ATAU TARIK DIRI KURSUS**

### **1. Tambah Kursus**

- Tempoh yang dibenarkan untuk penambahan kursus adalah sehingga minggu ke-2 minggu pembelajaran. Pelajar yang lewat mendaftar perlu mengisi Borang HEA(B)-02[b] (Borang Pendaftaran Kursus Lewat) dan menyerahkannya kepada Penolong Pendaftar Fakulti untuk dikemas kini dalam sistem. Permohonan untuk tambah kursus adalah tertakluk kepada kelulusan dan kekosongan kuota.

### **2. Gugur Kursus**

- Tempoh yang dibenarkan untuk menggugurkan kursus adalah sehingga minggu ke-7 minggu pembelajaran. Pelajar perlu mengisi Borang HEA(B)-03 (Borang Permohonan Gugur Kursus). Borang perlu ditandatangani oleh pensyarah kursus, Dekan Fakulti dan diserahkan kepada Penolong Pendaftar Fakulti untuk dikemas kini dalam sistem.

### **3. Tarik Diri Kursus**

- Pelajar dengan persetujuan Pensyarah Kursus dan Dekan Fakulti boleh memohon untuk menarik diri daripada kursus yang telah didaftarkan pada semester yang berkenaan tidak lewat dari hari akhir bekerja pada minggu ke-12 minggu pembelajaran. Pelajar yang ingin menarik diri daripada kursus perlulah mengisi Borang HEA(B)-04 (Borang Permohonan Tarik Diri Kursus).
- Kebenaran untuk pelajar menarik diri daripada mengikuti sesuatu kursus adalah tertakluk kepada jumlah kredit minimum, kecuali dengan kebenaran Dekan.
- Status Tarik Diri (TD) akan dicatatkan dalam rekod pendaftaran kursus dan transkrip akademik pelajar. Walau bagaimanapun, gred tidak akan diambil kira dalam pengiraan PNG dan PNGK.

## **ADD COURSES, DROP COURSES OR COURSE WITHDRAWAL**

### **1. Adding Courses**

- *The time period allowed for the adding of courses is up to the second week of study). The students are required to fill in the HEA(B)-02[b] Late Course Registration Form and submit it to the Assistant Registrar of the Faculty to be updated in the system. Applications for additional courses are subject to quota approval and vacancy.*

### **2. Dropping Courses**

- *The time period allowed to drop courses is up to week 7 (week of study). Students must use the HEA(B)-03 Drop Courses Application Form to be signed by the course lecturer, Dean of the Faculty and submit it to the Assistant Registrar of the Faculty to be updated in the system.*

### **3. Course Withdrawal**

- *With the consent of course lecturer and Dean of the Faculty, a student may apply to withdraw from a course registered in a semester no later than the last working day of week 12 (week of study). To apply for a withdrawal from a course, the student must fill in HEA(B)-04 Withdrawal Courses Application Form.*
- *Permission to allow students to withdraw from a course is subject to the minimum credits allowed except with permission from the Dean.*
- *Withdrawal status (TD) will be recorded in the record of registration and academic transcript. However, the grade will not be included to contribute towards the GPA and CGPA.*

## JENIS-JENIS KURSUS

### 1. KURSUS WAJIB UNIVERSITI

Kursus Wajib Universiti ialah kursus-kursus di luar pengkhususan pelajar. Kursus-kursus ini ditawarkan oleh Jabatan Bahasa & Pengajian Umum dan Pusat Ko-Kurikulum. Semua kursus ini wajib diambil dan pelajar perlu lulus dengan gred C sebagai syarat untuk pengijazahan.

Kursus-kursus Wajib Universiti bagi program Sarjan Muda ialah:

#### a) Falsafah Dan Isu Semasa (SMU13002) – (2 kredit)

Semua pelajar wajib mengambil SMU13002 Falsafah Dan Isu Semasa. Kursus ini ditawarkan kepada pelajar warganegara dan antarabangsa dengan mengikut kepada struktur kursus dalam penawaran kurikulum program masing-masing.

#### b) Penghayatan Etika Dan Peradaban (SMU13102) – (2 kredit)

Semua pelajar wajib mengambil kursus SMU13102 Penghayatan Etika dan Peradaban. Kursus ini ditawarkan kepada pelajar warganegara dan antarabangsa dengan mengikut kepada struktur kursus dalam penawaran kurikulum program masing-masing.

#### c) Integriti dan Anti Rasuah (SMU12102) – (2 kredit)

Semua pelajar wajib mengambil kursus SMU12102 Integriti dan Anti Rasuah. Kursus ini ditawarkan kepada pelajar warganegara dengan mengikut kepada struktur kursus dalam penawaran kurikulum program masing-masing.

#### d) Keusahawanan Kejuruteraan (SMU22402) – (2 kredit)

Semua pelajar daripada program kejuruteraan, teknologi kejuruteraan dan teknologi wajib mengambil kursus SMU22402 Keusahawanan Kejuruteraan. Kursus ini ditawarkan kepada pelajar warganegara dan antarabangsa dengan mengikut kepada struktur kursus dalam penawaran kurikulum program masing-masing.

## TYPES OF COURSES

### 1. UNIVERSITY REQUIREMENT COURSES

*The University Requirement Courses are courses that are offered outside the student's field of study. These courses are offered by the Languages & General Studies Department and the Co-Curriculum Centre. These courses are compulsory and students are required to pass them with a grade C or above in order to graduate.*

*The University Requirement Courses for Bachelor Degree programmes are:*

#### a) *Philosophy And Current Issues (SMU13002) – (2 credits)*

*All students are required to enrol SMU13002 Philosophy And Current Issues. This course is offered to local and international students by following the course structure of their respective programme.*

#### b) *Appreciation Of Ethics And Civilization (SMU13102) – (2 credits)*

*All students are required to enrol SMU13102 Appreciation of Ethics And Civilization. This course is offered to local and international students by following the course structure of their respective programme.*

#### c) *Integrity and Anti-Corruption (SMU12102) – (2 credits)*

*All students are required to enrol SMU12102 Integrity and Anti-Corruption. This course is offered to local students by following the course structure of their respective programme.*

#### d) *Engineering Entrepreneurship (SMU22402) – (2 credits)*

*All students from engineering, engineering technology and technology programmes are required to enrol SMU22402 Engineering Entrepreneurship. This course is offered to local and international students by following the course structure of their respective programme.*



**e) Kemahiran Berfikir (SMU32202) – (2 kredit)**

Semua pelajar daripada program komunikasi media baharu dan perniagaan wajib mengambil kursus SMU32202 Kemahiran Berfikir. Kursus ini ditawarkan kepada pelajar warganegara dan antarabangsa dengan mengikut kepada struktur kursus dalam penawaran kurikulum program masing-masing.

**f) Pengajian Malaysia (SMU13202) – (2 kredit)**

Semua pelajar antarabangsa wajib mengambil kursus SMU13202 Pengajian Malaysia untuk melengkapkan keperluan kredit. Kursus ini ditawarkan kepada pelajar antarabangsa dengan mengikut kepada struktur kursus dalam penawaran kurikulum program masing-masing.

**g) Ko-kurikulum (SMZXXXXX) – (2 kredit)**

Semua pelajar UniMAP DIWAJIBKAN untuk mendaftar sekurang-kurangnya dua (2) kredit bagi kursus kokurikulum dalam tempoh pengajian sebagai syarat umum untuk bergraduasi. Dua (2) kredit tersebut perlu didaftar secara berturutan mengikut pilihan pelajar dan jumlah kouta yang disediakan. Antara kursus yang ditawarkan adalah kursus KoKurikulum badan beruniform berpakej lengkap, kursus KoKurikulum badan beruniform berpakej pilihan atau kursus KoKurikulum bukan badan beruniform berpakej lengkap.

Pelajar yang mengambil kursus KoKurikulum badan beruniform berpakej lengkap adalah DIWAJIBKAN untuk melengkapkannya mengikut jumlah kredit kursus tersebut bagi tujuan pentauliahan/tamat latihan. Bagi kursus kokurikulum badan beruniform berpakej pilihan, satu (1) kredit kursus badan beruniform perlu diambil pada semester 1. Manakala, satu (1) kredit kursus badan beruniform yang sama atau bukan badan beruniform perlu diambil pada semester 2. Bagi kursus KoKurikulum bukan badan beruniform berpakej lengkap, hanya tiga kursus sahaja yang ditawarkan iaitu Gamelan, Kumpulan Jazz dan Angklung. Pelajar DIWAJIBKAN untuk melengkapkan jumlah kredit bagi kursus-kursus tersebut.

**e) Thinking Skills (SMU32202) – (2 credits)**

*All students from new media communication and business programmes are required to enrol SMU32202 Thinking Skills. This course is offered to local and international students by following the course structure of their respective programme.*

**f) Malaysian Studies (SMU13202) – (2 credits)**

*All international students are required to enrol SMU13202 Malaysian Studies to complete the credit requirement. This course is offered to international students by following the course structure in the curriculum offerings of their respective programs.*

**g) Co-curriculum (SMZXXXXX) – (2 credits)**

*All UniMAP students are COMPULSORY to register for at least two (2) credits Co-Curriculum courses during their studies as a general requirement for graduation. These two (2) credits must be registered consecutively according to the student's choice and the available quota. The courses offered include complete uniformed body Co-Curriculum courses, optional uniformed body Co-Curriculum courses, or complete non-uniformed body Co-Curriculum courses.*

*Students who take the complete uniformed body Co-Curriculum course are COMPULSORY to complete it according to the credit requirements for certification/completion of training. For optional uniformed body Co-Curriculum course, one (1) credit unit of uniformed body course must be taken in the 1st. Meanwhile, one (1) credit unit of uniformed body course or non-uniformed body course must be taken in the 2<sup>nd</sup> semester. For complete non-uniformed body Co-Curriculum courses, only three courses are offered: Gamelan, Jazz Group, and Angklung. Students are COMPULSORY to complete the total credits for that courses.*



#### **h) Bahasa Melayu (SMB41002) – (2 kredit)**

Kursus ini wajib diambil oleh semua pelajar tempatan (termasuk pelajar antarabangsa daripada negara-negara di mana bahasa Melayu diamalkan sebagai bahasa kebangsaan atau bahasa pertuturan mereka, seperti pelajar dari Indonesia, Brunei dan Singapura).

#### **i) Bahasa Inggeris Persediaan (SMB10102) – (2 kredit)**

Pelajar dengan salah SATU kriteria berikut perlu mendaftar kursus ini iaitu :

- Memperolehi keputusan MUET Band 1, Band 2 dan Band 2.5.
- Memperolehi keputusan MUET dibawah Band 3 / IELTS 4.0 ke bawah / TOEFL 4.5 ke bawah bagi Program Persediaan Pra-Universiti (untuk pelajar-pelajar antarabangsa sahaja).

#### **j) Bahasa Inggeris untuk Komunikasi Umum (SMB20102) – (2 kredit)**

Pelajar dengan salah SATU kriteria berikut perlu mendaftar kursus ini iaitu;

- Memperolehi keputusan MUET Band 3 dan Band 3.5.
- Lulus Bahasa Inggeris Persediaan (SMB10102) dengan minimum gred C.

#### **h) Malay Language (SMB41002) – (2 credits)**

*This course is compulsory for all local students (including international students from countries where the Malay Language is either their national language or home language, e.g. students from Indonesia, Brunei and Singapore).*

#### **i) Preparatory English (SMB10102) – (2 credits)**

*Students with ONE of the following criteria must register for this course;*

- *Obtained either a Band 1, Band 2 and Band 2.5 for the Malaysian University English Test (MUET).*
- *Scored below a Band 3 for the Malaysian University English Test (MUET) / scored 4.0 and below for IELTS / scored 4.5 and below for TOEFL for Pre-University Preparatory Programme (EPPP) (applicable to international students only).*

#### **j) English for General Communication (SMB10102) – (2 credits)**

*Students with ONE of the following criteria must register for this course.*

- *Obtained a Band 3 and Band 3.5 for the Malaysian University English Test (MUET).*
- *Passed Preparatory English (SMB10102) with a minimum of grade C.*

**k) Bahasa Inggeris untuk Komunikasi Teknikal (SMB31202) / Bahasa Inggeris Akademik (SMB31302) – (2 kredit)**

- Semua pelajar wajib mengambil kursus **Bahasa Inggeris untuk Komunikasi Teknikal** (bagi program Sarjana Muda Kejuruteraan, Sarjana Muda Teknologi Kejuruteraan dan Sarjana Muda Teknologi) atau kursus **Bahasa Inggeris Akademik** (bagi program Sarjana Muda Perniagaan dan Sarjana Muda Komunikasi Media Baharu). Bagaimanapun, bergantung kepada keputusan MUET, pelajar-pelajar diwajibkan mengikuti beberapa kursus Bahasa Inggeris lain terlebih dahulu sebelum dibenarkan mengambil kursus Bahasa Inggeris untuk Komunikasi Teknikal atau kursus Bahasa Inggeris Akademik seperti ditunjukkan dalam Jadual 3.
- Pelajar yang memperolehi Band 1, Band 2 atau Band 2.5 dalam MUET diwajibkan terlebih dahulu mengambil Bahasa Inggeris Persediaan (Preparatory English) iaitu kursus 2 kredit tidak berkredit (audit) dan perlu mendapat kelulusan minimum gred C sebelum dibenarkan mengambil kursus Bahasa Inggeris Umum (English for General Purposes) sebanyak 2 kredit dan kursus Bahasa Inggeris untuk Komunikasi Teknikal (English for Technical Communication) atau Bahasa Inggeris Akademik (English for Academic Purposes) sebanyak 2 kredit. Gred Lulus minimum bagi semua kursus Bahasa Inggeris ialah gred C.
- Bagi pelajar yang memperolehi Band 3 dan Band 3.5 dalam MUET diwajibkan mengambil mengambil kursus Bahasa Inggeris Umum (English for General Communication) iaitu kursus 2 kredit sebelum dibenarkan mengambil kursus Bahasa Inggeris untuk Komunikasi Teknikal (English for Technical Communication) atau Bahasa Inggeris Akademik (English for Academic Purposes). Pelajar yang memperolehi Band 3 dan Band 3.5 dalam MUET tidak perlu mengambil kursus Bahasa Inggeris Persediaan (Preparatory English).

**k) English for Technical Communication (SMB31202) / English for Academic Purposes (SMB31302) – (2 credits)**

- *All students are required to take **English for Technical Communication** (for Bachelor of Engineering, Bachelor of Engineering Technology and Bachelor of Technology) or **English for Academic Purposes** (for Bachelor of Business and Bachelor of New Media Communication). However, depending on their MUET results, students are required to attend and pass prerequisite English language courses first before they are allowed to take English for Technical Communication or English for Academic Purposes, as illustrated in Table 3.*
- *Students who obtained a Band 1, Band 2 or Band 2.5 in MUET, first and foremost, are required to take Preparatory English, which is a 2 credit non-accredited (audited) course, and pass with a minimum of grade C, before being allowed to continue and take 2 credits of English for General Communication and later another 2 credits of either English for Technical Communication or English for Academic Purposes. The minimum Passing Grade for all English language courses is grade C.*
- *Students who obtained a Band 3 and Band 3.5 in MUET are required to take and pass 2 credits of English for General Communication before being allowed to continue and take either English for Technical Communication or English for Academic Purposes. These students are not required to take the Preparatory English course.*

- Pelajar yang memperolehi Band 4 atau Band 5+ dalam MUET pula hanya diwajibkan mengambil kursus Bahasa Inggeris untuk Komunikasi Teknikal atau Bahasa Inggeris Akademik. Pelajar yang memperolehi Band 4 atau Band 5+ dalam MUET tidak perlu mengambil Bahasa Inggeris Persediaan atau kursus Bahasa Inggeris Umum.
- Bagi pelajar yang mendapat Band 1, Band 2, Band 3 dan Band 3.5 dua (2) kredit yang diperolehi melalui kursus Bahasa Inggeris Umum boleh dikira sebagai Kursus Opsyen. Kursus Opsyen lain juga dibuka kepada pelajar yang mendapat MUET Band 1, Band 2, Band 3 dan Band 3.5 untuk memberi nilai tambah kepada pelajar. Walau bagaimanapun, jumlah kredit bergraduasi bagi pelajar yang mendapat MUET Band 1, Band 2, Band 3 dan Band 3.5 yang mengambil Kursus Opsyen (selain kursus Bahasa Inggeris Umum yang telah dikira sebagai Kursus Opsyen) akan menjadi 139 unit bagi program Ijazah Kejuruteraan dan 144 unit bagi program Teknologi Kejuruteraan. Pelajar yang mendapat Band 4 dan 5+ dalam MUET wajib mengambil Kursus Opsyen.
- *Students who obtained a Band 4 or Band 5+ in MUET are only required to take either English for Technical Communication or English for Academic Purposes. These students are not required to take both Preparatory English and English for General Communication.*
- *For students who obtained a Band 1, Band 2, Band 3 and Band 3.5, the two (2) credits obtained via English for General Communication will be included as part of Optional Courses. Other Optional Courses are also open to those who obtained a Band 1, Band 2, Band 3 and Band 3.5 in MUET for added value to students. As such, the number of credits required for graduation for students with a Band 1, Band 2, Band 3 and Band 3.5 in MUET who are taking Optional Courses (other than English for General Communication which is already taken into account as an Optional Course) are 139 units for Engineering programme and 144 units for Engineering Technology programme. Students who have obtained a Band 4 and Band 5+ in MUET must take any other Optional Courses offered.*



**Jadual 3 : Kursus Wajib Bahasa Inggeris**  
**Table 3 : English Requirement Courses**

| MUET BAND                                   | Kursus Wajib Bahasa Inggeris / English Requirement Courses                                                    |                                                                               |                                                                                                                                                                                                                               |                                                                                                          |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
|                                             | SMB10102<br>Bahasa Inggeris<br>Persediaan /<br>Preparatory<br>English<br>(Tidak Berkredit/<br>Non-Accredited) | SMB20102<br>Bahasa Inggeris<br>Umum /<br>English For General<br>Communication | SMB31202<br>Bahasa Inggeris<br>untuk Komunikasi<br>Teknikal / <i>English for<br/>Technical<br/>Communication</i><br><br>ATAU/OR<br><br>SMB31302<br>Bahasa Inggeris<br>Akademik / <i>English<br/>for Academic<br/>Purposes</i> | Kursus-kursus<br>Opsyen/<br>Optional Courses<br>(Bahasa-bahasa<br>Asing / <i>Foreign<br/>Languages</i> ) |
| BAND 1, BAND<br>2, & BAND 2.5               | /                                                                                                             | /                                                                             | /                                                                                                                                                                                                                             | Pendaftaran dibuka<br>kepada pelajar /<br><i>Registration is<br/>open to students</i>                    |
| BAND 3 &<br>BAND 3.5                        |                                                                                                               | /                                                                             | /                                                                                                                                                                                                                             |                                                                                                          |
| BAND 4, BAND<br>4.5, BAND 5.0, &<br>BAND 5+ |                                                                                                               |                                                                               | /                                                                                                                                                                                                                             | /                                                                                                        |

## 2. KURSUS TERAS

Kursus Teras terdiri daripada kursus-kursus yang wajib diambil oleh semua pelajar. Kursus-kursus ini menjadi keperluan utama untuk pengijazahan. Pelajar yang gagal mana-mana kursus teras mesti mengulanginya dan lulus sebelum layak dipertimbangkan untuk pengijazahan.

## 3. KURSUS ELEKTIF

Kursus Elektif merupakan beberapa pilihan kursus daripada disiplin program pengajian yang boleh diikuti oleh pelajar bagi menyokong bidang pengkhususan pengajian.

## 4. KURSUS OPSYEN

Kursus Opsyen adalah kursus diluar bidang pengkhususan yang memberi nilai tambah kepada pelajar.

## 5. KURSUS AUDIT

Kursus audit merujuk kepada:

- i. Kursus yang didaftarkan dalam program terdahulu pelajar yang berkaitan dengan program semasa tetapi tidak memenuhi syarat pemindahan kredit.
- ii. Kursus yang didaftarkan dalam program terdahulu pelajar yang tidak berkaitan dengan program semasa pelajar.
- iii. Kursus yang didaftarkan dan tidak mempunyai kredit.

## 2. CORE COURSES

*Core Courses are courses specific to a programme that must be taken by students. These courses are part of the requirements for graduation. Students who fail these Core Courses must repeat them and pass before they can graduate.*

## 3. ELECTIVE COURSES

*Elective courses are a number of course options from the discipline of the programme that student can follow to support their programme of study specialisation.*

## 4. OPTIONAL COURSES

*Optional Courses are courses outside students' field of specialization that provide added value to students.*

## 5. AUDIT COURSES

*Audit Courses refers to:*

- i. *A course that is registered in student's previous programme of study which is related to their current programme but does not meet the credit transfer requirements.*
- ii. *A course that is registered in student's previous programme of study which is not related to their current programme.*
- iii. *A course that is registered but has no credit.*

## PENDEKATAN PEMBELAJARAN DAN PENGAJARAN DI UniMAP

- Kebanyakan Kursus Teras yang ditawarkan merangkumi komponen teori dan komponen praktikal dengan nilai jam.
- Komponen praktikal terdiri daripada bentuk-bentuk pembelajaran dan pengajaran berikut:
  - i. **Pembelajaran di dalam makmal dan bengkel** - sepasukan pelajar yang terdiri dari 2-3 orang, menjalankan satu eksperimen. Di dalam beberapa program makmal asas, setiap pelajar menjalankan eksperimen secara individu (1:1) dan bukannya dalam pasukan.
  - ii. **E-pembelajaran** – pendekatan pembelajaran yang diperkukuhkan dengan ICT, yang melengkapkan pendekatan pembelajaran konvensional. Pelajar mempelajari kursus atau topik-topik tertentu menggunakan modul yang boleh diakses dari laman web UniMAP. Modul mengandungi nota kuliah dalam bentuk multimedia, yang merangkumi audio, video, grafik, animasi, simulasi, permainan, dan pelbagai lagi aktiviti berbentuk interaksi.
  - iii. **Pendedahan kepada industri** – pelajar menjalankan lawatan ke industri selama tempoh masa tertentu beberapa kali sepanjang pengajiannya di UniMAP. Ini termasuklah program InTra (Latihan Industri), Keusahawanan Industri, dan lain-lain lagi.

## TEACHING AND LEARNING APPROACHES AT UniMAP

- *Many of the Core Courses offered include theory component and practical component, the values of contact hours for each.*
- *The practical components consist of the following teaching and learning modes:*
  - i. **Lab and workshop Intensive Learning** – *two or three students carry out an experiment in a group. In some basic lab intensive programmes, each student will conduct an experiment individually (1:1) and not in a group.*
  - ii. **E-Learning** – *Learning approach that is reinforced using ICT to complement the conventional approach. Students obtain access to course modules and topics via the UniMAP website. The modules consist of lecture notes in multimedia format such as audio, video, graphic, animation, simulation, games and other interactive activities*
  - iii. **Exposure to Industry** – *Students will make multiple visits to industry for a certain period of time throughout their study at UniMAP. These include InTra (Industrial Training), Industrial Entrepreneurship Exposure and others.*



## LATIHAN INDUSTRI

- Latihan Industri merupakan salah satu syarat/kursus wajib Universiti bagi setiap pelajar Universiti Malaysia Perlis (UniMAP) sebelum dianugerahkan pengijazahan. Latihan Industri ini memberi peluang kepada pelajar-pelajar Universiti merasai konsep pembelajaran dan pengajaran serta pengalaman industri dalam dunia pekerjaan sebelum menempuhi alam pekerjaan kelak. Disamping itu juga, dengan kemahiran dan pengetahuan yang telah diadaptasikan dapat memenuhi hasrat dan keperluan kebolehpasaran graduan demi kemajuan negara.
- Tujuan utama Latihan Industri dilaksanakan adalah:-
  - i. Menyemai sikap profesional di kalangan pelajar.
  - ii. Menyedarkan pelajar tentang kepentingan dan kaitan yang kuat antara latihan industri, makmal/amali dan teori yang dipelajari.
  - iii. Memberi pendedahan awal kepada pelajar tentang persekitaran dan keadaan di industri serta amalannya. Pelajar berpeluang melengkapkan diri sebagai bekalan untuk menghadapi cabaran akan datang, baik di dalam pengajian akademik mahupun rintangan yang mendatang.

## INDUSTRIAL TRAINING

- *Industrial Training is one of the University compulsory courses for student of University Malaysia Perlis (UniMAP) before graduating. The Industrial Training Course gives an opportunity for students to experience the working life at industrial world for the preparation in the future. In addition, the adaptation of industrial experience will meet the needs of graduate employment worldwide and the progress of the country.*
- *The main objectives of the Industrial Training are to:-*
  - i. *Instill professionalism in students*
  - ii. *Raise students' awareness on the importance and connection between industrial and lab-intensive training, and engineering theories.*
  - iii. *Provide students with early exposure to industrial environment and practices. Students also are given the opportunity to equip themselves with the necessary skills and knowledge needed in their respective academic and training fields.*

- Tempoh Latihan Industri ditentukan mengikut bidang pengajian seperti Jadual 4.
- *The period of Industrial Training is determined according to the field of study as in Table 4.*

**Jadual 4 : Tempoh Latihan Industri**  
**Table 4 : Industrial Training Period**

| Program Pengajian / Programme                                                             | Kredit / Credits | Tempoh Latihan Industri / Industrial Training Period |
|-------------------------------------------------------------------------------------------|------------------|------------------------------------------------------|
| Sarjana Muda Kejuruteraan / <i>Bachelor of Engineering</i>                                | 5                | 10 Minggu / weeks                                    |
| Sarjana Muda Teknologi Kejuruteraan / <i>Bachelor of Engineering Technology</i>           | 12               | 24 Minggu / weeks                                    |
| Sarjana Muda Teknologi / <i>Bachelor of Technology</i>                                    | 12               | 24 Minggu / weeks                                    |
| Sarjana Muda Perniagaan / <i>Bachelor of Business</i>                                     | 4                | 8 Minggu / weeks                                     |
| Sarjana Muda Komunikasi Media Baharu / <i>Bachelor of New Media Communication</i>         | 6                | 12 Minggu / weeks                                    |
| Sarjana Muda Teknologi Media Interaktif / <i>Bachelor of Interactive Media Technology</i> | 12               | 48 Minggu / weeks                                    |
| Diploma Kejuruteraan / <i>Diploma in Engineering</i>                                      | 8                | 16 Minggu / weeks                                    |

## TEMPOH PENGAJIAN MINIMUM DAN MAKSIMUM

Pelajar hendaklah menamatkan pengajian mengikut tempoh yang ditetapkan oleh universiti. Tempoh pengajian mengikut program pengajian universiti adalah seperti dalam Jadual 5. Tempoh pengajian adalah berbeza bagi pelajar yang memperolehi pengecualian kredit, penangguhan semester dan pelajar yang menduduki Semester Pendek.

## MINIMUM AND MAXIMUM PERIOD OF STUDY

*Students must graduate according to the time period as stipulated by the university. The duration of study according to each programme of study is as listed in Table 5. The duration of study is different for students who obtain credit exemption, postponed their semester and for students who sit for the Short Semester.*

**Jadual 5 : Tempoh minimum atau maksimum pengajian pelajar**  
**Table 5 : The minimum and maximum period of study**

| Program Pengajian / Programme                                                             | Minimum (Semester) /<br>Minimum (Semester) | Maksimum (Semester) /<br>Maximum (Semester) |
|-------------------------------------------------------------------------------------------|--------------------------------------------|---------------------------------------------|
| Sarjana Muda Kejuruteraan / <i>Bachelor of Engineering</i>                                | 8                                          | 14                                          |
| Sarjana Muda Teknologi Kejuruteraan / <i>Bachelor of Engineering Technology</i>           | 8                                          | 14                                          |
| Sarjana Muda Teknologi / <i>Bachelor of Technology</i>                                    | 7                                          | 12                                          |
| Sarjana Muda Perniagaan / <i>Bachelor of Business</i>                                     | 6                                          | 10                                          |
| Sarjana Muda Komunikasi Media Baharu / <i>Bachelor of New Media Communication</i>         | 6                                          | 10                                          |
| Sarjana Muda Teknologi Media Interaktif / <i>Bachelor of Interactive Media Technology</i> | 8                                          | 12                                          |
| Diploma Kejuruteraan / <i>Diploma in Engineering</i>                                      | 6                                          | 10                                          |



## PERTUKARAN PROGRAM PENGAJIAN

- Permohonan pertukaran program pengajian pelajar bermaksud permohonan seseorang pelajar untuk menukar program pengajian sama ada program pengajian yang ditawarkan dalam Fakulti yang sama atau pertukaran program sedia ada kepada program pengajian yang ditawarkan oleh Fakulti yang lain atas sebab-sebab tertentu yang diperakukan oleh Dekan Fakulti yang berkaitan.
- Pertukaran program pengajian adalah tidak digalakkan. Walau bagaimanapun, permohonan pertukaran program pengajian boleh dipertimbangkan dengan alasan-alasan yang kukuh dan tertakluk kepada garis panduan seperti berikut:
  1. Pertukaran program pengajian mestilah dipohon dalam tempoh dua (2) semester pertama pengajian di UniMAP. Permohonan pertukaran program pengajian boleh dilakukan seawal semester 1 pengajian. Sekiranya permohonan diluluskan, status pelajar dengan program baharu akan berkuatkuasa pada semester yang berikutnya. Pelajar perlu mengisi borang HEA(B)-06 Borang Permohonan Pertukaran Program Pengajian.
  2. Bagi pelajar yang mendapat penajaan dan pembiayaan, pelajar mestilah memaklumkan dan mendapatkan kelulusan daripada penaja masing-masing terlebih dahulu sebelum membuat permohonan.

## TRANSFER OF STUDY PROGRAMME

- *Student application for transfer of programme is an application by the student to transfer from their current study programme to either another programme offered by the same Faculty or to an existing programme offered by another Faculty for specific reasons as certified by the Dean of the related Faculty.*
- *A transfer between programmes is not recommended. However, the application for transfer will be considered if the student has strong reasons and adheres to the following guidelines:*
  1. *The programme transfer must be applied within the first two (2) semesters of study at UniMAP. The application can be done as early as the first semester of academic session. If the application is approved, the student's status with regards to the new programme will take place in the following semester. The student will have to complete the HEA(B)-06 Change Programme of Study Application Form.*
  2. *Students who are under sponsorship and funding must inform and get approval from their respective sponsors before applying.*

3. Borang permohonan mestilah disertakan dengan lampiran:

- a) Salinan keputusan peperiksaan peringkat SPM.
  - b) Salinan keputusan STPM/ Matrikulasi/ Diploma/setaraf;
  - c) Salinan keputusan MUET
  - d) Slip keputusan peperiksaan semester sebelumnya (dikecualikan bagi permohonan pada semester pertama).
  - e) Surat kebenaran daripada penaja (sekiranya berkaitan).
- Pertukaran program pengajian adalah tidak dibenarkan kepada pemohon yang statusnya telah kembali aktif setelah berjaya dalam permohonan rayuan kemasukan semula.
  - Permohonan pertukaran program hanya dibenarkan sekali sahaja sepanjang tempoh pengajian.
  - Kebenaran untuk pertukaran program pengajian adalah tertakluk kepada perakuan Dekan Fakulti asal dan persetujuan Dekan Fakulti yang dipohon, perakuan Pengarah Pusat Pengurusan Akademik serta kelulusan Naib Canselor atau Timbalan Naib Canselor (Akademik dan Antarabangsa).

3. *The following documents must be attached with the application form:*

- a) A copy of SPM level examination results.*
  - b) A copy of STPM / Matriculation / Diploma / equivalent results;*
  - c) A copy of MUET results*
  - d) The previous semester examination results slip (excluded for first semester applications).*
  - e) A letter of permission from the sponsor (if applicable).*
- The programme transfer is not allowed for students whose Active status has been restored upon a successful Re-admission appeal.*
  - The programme transfer is only allowed once during the student's entire study period.*
  - Permission for programme transfer is subject to the approval of the Dean of the original Faculty and consent of the Dean of the Faculty applied for, endorsement by the Director of the Academic Management Centre and approval of the Vice Chancellor or Deputy Vice Chancellor (Academic and International).*

## PENANGGUHAN PENGAJIAN

- Penangguhan pengajian adalah kebenaran kepada pelajar untuk tidak mengikuti pengajian pada sesuatu semester atas alasan-alasan tertentu yang dibenarkan Universiti.
- Permohonan penangguhan pengajian dibenarkan kepada pelajar yang mempunyai masalah kesihatan dan disahkan sakit oleh Hospital Kerajaan/Doktor Panel Universiti / Pusat Kesihatan UniMAP sahaja. Bagi kes-kes tertentu sijil sakit yang bukan daripada Hospital Kerajaan atau Doktor Panel Universiti perlu mendapat perakuan Pusat Kesihatan UniMAP. Permohonan yang diasaskan selain daripada masalah kesihatan boleh dipertimbangkan sekiranya mempunyai alasan yang munasabah dan mendapat kelulusan Naib Canselor/Timbalan Naib Canselor (Akademik & Antarabangsa).
- Pelajar yang memohon untuk menangguhkan pengajian perlu mengisi Borang HEA(B)-07 (Borang Permohonan Tangguh Pengajian) yang boleh didapati di Fakulti. Permohonan perlu mendapat perakuan dan kelulusan yang berikut:
  1. Pengesahan Rakan Pendamping Siswa (RPS)
  2. Perakuan Dekan Fakulti
  3. Perakuan Pengarah Pusat Pengurusan Akademik dan
  4. Kelulusan Naib Canselor atau Timbalan Naib Canselor (Akademik & Antarabangsa).

## POSTPONEMENT OF STUDY

- *Postponement of studies is an authorization for students to postpone their studies for a semester for specific reasons permitted by the University.*
- *Postponement of study is permitted for students who have health complications and illnesses which has been verified by government hospitals or the University panel of doctors or Pusat Kesihatan UniMAP. For certain cases, students who present medical certificates from hospitals other than those mentioned, must obtain endorsement from Pusat Kesihatan UniMAP. An application made due to reasons other than ill health may be considered if it is reasonable and approved by the Vice Chancellor / Deputy Vice Chancellor (Academic and International).*
- *Students can apply for postponement of study by filling in the HEA(B)-07 Deferment of Study Application Form which can be obtained from the Registrar or their Faculty. Application must be:*
  1. *Confirmation by the Rakan Pendamping Siswa (RPS),*
  2. *Verification by the Dean of Faculty,*
  3. *Verification by the Director of Academic Management, and*
  4. *Approved by the Vice Chancellor / Deputy Vice Chancellor (Academic and International)*



- Borang permohonan penangguhan pengajian pelajar perlu dikemukakan sebelum minggu ketujuh(7) pengajian. Pemohonan selepas minggu ketujuh(7) hanya dibenarkan atas sebab kesihatan atau kes-kes tertentu yang mendapat kelulusan Naib Canselor/Timbangan Naib Canselor (Akademik & Antarabangsa).
- Pelajar tidak dibenarkan menangguhkan pengajian melebihi 2 semester berturut-turut kecuali dengan kelulusan Naib Canselor/Timbangan Naib Canselor (Akademik & Antarabangsa). Bagi kes selain sebab kesihatan, pelajar hanya dibenarkan pulang/keluar daripada universiti setelah permohonan penangguhan pengajian mendapat kelulusan universiti. Sekiranya pelajar telah pulang sebelum kelulusan diperoleh, ia adalah di bawah tanggungjawab pelajar sendiri.
- Bagi pelajar yang menangguhkan pengajian atas sebab kesihatan/sakit atau untuk alasan-alasan yang dibenarkan, semester berkenaan tidak akan diambil kira dalam pengiraan semester yang digunakan untuk pengijazahan (Tanpa Penalti). Bagi kes Tanpa Penalti, kursus yang didaftarkan pada semester tersebut akan digugurkan, dan sekiranya terdapat keputusan peperiksaan yang telah disahkan pada peringkat Majlis Peperiksaan Universiti (MPU), keputusan peperiksaan tersebut juga akan terbatal.
- Pelajar akan diberikan peringatan secara bertulis oleh Fakulti sekiranya didapati tidak mendaftar pada sesuatu semester tanpa memberi sebarang permohonan penangguhan pengajian. Pelajar yang tidak memberi sebarang maklum balas dalam sesuatu tempoh mencapai dua (2) semester berturut-turut boleh ditamatkan pengajian dan disahkan berhenti daripada Universiti.
- *Application for a postponement of study should be submitted before the 7<sup>th</sup> week of the semester. Application made after that period will only be allowed for medical reasons and other reasons with the approval of the the Vice Chancellor / Deputy Vice Chancellor (Academic and International).*
- *Students are not allowed to postpone their studies for more than 2 semesters consecutively except with the approval of the Vice Chancellor / Deputy Vice Chancellor (Academic and International). In cases not related to health complications, students are only allowed to leave the university after the application for postponement is approved by the university. Students who leave the university before the approval is allowed to do so at their own risk.*
- *Students who postpone their studies due to health or other permissible reasons, the semester will not be taken into account in the calculation for graduation (without penalty). In the case of Without Penalty, courses registered for the semester will be dropped, and examination results confirmed by University Examination Council will also be cancelled.*
- *Students will be given a written reminder by the Faculty if they are found to be unregistered during a semester without any application for study postponement. Students who do not respond within a period of up to two (2) consecutive semesters will be terminated from their studies and confirmed as dropouts from the University.*



## PENAMATAN PENGAJIAN

- Fakulti perlu memberi peringatan secara bertulis kepada pelajar sekiranya pelajar didapati tidak mendaftar pada sesuatu semester tanpa membuat sebarang permohonan penangguhan pengajian.
- Pelajar yang tidak memberi sebarang maklum balas dalam sesuatu tempoh mencapai dua (2) semester berturut-turut boleh ditamatkan pengajian dan disahkan berhenti dari Universiti.
- Fakulti perlu melengkapkan borang HEA(B)-09 yang mengandungi:
  1. Butiran diri pelajar
  2. Butiran akademik pelajar (Sila sertakan rekod peribadi dan rekod akademik pelajar yang boleh didapati dalam sistem AMIS)
  3. Perakuan Dekan Fakulti
- Borang yang telah lengkap diisi bersama lampiran rekod peribadi dan akademik pelajar dan lampiran surat menyurat peringatan kepada pelajar perlu dikemukakan kepada Unit Kemasukan dan Rekod Pelajar, Bahagian Pengurusan Akademik.
- Borang penamatan pengajian perlu dikemukakan ke Pusat Pengurusan Akademik untuk perakuan.

## TERMINATION OF STUDY

- *The Faculty must provide a written warning to the student if the student is found to be unregistered for the semester without any application for study postponement.*
- *Students who do not respond within a period of up to two (2) consecutive semesters will be terminated from their studies and confirmed as dropouts from the University.*
- *Faculty must complete HEA(B)-09 form which contains:*
  1. *Student personal details*
  2. *Student academic details (Please include personal and academic records of students which are available in the AMIS system)*
  3. *Certification of Dean of the Faculty*
- *The completed form with the attachment of the student's personal and academic records and the attachment of other warning letters to the student must be submitted to the Student Admissions and Records Unit, Academic Management Division.*
- *The form will then be submitted to the Academic Management Centre for certification.*

- Pihak Pusat Pengurusan Akademik akan meneliti dan mengesahkan status akademik pelajar berdasarkan rekod yang dikemukakan oleh Fakulti dan mendapatkan maklumat akhir daripada Jabatan Bendahari berkaitan status yuran dan lain-lain hutang tertunggak sebelum dikemukakan untuk pertimbangan kelulusan daripada Timbalan Naib Canselor (Akademik dan Antarabangsa).
  - Setelah mendapat pertimbangan Naib Canselor / Timbalan Naib Canselor (Akademik & Antarabangsa), Unit Kemasukan dan Rekod Pelajar, Bahagian Pengurusan Akademik akan mengeluarkan surat rasmi kepada pelajar dan mengemaskini sistem AMIS mengikut tarikh kuatkuasa penamatan pengajian.
  - Sekiranya pelajar mempunyai baki hutang tertunggak, jumlah tersebut akan dinyatakan di dalam surat rasmi dan pelajar akan diberikan tempoh masa untuk menjelaskan hutang sebelum sebarang tindakan undang-undang diambil.
- *The Centre for Academic Management will examine and confirm the academic status of students based on the records submitted by the Faculty and obtain final information from the Treasury Department regarding the status of fees and other outstanding debts before the submission for consideration by the Deputy Vice Chancellor (Academic and International).*
  - *Upon consideration of the Vice Chancellor / Deputy Vice-Chancellor (Academic and International), Student Admissions and Records Unit, Academic Management Division will issue an official letter to students and update the AMIS system in accordance with the effective date of termination of the study.*
  - *If a student has a balance of outstanding debts, the amount will be stated in the formal letter and the student will be given a period of time to pay off the debt before any legal action is taken.*

## PEMINDAHAN KREDIT

- Pemindahan kredit ditakrifkan sebagai pengiktirafan sejumlah kredit yang telah diperolehi oleh seseorang pelajar dalam sesuatu program terdahulu ke program yang sedang diikuti di UniMAP. Terdapat 2 kategori pemindahan kredit iaitu:

### 1. Pemindahan Kredit Vertikal atau Pengecualian Kredit

Pemindahan kredit daripada peringkat rendah ke peringkat yang lebih tinggi seperti Sijil ke Diploma ATAU Diploma ke Sarjana Muda. Pemindahan Kredit yang dibenarkan adalah Pemindahan Kredit Tanpa Gred (Pengecualian Kredit).

### 2. Pemindahan Kredit Horizontal

Pemindahan kredit daripada program pada tahap kelayakan yang sama seperti daripada Diploma ke Diploma ATAU Sarjana Muda ke Sarjana Muda. Pemindahan Kredit yang dibenarkan adalah Pemindahan Kredit Dengan Gred atau Pemindahan Kredit Tanpa Gred (Pengecualian Kredit) berdasarkan situasi.

- Syarat umum pemindahan pemindahan kredit adalah:
  - i. Gred lulus – Gred lulus minimum bagi kursus yang layak dipertimbangkan untuk pemindahan kredit ialah Gred C atau nilai gred 2.00.
  - ii. Nilai kredit – nilai kredit bagi kursus yang layak dipertimbangkan untuk pemindahan kredit mestilah sama atau lebih tinggi daripada nilai kredit kursus yang dipohon.
  - iii. Kesetaraan kandungan kursus-kursus yang terlibat dengan pemindahan kredit mestilah tidak kurang daripada 80%.

## CREDIT TRANSFER

- *Credit transfer is defined as the accreditation of the credits accumulated by a student from his/her previous programme to the current programme pursued at UniMAP.*

### 1. Vertical Credit Transfer or Credit Exemption

*Credit transfer from a lower to a higher level of qualification such as from Certificate to Diploma OR from Diploma to Bachelor's Degree. The credit transfer permitted is the Credit Transfer Without Grade (Credit Exemption).*

### 2. Horizontal Credit Transfer

*Credit transfer from one programme to another programme at the same academic level, i.e., from Diploma to Diploma OR Bachelor's Degree to Bachelor's Degree. The credit transfer permitted is either the Credit Transfer with Grades or Credit Transfer without Grades (Credit Exemption) based on the situation.*

- *The general requirements for credit transfer are as follow:*
  - i. *Passing Grade – Minimum passing grade of either a C grade or a 2.00 grade points for courses that are eligible for credit transfer.*
  - ii. *Credit value – credit value point of the equivalent course must be equal or higher than the credit value point of the course being applied.*
  - iii. *The content of the courses involved with credit transfer must be equal to or more than 80% with the course being applied.*



## SEMESTER TAMBAHAN

- Semester Tambahan ditawarkan kepada pelajar-pelajar yang mahu mengulang kursus-kursus yang gagal pada semester biasa, tertakluk kepada syarat dan kelulusan oleh Senat Universiti. Tempoh Semester Tambahan merangkumi empat(4) minggu pembelajaran dan satu(1) minggu peperiksaan. Cuti pertengahan semester dan ulangkaji tidak diperuntukkan untuk semester ini.
  - Pelajar wajib mendaftarkan kursus dan pendaftaran hendaklah tidak melebihi 9 kredit per semester dan terhad kepada 16 kredit berdaftar untuk keseluruhan tahun pengajian. Pembelajaran dan pengajaran adalah dalam bentuk tutorial selama 4 minggu dan kehadiran pelajar dalam tutorial yang dikendalikan juga diwajibkan dan kedatangan adalah direkodkan.
  - Syarat-syarat kelayakan mengikuti Semester Tambahan adalah:
1. Kursus yang ditawarkan dalam Semester Tambahan layak dimohon oleh pelajar yang mendapat:
    - a. Pelajar yang mendapat gred D dan ke bawah untuk Kursus Teras  
ATAU
    - b. Pelajar yang mendapat gred C- dan ke bawah untuk Kursus Wajib Universiti;  
DAN
    - c. Lulus penilaian berterusan dengan markah 40% bagi kursus-kursus yang berkaitan.

## ADDITIONAL SEMESTER

- *The Additional Semester are offered to students who wish to repeat failed courses in the regular semester, subject to conditions and approval by the University Senate. Additional semester period includes four (4) weeks of study and one (1) week of exams. Mid-semester break and revision week are not provided for this semester.*
- *Students must register for courses and enrollment must not exceed 9 credits per semester and be limited to 16 credits registered for the entire academic year. Learning and teaching are in the form of a 4-week tutorial and student attendance in the tutorial is also required and attendance is recorded.*
- *The eligibility requirements for the Additional Semester are:*
  1. *Courses offered in the Additional Semester are eligible for students who have:*
    - a. *Student who obtained a grade D and below for Core Courses;  
OR*
    - b. *Student who obtained grade C- and below for University Requirement Courses;  
AND*
    - c. *Obtain a passing mark for continuous assessment with a score of 40% for relevant courses.*



2. Kebenaran untuk mengambil Semester Tambahan bagi tujuan membaiki gred (D+ atau C- bagi Kursus Teras) hanya akan diberikan kepada pelajar tahun akhir sahaja.
3. Pelajar yang mendapat gred F\* dan X tidak layak untuk mendaftar Semester Tambahan.
4. Semester Tambahan hanya boleh diduduki oleh pelajar yang telah mendaftar dan membayar yuran sahaja. Tiada rayuan pengecualian bayaran dibenarkan untuk membolehkan pelajar membuat pendaftaran.
5. Pelajar yang terlibat dengan latihan industri semasa semester tambahan berlangsung tidak dibenarkan untuk mengikuti semester tambahan.

2. *Permission to take Additional Semester for the purpose of grade improvement (D+ or C- for Core Courses) will only be given to final year students.*
3. *Students who have F \* and X grades are not eligible to enroll in additional semesters.*
4. *Additional Semester can only be taken by students who have registered and paid the fees. Students are not able to apply for exemption in payment when registering.*
5. *Student engaged in industrial training during the Additional Semester are not allowed to attend the Additional Semester*

## SISTEM PEPERIKSAAN DAN PENILAIAN

- Keputusan sesuatu kursus biasanya ditentukan berdasarkan komponen penilaian secara berterusan dan peperiksaan. Walau bagaimanapun, penilaian sesuatu kursus adalah tertakluk kepada keperluan kursus tersebut yang telah diluluskan oleh Senat.
- Peperiksaan akhir diadakan pada hujung semester. Setiap pelajar mestilah terlebih dahulu memenuhi syarat kehadiran ke kuliah, tutorial, amali dan sebagainya sebelum layak menduduki peperiksaan. Pelajar yang gagal memenuhi syarat kehadiran 80% boleh dihalang daripada menduduki peperiksaan akhir.
- Prestasi pelajar dalam sesuatu kursus dinilai oleh gred yang diperoleh. Hubungan antara gred dan mata nilai adalah seperti dalam Jadual 6 :

| Gred / Grade | Nilai Gred / Point Value |
|--------------|--------------------------|
| A            | 4.00                     |
| A-           | 3.75                     |
| B+           | 3.50                     |
| B            | 3.00                     |
| B-           | 2.75                     |
| C+           | 2.50                     |
| C            | 2.00                     |
| C-           | 1.75                     |
| D+           | 1.50                     |
| D            | 1.00                     |
| D-           | 0.75                     |
| F            | 0.00                     |

## EXAMINATION AND EVALUATION SYSTEM

- Student results in a course are usually determined based on the components of continuous assessment and examination. However, the assessment of a course is subject to the requirements of the course which have been approved by the Senate.*
- The final exam is conducted at the end of the semester. Every student must first meet the attendance requirements for lectures, tutorials, practical and so on before being eligible to sit for the exam. Students who fail to meet the 80% attendance requirement may be barred from sitting the final exam.*
- Student performance in a course is presented by the grades obtained. The relationship between grade and point value is as shown in Table 6 :*

**Jadual 6 : Hubungan Antara Gred dan Mata Nilai**  
**Table 6 : Relationship Between Grade and Point Value**

- Gred LULUS untuk sesuatu kursus adalah seperti berikut:-

- Gred LULUS bagi sesuatu kursus Wajib Universiti adalah Gred C dan ke atas (Gred A hingga C)
- Gred LULUS bagi sesuatu kursus Teras adalah Gred D+ dan ke atas (Gred A hingga D+).

- Passing grades for a course are as follows;*

- The grade for PASS for a University Requirement course is Grade C and above (Grade A to C)*
- The grade for PASS for a Core course is Grade D+ and above (Grade A to D+)*

**Jadual 7 : Pengiraan PNG dan PNGK**  
**Table 7 : Calculation of GPA and CGPA**

| KURSUS/<br>COURSE             | KREDIT/<br>CREDIT                                                                                                                                                                     | NILAI GRED/ GRADE<br>VALUE [NG] | GRED/ GRADE<br>[G] | JUMLAH/ TOTAL<br>NG |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------|---------------------|
| QDQ10103                      | 3                                                                                                                                                                                     | 3.75                            | A-                 | 11.25               |
| EDJ16002                      | 2                                                                                                                                                                                     | 2.50                            | C+                 | 5.00                |
| EDJ17303                      | 3                                                                                                                                                                                     | 3.50                            | B+                 | 10.50               |
| SDU12302                      | 2                                                                                                                                                                                     | 4.00                            | A                  | 8.00                |
| SDB10102                      | 2                                                                                                                                                                                     | 1.75                            | C-                 | 3.50                |
| EDJ17703                      | 3                                                                                                                                                                                     | 2.75                            | B-                 | 8.25                |
| EDJ28003                      | 3                                                                                                                                                                                     | 3.00                            | B                  | 9.00                |
|                               | 18                                                                                                                                                                                    |                                 |                    | 55.50               |
| PNG [GPA] = $55.50/18 = 3.08$ |                                                                                                                                                                                       |                                 |                    |                     |
| QDQ20303                      | 3                                                                                                                                                                                     | 3.50                            | B+                 | 10.50               |
| EDJ29403                      | 3                                                                                                                                                                                     | 2.00                            | C                  | 6.00                |
| EDJ28503                      | 3                                                                                                                                                                                     | 4.00                            | A                  | 12.00               |
| SDB30102                      | 2                                                                                                                                                                                     | 3.50                            | B+                 | 7.00                |
| SDU12902                      | 2                                                                                                                                                                                     | 3.75                            | A-                 | 7.50                |
| EDJ29703                      | 3                                                                                                                                                                                     | 2.50                            | C+                 | 7.50                |
|                               | 16                                                                                                                                                                                    |                                 |                    | 50.50               |
| PNG [GPA] = $50.50/16 = 3.16$ |                                                                                                                                                                                       |                                 |                    |                     |
| PNGK [CGPA]                   | $= \frac{\text{Jumlah NG Terakumulat [Total Accumulated Grade Value]}}{\text{Jumlah Bil. Kredit Terakumulat [Total Accumulated Credits]}}$ $= \frac{55.50 + 50.50}{18 + 16}$ $= 3.12$ |                                 |                    |                     |

## RAYUAN SEMAKAN SEMULA KEPUTUSAN PEPERIKSAAN

- Atas sebab-sebab tertentu, pelajar mungkin ingin memohon untuk penyemakan dijalankan ke atas keputusan peperiksaan akhir semester pelajar. Pelajar hanya dibenarkan memohon menyemak semula keputusan peperiksaan akhir semester dalam tempoh 10 hari selepas keputusan rasmi peperiksaan dikeluarkan oleh Pusat Pengurusan Akademik. Permohonan selepas tempoh ini tidak akan dipertimbangkan.
- Pelajar perlu menghantar Borang HEA(C)-02(a) (Borang Rayuan Semakan Semula Keputusan Peperiksaan) kepada Unit Peperiksaan & Pengijazahan (UPP), Bahagian Pengurusan Akademik, Pusat Pengurusan Akademik. Borang rayuan hendaklah dikemukakan dalam tempoh 10 hari bermula dari hari keputusan rasmi diumumkan. Pelajar perlu mengisi borang dalam dua (2) salinan. Satu (1) salinan adalah untuk simpanan pelajar. Kadar bayaran rayuan ialah RM50 untuk setiap kursus.

## PENGUNAAN BAHASA INGGERIS

- Bahasa Melayu adalah bahasa rasmi universiti. Walau bagaimanapun Bahasa Inggeris digunakan secara meluas dalam proses pembelajaran dan pengajaran. Ini adalah untuk membantu pelajar dalam kerjaya mereka. Bagi kursus-kursus yang diajar dalam bahasa Inggeris, peperiksaan akan dijalankan dalam bahasa yang sama.

## APPEAL FOR EXAMINATION RESULTS REVISION

- *In certain cases, a student might wish to apply for a revision of their examination results. Students are only allowed to appeal for a revision within the duration of 10 days after the examination results are officially released by the Academic Management Centre (AMC). Application after this duration will not be considered.*
- *Students must submit the HEA(C)-02(a) form (Appeal for Review of Examination Results) to the Examination & Graduation Unit, Academic Management Division, and Academic Management Centre (AMC). The appeal form must be submitted within the period of 10 days after the official result is announced. Students will have to fill in their details in two (2) copies, one of which is the student copy. Students will be charged RM50 per course for each course appealed.*

## ENGLISH LANGUAGE USE

- *Malay is the official language of the university. However English is used widely in the teaching and learning process at UniMAP. This is to help students in their future career. For courses that are taught in English, the examination will be conducted in the same language.*



## SISTEM RAKAN PENDAMPING SISWA (RPS)

- Sistem Penasihat Akademik menjadi penghubung antara pelajar dengan pensyarah untuk berbincang dan membuat keputusan berkenaan rancangan pengajian pelajar. Walaupun pelajar mendaftar sendiri secara dalam talian (*on-line*), pelajar perlu berjumpa dengan Rakan Pendamping Siswa (RPS) untuk mendapatkan nasihat semasa tempoh pendaftaran.
- RPS adalah satu sistem di mana staf akademik menyelia sekumpulan kecil pelajar sepanjang tempoh pengajian pelajar di UniMAP. 'Penyeliaan' di sini melibatkan perjumpaan yang kerap secara tidak formal, di mana pelajar boleh bersantai dengan staf yang berperanan sebagai "rakan" bagi membincangkan isu-isu akademik dan sosial yang berkenaan dengan mereka. Pelajar yang mempunyai prestasi akademik yang tidak memuaskan boleh merujuk kepada RPS sebagai 'mentor', dan pelajar tersebut menjadi 'mentee', di mana ini akan benar-benar membantu pelajar dalam setiap perkara yang memerlukan penyelesaian.

Maklumat lanjut berkaitan peraturan-peraturan boleh dirujuk kepada Peraturan Akademik (Sarjana Muda & Diploma) yang terkini

## BUDDY SYSTEM (RAKAN PENDAMPING SISWA)

- *Buddy System (Rakan Pendamping Siswa) or RPS is a system which connects students and lecturers to allow them to discuss and decide on students' study plan. Even though course registration is done via online by students, they are advised to meet their RPS during the registration exercise for advisory purposes.*
- *In the system, an academic staff supervises a small group of students for the whole duration of the students' study period at UniMAP. 'Supervision' here entails frequent meetings under informal settings, where students are able to discuss about academic and social issues with their lecturers who act as a 'buddy' to them. Students who have unsatisfactory academic performance may refer to their RPS as a mentor, and the student is a 'mentee'.*

*More information related to the regulations can be referred to the latest Academic Regulations (Bachelor Degree & Diploma).*

## UniMAP Academic Guide



## Online Student Information



## DIREKTORI / DIRECTORY

Pejabat Timb. Naib Canselor (Akademik & Antarabangsa) /  
*Deputy Vice Chancellor (Academic & International) Office*

04-941 4159

Pusat Pengurusan Akademik (AMC) /  
*Academic Management Centre*

04-941 4158

Bahagian Pemantapan Akademik (AED) /  
*Academic Enhancement Division*

04-941 4157

Bahagian Pendidikan Fleksibel  
*Flexible Education Division*

04-9414321

Bahagian Pengurusan Dasar TVET  
*Management Policy TVET Division*

04-9414322

Bahagian Pengurusan Akademik (AMD) / *Academic Management Division*

- Unit Kemasukan dan Rekod Pelajar / *Student Admissions & Records Unit*
- Unit Peperiksaan dan Pengijazahan / *Examination & Convocation Unit*
- Unit SENAT / *Senat Unit*

04-941 4056/4065

04-941 4057/4058

04-941 4060

Jabatan Bendahari / *Bursary Department*

04-941 4020/4021/4022

Jabatan Pendaftar / *Registrar Department*

04-941 4081

Pusat Pembangunan and Perkhidmatan Pelajar (P3P) /  
*Centre for Student Development and Services*

04-941 4434

Perpustakaan Tuanku Syed Faizuddin Putra (PTSFP) /  
*Tuanku Syed Faizuddin Putra Library*

04-988 5422/5410

# FACULTY OF ELECTRICAL ENGINEERING & TECHNOLOGY (FKTE)

## Programmes Offered:

1. Bachelor of Electrical Engineering with Honours
2. Bachelor of Mechatronic Engineering with Honours
3. Bachelor of Electrical Engineering Technology (Industrial Power) with Honours
4. Bachelor of Electrical Engineering Technology (Robotic And Automation Technology) with Honours
5. Bachelor of Technology in Electrical Maintenance System with Honours
6. Diploma in Electrical Engineering
7. Diploma in Mechatronic Engineering

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Universiti Malaysia Perlis  
Kampus Alam UniMAP Pauh Putra  
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**UR6522001**  
**Bachelor of Electrical Engineering with Honours**

## **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

### **PEO 1**

Graduates who have demonstrated career advancement in the field of Electrical Engineering or related engineering field.

### **PEO 2**

Graduates who are involved in a professional body or society.

### **PEO 3**

Graduates who pursue life-long learning

## PROGRAMME OUTCOMES (PO)

### P01

Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization respectively to the solution of complex engineering problems.

### P02

Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

### P03

Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental consideration

### P04

Conduct investigation of complex engineering problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### P05

Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations.

### P06

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problem.

### P07

Understand and evaluate the sustainability and impact of professional engineering work in the solutions of complex engineering problems in societal and environmental contexts including ability to have entrepreneurship skills.

### P08

Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

### P09

Function effectively as an individual, and as a member or leader in diverse teams and multi-disciplinary settings.

### P010

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

Demonstrate knowledge and understand of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.

### P012

Recognise the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



**CURRICULUM STRUCTURE**  
**UR6522001 BACHELOR OF ELECTRICAL ENGINEERING WITH HONOURS INTAKE 2024/2025**

| YEAR                                                           | FIRST                                                |                                                              | SECOND                                       |                                                          | THIRD                                |                                              |                                 | FOURTH                                           |                                      |
|----------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------|----------------------------------------------------------|--------------------------------------|----------------------------------------------|---------------------------------|--------------------------------------------------|--------------------------------------|
| SEMESTER                                                       | 1                                                    | 2                                                            | 3                                            | 4                                                        | 5                                    | 6                                            | BREAK                           | 7                                                | 8                                    |
| <b>DISCIPLINE CORE &amp; ELECTIVE COURSES</b><br>(102 CREDITS) | EMJ12002<br>Engineering Science                      | EMJ13003<br>Electronic Devices                               | EMJ22003<br>Instrumentation and Measurements | EMJ23204<br>Microcontroller Systems Design               | EMJ32004<br>Power System Engineering | EMJ33003<br>Communication System Engineering | EMJ30105<br>Industrial Training | EMJ40002<br>Final Year Project I                 | ***EMJ40004<br>Final Year Project II |
|                                                                | EMJ12103<br>Electric Circuit I                       | EMJ10003<br>Computer Programming                             | EMJ22204<br>Analog Electronics               | EMJ23003<br>Electrical Power Technology                  | EMJ32103<br>Electromagnetic Theory   | ***EMJ33103<br>Power System Analysis         |                                 | ***EMJ42202<br>Electrical Installation Design II | EMJ43003<br>Electrical Drives        |
|                                                                | EMJ12202<br>Introduction to Electrical Engineering   | ***EMJ13103<br>Electric Circuit II                           | EMJ22304<br>Digital Electronics              | EMJ23103<br>Control Systems Engineering                  | EMJ32204<br>Electrical Machine       | EMJ33303<br>Electrical Energy Utilization    |                                 | EMJ42003<br>High Voltage Engineering             | EMJ44X03<br>Elective III             |
|                                                                |                                                      | EMJ13203<br>Electrical Engineering Practices                 | EMJ22403<br>Signals and Systems              |                                                          | EMJ32304<br>Power Electronics I      | EMJ33404<br>Electrical Installation Design I |                                 | EMJ44X03<br>Elective I                           | EMJ44X03<br>Elective IV              |
|                                                                |                                                      |                                                              |                                              |                                                          |                                      |                                              |                                 | EMJ44X03<br>Elective II                          |                                      |
| <b>COMMON CORE COURSES</b><br>(17 CREDITS)                     | QMQ10103<br>Engineering Mathematics I                | QMQ10203<br>Engineering Mathematics II                       | QMQ20303<br>Engineering Mathematics III      | QMQ27103<br>Engineering Statistics                       |                                      |                                              |                                 | EMJ41003<br>Management for Engineers             | EMJ41102<br>Professional Engineers   |
| <b>UNIVERSITY REQUIREMENT COURSES</b><br>(16 CREDITS)          | SMB41002<br>University Malay Language <sup>[3]</sup> | SMB20102<br>English for General Communication <sup>[2]</sup> |                                              | SMB31202<br>English for Technical Communication          | SMB1XX02<br>Option                   |                                              |                                 |                                                  |                                      |
|                                                                | SMU13002<br>Philosophy and Current Issues            |                                                              |                                              | SMU12102<br>Integrity and Anti-Corruption <sup>[4]</sup> |                                      | SMU22402<br>Engineering Entrepreneurship     |                                 |                                                  |                                      |
|                                                                | SMU13102<br>Appreciation of Ethics and Civilization  |                                                              |                                              |                                                          |                                      |                                              |                                 |                                                  |                                      |
|                                                                | SMZXXX01<br>Co-Curriculum 1                          | SMZXXX01<br>Co-Curriculum 2                                  |                                              |                                                          |                                      |                                              |                                 |                                                  |                                      |
| <b>TOTAL CREDITS</b><br>(135 CREDITS)                          | <b>17</b>                                            | <b>18</b>                                                    | <b>17</b>                                    | <b>17</b>                                                | <b>15</b>                            | <b>15</b>                                    | <b>5</b>                        | <b>16</b>                                        | <b>15</b>                            |
| <b>AUDIT COURSES</b>                                           | SMB10102<br>Preparatory English <sup>[1]</sup>       |                                                              |                                              |                                                          |                                      |                                              |                                 |                                                  |                                      |

| Field            | Course Code | Elective Courses                 | Sem | Field                        | Course Code | Elective Courses              | Sem | Courses  | Prerequisite |
|------------------|-------------|----------------------------------|-----|------------------------------|-------------|-------------------------------|-----|----------|--------------|
| Electrical Power | EMJ44103    | Power System Operation & Control | 7   | Renewable Energy and Control | EMJ44303    | Power Electronics II          | 7   | EMJ13103 | EMJ12103     |
|                  | EMJ44203    | Electrical Machine Design        |     |                              | EMJ44403    | Electrical Energy System      |     | EMJ42202 | EMJ33404     |
|                  | EMJ44603    | Substation Design                | 8   |                              | EMJ44503    | Industrial Electronic Control | 8   | EMJ40004 | EMJ40002     |
|                  | EMJ44803    | Power System Protection          |     |                              | EMJ44703    | Renewable Energy System       |     | EMJ33103 | EMJ32004     |

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

Courses with prerequisite



**UR6523003**  
**Bachelor of Mechatronic Engineering with Honours**

## PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

### PEO 1

Graduates who have demonstrated career advancement in the field of Mechatronic Engineering or related engineering field

### PEO 2

Graduates who are involved in a professional body or society.

### PEO 3

Graduates who pursue lifelong learning.

## PROGRAMME OUTCOMES (PO)

### PO 1

Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

### PO 2

Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

### PO 3

Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

### PO 4

Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### PO 5

Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations

### PO 6

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems.

### PO 7

Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts including ability to have entrepreneurship skills.

### PO 8

Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

### PO 9

Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

### PO 10

Communicate effectively on complex engineering activities with the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

### PO 11

Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work as a member and leader in a team, to manage projects and in multi-disciplinary environments.

### PO 12

Recognise the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

| CURRICULUM STRUCTURE<br>UR6523003 BACHELOR OF MECHATRONIC ENGINEERING WITH HONOURS INTAKE 2024/2025 |                                                      |                                                           |                                                   |                                                                 |                                                              |                                                         |                                 |                                                                       |                                             |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------|---------------------------------------------|
| YEAR                                                                                                | FIRST                                                |                                                           | SECOND                                            |                                                                 | THIRD                                                        |                                                         |                                 | FOURTH                                                                |                                             |
| SEMESTER                                                                                            | 1                                                    | 2                                                         | 3                                                 | 4                                                               | 5                                                            | 6                                                       | BREAK                           | 7                                                                     | 8                                           |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES</b><br>(103 CREDITS)                              | EMJ10003<br>Computer<br>Programming                  | EMJ17103<br>Analogue<br>Electronics                       | EMJ26103<br>Signals & Linear<br>Systems           | EMJ27103<br>Electromagnetic<br>Field Theory                     | EMJ36103<br>Control<br>Engineering I                         | EMJ37103<br>Control<br>Engineering II                   | EMJ30105<br>Industrial Training | EMJ40002<br>Final Year<br>Project I                                   | EMJ40004<br>Final Year<br>Project II        |
|                                                                                                     | EMJ16103<br>Electric Circuit<br>Theory               | EMJ17303<br>Computer<br>Aided Drawing                     | EMJ26203<br>Digital Logic<br>Circuit              | EMJ27204<br>Embedded System<br>and Interfacing                  | EMJ36203<br>Machine<br>Vision                                | EMJ37203<br>Mechatronic<br>Systems Design I             |                                 | EMJ47204<br>Mechatronic<br>Systems Design II                          | EMJ47002<br>Production<br>& Quality Control |
|                                                                                                     | EMJ16203<br>Engineering<br>Statics                   | EMJ17402<br>Principle of<br>Engineering<br>Thermofluids   | EMJ26403<br>Engineering<br>Dynamics               | EMJ26303<br>Instrumentation &<br>Measurements                   | EMJ36303<br>Fluid Power Systems                              | EMJ37303<br>Robotic<br>Systems                          |                                 | EMJ47303<br>Artificial Intelligence<br>for Mechatronic<br>Engineering |                                             |
|                                                                                                     | EMJ16302<br>Principle of<br>Engineering<br>Materials | EMJ16403<br>Mechatronic<br>Engineering<br>Practices       | EMJ26503<br>Data<br>Communication &<br>Networking | EMJ26703<br>Design of<br>Machinery                              | EMJ36404<br>Electrical Machines<br>& Power Systems           | EMJ37603<br>Automation<br>System                        |                                 | EMJ47402<br>Automation System<br>Application                          |                                             |
|                                                                                                     |                                                      |                                                           | EMJ27303<br>Power<br>Electronics                  |                                                                 |                                                              |                                                         |                                 | EMJ4XX03<br>Elective I                                                | EMJ4XX03<br>Elective II                     |
| <b>COMMON<br/>CORE COURSES</b><br>(17 CREDITS)                                                      | QMQ10103<br>Engineering<br>Mathematics I             | QMQ10203<br>Engineering<br>Mathematics II                 | QMQ20303<br>Engineering<br>Mathematics III        | QMQ27103<br>Engineering<br>Statistics                           |                                                              |                                                         |                                 | EMJ41102<br>Professional<br>Engineers                                 | EMJ41003<br>Management<br>for Engineers     |
| <b>UNIVERSITY<br/>REQUIREMENT COURSES</b><br>(16 CREDITS)                                           | SMZXXX01<br>Co-Curriculum 1                          | SMZXXX01<br>Co-Curriculum 2                               |                                                   | SMB20102<br>English for General<br>Communication <sup>[2]</sup> | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup> | SMU22402<br>Engineering<br>Entrepreneurship             |                                 |                                                                       |                                             |
|                                                                                                     | SMU13002<br>Philosophy and<br>Current Issues         | SMU13102<br>Appreciation of<br>Ethics and<br>Civilization |                                                   |                                                                 | SMB31202<br>English for Technical<br>Communication           | SMB41002<br>University Malay<br>Language <sup>[3]</sup> |                                 |                                                                       |                                             |
| <b>TOTAL CREDITS</b><br>(136 CREDITS)                                                               | <b>17</b>                                            | <b>17</b>                                                 | <b>18</b>                                         | <b>18</b>                                                       | <b>17</b>                                                    | <b>16</b>                                               | <b>5</b>                        | <b>16</b>                                                             | <b>12</b>                                   |
| <b>AUDIT COURSES</b>                                                                                | SMB10102<br>Preparatory<br>English <sup>[1]</sup>    |                                                           |                                                   |                                                                 |                                                              |                                                         |                                 |                                                                       |                                             |

Elective I : EMJ47603 Autonomous Mobile Robots, EMJ47703 IoT & Data Analytics, EMJ47803 Advanced Control Design.

Elective II : EMJ48603 Advanced PLC Systems, EMJ48703 Smart System Design, EMJ48803 System Identification Modelling.

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.



**LIST OF COURSES**

| COURSE CODE | COURSE NAME                                                                      |
|-------------|----------------------------------------------------------------------------------|
| EMJ10003    | Computer Programming [Pengaturcaraan Komputer]                                   |
| EMJ12002    | Engineering Science [Sains Kejuruteraan]                                         |
| EMJ12103    | Electric Circuit I [Litar Elektrik I]                                            |
| EMJ12202    | Introduction To Electrical Engineering [Pengenalan Kepada Kejuruteraan Elektrik] |
| EMJ13003    | Electronics Devices [Peranti Elektronik]                                         |
| EMJ13103    | Electric Circuit II [Litar Elektrik II]                                          |
| EMJ13203    | Electrical Engineering Practices [Amalan-amalan Kejuruteraan Elektrik]           |
| EMJ16103    | Electric Circuit Theory [Teori Litar Elektrik]                                   |
| EMJ16203    | Engineering Statics [Statik Kejuruteraan]                                        |
| EMJ16302    | Principle Of Engineering Materials [Prinsip-Prinsip Bahan Kejuruteraan]          |
| EMJ16403    | Mechatronic Engineering Practices [Amalan-Amalan Kejuruteraan Mekatronik]        |
| EMJ17103    | Analog Electronics [Elektronik Analog]                                           |
| EMJ17104    | Analog Electronics [Elektronik Analog]                                           |
| EMJ17203    | Engineering Dynamics [Dinamik Kejuruteraan]                                      |
| EMJ17303    | Computer Aided Drawing [Lukisan Terbantu Komputer]                               |
| EMJ17402    | Principle of Engineering Thermofluids [Prinsip-Prinsip Kejuruteraan Termofluid]  |
| EMJ20002    | Industrial Attachment [Sangkutan Industri] (Optional Course)                     |
| EMJ22003    | Instrumentation and Measurements [Instrumentasi dan Pengukuran]                  |
| EMJ22204    | Analog Electronics [Elektronik Analog]                                           |

| COURSE CODE | COURSE NAME                                                                        |
|-------------|------------------------------------------------------------------------------------|
| EMJ22304    | Digital Electronics [Elektronik Digit]                                             |
| EMJ22403    | Signals and Systems [Isyarat dan Sistem]                                           |
| EMJ23204    | Microcontroller Systems Design [Rekabentuk Sistem Mikropengawal]                   |
| EMJ23003    | Electrical Power Technology [Teknologi Kuasa Elektrik]                             |
| EMJ23103    | Control Systems Engineering [Kejuruteraan Sistem Kawalan]                          |
| EMJ26103    | Signals & Linear Systems [Isyarat & Sistem Lelurus]                                |
| EMJ26203    | Digital Logic Circuit [Litar Logik Digit]                                          |
| EMJ26303    | Instrumentation And Measurements [Instrumentasi Dan Pengukuran]                    |
| EMJ26403    | Engineering Dynamics [Dinamik Kejuruteraan]                                        |
| EMJ26402    | Principle Of Engineering Thermofluids [Prinsip-Prinsip Kejuruteraan Termobendalir] |
| EMJ26503    | Data Communication & Networking [Komunikasi Data & Rangkaian]                      |
| EMJ26703    | Design Of Machinery [Rekabentuk Jentera]                                           |
| EMJ27103    | Electromagnetic Field Theory [Teori Medan Elektromagnetik]                         |
| EMJ27204    | Embedded System And Interfacing [Sistem Terbenam Dan Pengantaramuka]               |
| EMJ27303    | Power Electronics [Elektronik Kuasa]                                               |
| EMJ27403    | Network And Communication System [Sistem Komunikasi Dan Rangkaian]                 |
| EMJ30105    | Industrial Training [Latihan Industri]                                             |
| EMJ32004    | Power System Engineering [Kejuruteraan Sistem Kuasa]                               |
| EMJ32103    | Electromagnetic Theory [Teori Elektromagnetik]                                     |

| COURSE CODE | COURSE NAME                                                                                           |
|-------------|-------------------------------------------------------------------------------------------------------|
| EMJ32204    | Electrical Machine [Mesin Elektrik]                                                                   |
| EMJ32304    | Power Electronics I [Elektronik Kuasa I]                                                              |
| EMJ33003    | Communication System Engineering [Kejuruteraan Sistem Perhubungan]                                    |
| EMJ33103    | Power System Analysis [Analisa Sistem Kuasa]                                                          |
| EMJ33303    | Electrical Energy Utilization [Penggunaan Tenaga Elektrik]                                            |
| EMJ33404    | Electrical Installation Design [Reka Bentuk Pemasangan Elektrik]                                      |
| EMJ36103    | Control Engineering I [Kejuruteraan Kawalan I]                                                        |
| EMJ36203    | Machine Vision [Penglihatan Mesin]                                                                    |
| EMJ36303    | Fluid Power Systems [Sistem Kuasa Bendalir]                                                           |
| EMJ36404    | Electrical Machines & Power Systems [Jentera Elektrik & Sistem Kuasa]                                 |
| EMJ37103    | Control Engineering II [Kejuruteraan Kawalan II]                                                      |
| EMJ37203    | Mechatronic Systems Design I [Rekabentuk Sistem Mekatronik I]                                         |
| EMJ37303    | Robotic Systems [Sistem Robotik]                                                                      |
| EMJ37403    | Artificial Intelligence For Mechatronic Engineering [Kecerdikan Buatan Untuk Kejuruteraan Mekatronik] |
| EMJ37603    | Automation System [Sistem Automasi]                                                                   |
| EMJ40002    | Final Year Project I [Projek Tahun Akhir I]                                                           |
| EMJ40004    | Final Year Project II [Projek Tahun Akhir II]                                                         |
| EMJ41003    | Management for Engineers [Pengurusan Untuk Jurutera]                                                  |
| EMJ41102    | Professional Engineers [Jurutera Professional]                                                        |

| COURSE CODE | COURSE NAME                                                                                           |
|-------------|-------------------------------------------------------------------------------------------------------|
| EMJ42003    | High Voltage Engineering [Kejuruteraan Voltan Tinggi]                                                 |
| EMJ42202    | Electrical Installation Design II [Reka Bentuk Pemasangan Elektrik II]                                |
| EMJ43003    | Electrical Drives [Pemacu Elektrik]                                                                   |
| EMJ44103    | Power System Operation and Control [Operasi Sistem Kuasa dan Kawalan]                                 |
| EMJ44203    | Electrical Machine Design [Rekabentuk Mesin Elektrik]                                                 |
| EMJ44303    | Power Electronics II [Elektronik Kuasa II]                                                            |
| EMJ44403    | Electrical Energy System [Sistem Tenaga Elektrik]                                                     |
| EMJ44503    | Industrial Electronic Control [Kawalan Elektronik Industri]                                           |
| EMJ44603    | Substation Design [Rekabentuk Pencawang]                                                              |
| EMJ44703    | Renewable Energy System [Sistem Tenaga Boleh Baharu]                                                  |
| EMJ44803    | Power System Protection [Perlindungan Sistem Kuasa]                                                   |
| EMJ47002    | Production & Quality Control [Pengeluaran & Kawalan Kualiti]                                          |
| EMJ47104    | Automation [Automasi]                                                                                 |
| EMJ47204    | Mechatronic Systems Design II [Rekabentuk Sistem Mekatronik II]                                       |
| EMJ47303    | Artificial Intelligence For Mechatronic Engineering [Kecerdikan Buatan Untuk Kejuruteraan Mekatronik] |
| EMJ47402    | Automation System Application [Aplikasi Sistem Automasik]                                             |
| EMJ47503    | Advanced Control Engineering [Kejuruteraan Kawalan Lanjutan]                                          |
| EMJ47603    | Autonomous Mobile Robots [Robot Tergerak Automatik] (Elective I)                                      |
| EMJ47703    | IoT & Data Analytics [IoT dan Analitik Data] (Elective I)                                             |



| COURSE CODE | COURSE NAME                                                                               |
|-------------|-------------------------------------------------------------------------------------------|
| EMJ47803    | Advanced Control Design [Rekabentuk Kawalan Lanjutan] (Elective I)                        |
| EMJ48503    | System Identification & Parameter Estimation [Sistem Identifikasi dan Anggaran Parameter] |
| EMJ48603    | Advanced PLC Systems [Sistem PLC Lanjutan] (Elective II)                                  |
| EMJ48703    | Smart System Design [Rekabentuk Sistem Pintar] (Elective II)                              |
| EMJ48803    | System Identification Modelling [Permodelan Sistem Identifikasi] (Elective II)            |

**EMJ10003 COMPUTER PROGRAMMING****No of Credits: 3****Course Synopsis:**

This course is designed to introduce the fundamentals of Computer Programming using high level language, C Language. It provides an introduction to the principles of procedural programming, data types, control structures, data structures and functions, data representation on the machine level. The main objective of this course is to prepare the students with the ability of problem solving with programming, familiarize with the programming tools such as organization chart, flowchart and pseudo code and then to implement them by developing C program applied to engineering problem.

**Course Outcomes:**

1. Ability to design solutions for complex engineering related problems and systems by using computer programming techniques.
2. Ability to apply GNU/Linux for compiling, debugging and executing computer program.

**EMJ12002 ENGINEERING SCIENCE****No of Credits: 2****Course Synopsis:**

This course introduces the knowledge of material selection and properties changes in the real engineering applications/problems. Engineering science is a broad discipline, allowing students to merge multidisciplinary resources to propose and develop innovative, enduring solutions and transform the latest scientific discoveries into enabling new technologies in future.

**Course Outcomes:**

1. Ability to apply knowledge of the concept and principle of materials science and thermodynamics to the solution of complex engineering problem.
2. Ability to identify and solve the fundamental materials science and thermodynamics problems using first principles of natural sciences and thermodynamics concept.
3. Ability to engage in independent and life-long learning on the theory and practical knowledge of the materials science for engineering applications.

**EMJ12103 ELECTRIC CIRCUIT I****No of Credits: 3****Course Synopsis:**

This is an introductory circuit course that is devoted to DC circuits. It covers fundamental laws, resistive circuits, analytical techniques, passive and active elements. Students will be introduced to theorems such as Mesh, Nodal, Thevenin and Norton with dependent sources and special cases. The last chapter will cover the magnetic circuits principle.

**Course Outcomes:**

1. Ability to apply knowledge of charge, current, voltage, power in DC circuits.
2. Ability to apply knowledge of circuits using basic laws, methods of analysis, and circuit theorems
3. Ability to apply appropriate simulation techniques for linear circuits.

**EMJ12202 INTRODUCTION TO ELECTRICAL ENGINEERING****No of Credits: 2****Course Synopsis:**

This course serves as a general introduction to electrical engineering programs offered by the Faculty of Electrical Engineering Technology. In this course, students will be exposed to attributes of an electrical engineer from both academic and practical points of view. Some skills and knowledge that are necessary in the engineering world will be introduced here. Students will obtain a clearer overview of the benefits, excitements, and challenges of being an electrical engineering student and a professional electrical engineer in the near future. Furthermore, students shall identify, discuss, and analyse critically contemporary issues affecting mankind and his environment.

**Course Outcomes:**

1. Ability to apply knowledge related to engineering education including fundamental knowledge in accordance with the scope and career of an electrical engineer
2. Ability to assess any societal, health, safety, legal and cultural issues that relevant to the solution of engineering problem
3. Ability to assemble and construct electrical circuit on PCB based on schematic diagram
4. Ability to communicate effectively through effective presentation and academic report writing

**EMJ13003 ELECTRONICS DEVICES****No of Credits: 3****Course Synopsis:**

This course provides introduction to the basic operating principles and applications of discrete electronic devices and circuits. The course content starts with the fundamental solid-state principles and continues the discussions with the constructions and characteristics of diode, zener diode Bipolar Junction Transistor (BJT) and Enhancement Metal Oxide Semiconductor Field Effect Transistor (E-MOSFET). The application of diodes focusses on the basic power supply circuits whereas the applications of the transistors focus on the DC analysis of amplifier and switch. The course also introduces the importance of data sheet and important parameter which need to refer during circuit analysis.

**Course Outcomes:**

1. Ability to apply knowledge of fundamental concepts of electronic devices.
2. Ability to identify and solve the fundamental operations of electronic devices
3. Ability to analyze and differentiate basic biasing circuits.

**EMJ13103 ELECTRIC CIRCUIT II****No of Credits: 3****Course Synopsis:**

This course offers an introduction to AC circuits which consist concepts of first and second order responses of RLC circuits in time domain, sinusoidal steady state and phasor analysis using frequency domain, power calculation and frequency response using previous analytical techniques. The last chapter covers two-port circuits.

**Course Outcomes:**

1. Ability to apply knowledge of AC circuits analysis and power calculation using complex impedance.
2. Ability to apply knowledge of first and second-order concepts on RL, RC and RLC circuits.
3. Ability to analyze the concepts of frequency response and two-port network for AC circuits.

**EMJ13203 ELECTRICAL ENGINEERING PRACTICES****No of Credits: 3****Course Synopsis:**

This subject is 100% practical coursework and carries 3 units of credit hours. This course contains 6 modules namely Electrical Wiring, AutoCAD, Matlab Programming, Arduino Programming, Programmable Logic Controller (PLC), and OrCAD. Students will be given basic exposure to all the modules available in this subject. With this exposure, students are expected to develop their skills in the future.

**Course Outcomes:**

1. Ability to construct the basic skills and standard practiced of domestic wiring.
2. Ability to apply a logic system using a common controller tool (PLC).
3. Ability to apply a standard practiced of technical drawing and able to UNDERSTAND a standard practiced of PCB layout design and fabrication process.
4. Ability to apply programming to solve basic mathematical related to electrical engineering (Matlab).
5. Ability to apply programming in creating interactive objects or environments by using a microcontroller (ARDUINO).

**EMJ16103 ELECTRIC CIRCUIT THEORY****No of Credits: 3****Course Synopsis:**

This course provides the fundamentals of electrical elements, basic laws such as Kirchhoff's law, Nodal analysis, Thevenin's law and also circuit theorem (i.e. mesh analysis, nodal analysis and superposition theorem) to analyze and design the DC and AC circuits to meet the requirements of given applications.

**Course Outcomes:**

1. Ability to apply knowledge of mathematics equations to solve problems in electric circuits.
2. Ability to solve DC and AC problems using analytical method and circuit theorem.
3. Ability to design and evaluate basic circuits to meet specifications.

**EMJ16203****ENGINEERING STATICS****No of Credits: 3****Course Synopsis:**

The objective of the course is to investigate problems related to mechanics concepts in static conditions. This course deals with balanced force systems applied to rigid bodies that are at rest. Methods to determine support reactions and relationships between internal and external forces, as well as internal force distribution are introduced in this course.

**Course Outcomes:**

1. Ability to apply fundamental static theory in engineering problems.
2. Ability to evaluate static problems using the principles of equilibrium.

**EMJ16302****PRINCIPLE OF ENGINEERING MATERIALS****No of Credits: 2****Course Synopsis:**

This course introduces students to the principles of engineering materials which treat the atomic bonding, crystal structures, imperfections, mechanical properties, strengthening mechanism in metallic materials and their alloys. Besides, the course also explore the structural properties of metal alloys, ceramics, polymers, composites, electrical, magnetic and optical properties. At the end of this course, the student will be able to analyze the structural and physical characteristic of the engineering materials as well as evaluate the properties and mechanism that affects the behavior of materials for various engineering applications.

**Course Outcomes:**

1. Ability to compare and categorize types of materials, bonding and crystal structure.
2. Ability to evaluate the properties and mechanism of engineering materials that affecting the behaviour of materials and its microstructure.
3. Ability to analyze the structural characteristic in metal alloys, ceramics, polymers, composites and properties behaviour of electrical and magnetic materials.

**EMJ16403****MECHATRONIC ENGINEERING PRACTICES****No of Credits: 3****Course Synopsis:**

The purpose of this course is to provide the 1st year student with basic skill and practice in multi discipline for the used of tools, machine and instrumentations. Students will be exposed to the basic skills of electrical wiring and assembly of electronic components, use of measuring equipment and instrumentation. In addition, mechanical workshops provide exposure to machining and welding processes. The basics of microcontroller and PLC applications will prepare students for courses related to embedded systems and automation.

**Course Outcomes:**

1. Ability to understand and comprehends the basic skills and standard practiced of electrical wiring installation and electronic circuit assembly.
2. Ability to understand and comprehends the basic programming techniques for microcontroller & PLC and simulation software
3. Ability to understand and comprehends the basic skills and standard practiced of mechanical machine and equipment.
4. Ability to understand and practice the safety procedure in operating the electrical measurement equipment and mechanical machine.

**EMJ17103****ANALOG ELECTRONICS****No of Credits: 3****Course Synopsis:**

This course is designed to introduce basic concepts of semiconductor electronics and its applications. The course helps students to apply analogue theories for testing, designing and developing of electronic circuits.

**Course Outcomes:**

1. Ability to demonstrate characteristics of semiconductor devices.
2. Ability to analyze analogue circuits by using semiconductor devices.
3. Ability to evaluate analogue circuits for specific applications.



**EMJ17303****COMPUTER AIDED DRAWING****No of Credits: 3****Course Synopsis:**

This course provides an introduction into Mechanical and Electronic Engineering drawing through the use of computer aided design software. The first part of the course covers Mechanical Drawing which involves sketching techniques, multi-view projections, pictorial, dimensioning, designing parts, assembling and structural analysis. The second part of the course concerns on Electronic Drawing which includes the processes of schematic drawings, designing PCB and testing the circuit in simulation. The use of Computer Aided Design software would enhance the students' understanding on the design process as well as allowing them to practice the knowledge for the forthcoming projects

**Course Outcomes:**

1. Ability to design 2D and 3D drawing using computer aided design software and perform structural analysis to models
2. Ability to design schematic diagram and printed circuit board for an electronic circuit using computer aided design software
3. Ability to construct the mechanical and electronic drawing prototype.

**EMJ17402****PRINCIPLE OF ENGINEERING THERMOFLUIDS****No of Credits: 2****Course Synopsis:**

This course covers the fundamental of thermodynamics, fluid mechanics, and also their applications in the engineering field. In thermodynamics, fundamental principles and laws of thermodynamics and its general analysis will be covered. For fluid mechanics, attention will be given to the fundamental principles of fluid mechanics, fluid statics and fluid dynamics together with their analysis.

**Course Outcomes:**

1. Ability to apply basic law and principles of thermodynamics and fluid mechanics.
2. Ability to analyse theoretical concepts of thermodynamics and fluid mechanics in specific applications.

**EMJ20002****INDUSTRIAL ATTACHMENT****No of Credits: 2 (optional)****Course Synopsis:**

This course exposes the Bachelor of Engineering students with industrial experience, in addition to the compulsory industrial training. This course provides students with significant skills and practical knowledge, motivating them to become professional and successful engineers. The student will be exposed to the company's technical functions, organizational structures and operations, such as departmental function, work procedure, safety procedure, communication, technical skills and project management. The student will gain theoretical and practical knowledge during the industrial attachment period. The attachment period can be as minimum as four weeks.

**Course Outcomes:**

1. Ability to adapt to health, safety, legal, cultural and sustainable requirements in working environment.
2. Ability to execute tasks with professional ethics and responsibilities.
3. Ability to work independently, interact with co-workers and work in a team.
4. Ability to communicate effectively on the complex engineering activities performed in training.

**EMJ22003****INSTRUMENTATION AND MEASUREMENTS****No of Credits: 3****Course Synopsis:**

The course is aimed at providing an overview of modern instrumentation and measurement techniques. It is divided into several topics namely the fundamentals of electronic instrumentation and measurement systems; error in measurement and concept of analog instruments; principles and application of signal conditioning; principles of interfacing techniques and data conversion; and finally the working principles and applications of sensors and transducers.

**Course Outcomes:**

1. Ability to identify and analyze the fundamental concept of electronic instrumentation and measurement system.
2. Ability to select and apply appropriate tools for instrumentation and measurements related problems.
3. Ability to conduct investigation and evaluate electronic instrumentation and measurement system on their performances through theoretical or simulation.

**EMJ22204****ANALOG ELECTRONICS****No of Credits: 4****Course Synopsis:**

This course exposes the student the basic knowledge in analog electronic. The exposure encompasses DC and AC analysis, frequency analysis and simple design of small-signal amplifiers. This course offers the students an exposure to the theory and applications of op-amp and frequency response. Students will learn in depth about active filters and voltage regulators.

**Course Outcomes:**

1. Ability to analyse the basic amplifier circuits (BJT, and operational amplifier).
2. Ability to analyse and evaluate various types of filters.
3. Ability to analyse and evaluate basic types of voltage regulators.
4. Ability to communicate effectively on the basic amplifier circuits (BJT, and operational amplifier) through technical report and presentation.

**EMJ22304****DIGITAL ELECTRONICS****No of Credits: 4****Course Synopsis:**

This course introduces the fundamental principles of digital systems. From the importance of numbering systems and codes, it then proceeds to logic gates, their relationship to Boolean algebra, and gates' integration to form complex circuits. The course emphasizes combinational and sequential logic techniques to design, analyse, and implement simple digital systems using logic gates. The simulation software is introduced to facilitate the learning process.

**Course Outcomes:**

1. Ability to apply knowledge of the basic principles of the numbering systems and algebraic switching in digital systems.
2. Ability to design solutions for digital engineering problems using combinational or sequential logic design techniques.
3. Ability to evaluate and design the digital system project through valid approach with data validation

**EMJ22403****SIGNALS & SYSTEMS****No of Credits: 3****Course Synopsis:**

This course aims to introduce the students to basic knowledge of signals and systems. The students will learn how certain inputs to the system will produce the required outputs. The students will be exposed to the signals spectrum concept and various methods such as Fourier Series, Fourier Transform, Laplace Transform, and Z Transform to analyze the signal and its relations. The students will also learn the skills of analyzing the linear electric circuits using those methods.

**Course Outcomes:**

1. Ability to apply knowledge of the characteristics and properties of signals and process of the systems.
2. Ability to engage in independent and life-long learning on the theory of signals and systems based on the characteristics and process of the systems.
3. Ability to analyze and evaluate the periodic and non-periodic signals and the system responses using Fourier Series and Fourier Transform
4. Ability to analyze and evaluate the continuous- and discrete-time signals and the system responses using Laplace Transform and Z-transform.

**EMJ23204****MICROCONTROLLER SYSTEMS DESIGN****No of Credits: 4****Course Synopsis:**

This course introduce the knowledge of microcontroller architecture, its programming language and basic interfacing with input and output devices. From the importance of input and output modules, it then proceed to more advance modules like Timer module, Analog to Digital Converter (ADC) module and Serial module and how these modules being integrated and manipulated. The course emphasize on understanding the basic principle of input and output interfacing as well as build-in modules, and applied them to design a simple microcontroller based system.

**Course Outcomes:**

1. Ability to analyse and execute the microcontroller programming code in C language
2. Ability to design system using microcontroller to solve engineering problems
3. Ability to investigate and design a microcontroller based system application through simulation with valid approach.

**EMJ23003****ELECTRICAL POWER TECHNOLOGY****No of Credits: 3****Course Synopsis:**

This course covers the importance of the three-phase system, the electromagnetism, the magnetic circuit, as well as the single and three-phase transformers. The operation of the three-phase generator as well as the magnitude and the phase relationship connecting the three-phase voltages/currents are introduced. The significant of voltages, currents, and phase sequences for the three-phase Y- and/or delta-connected generator with Y- and/or delta-connected load are included. The real, the reactive, and the apparent power of all the elements for the Y- and/or delta-connected load are explained. This course also comprises the concept of the ferromagnetic materials, the application of Faraday's law on inducing force on a wire and/or voltage across a wire, the magnetic circuits, as well as the inductances and its energy. Additionally, the theories of single and three-phase transformers are elaborated. The voltage, the current, and the impedance relationships across the windings of an ideal transformer is introduced, which are expanded to approximate the real transformer. The copper losses, the leakage flux, as well as the hysteresis and eddy currents that are modeled in transformer equivalent circuits, which are then used to compute the voltage and the current transformations. The losses, the voltage regulation, and the efficiency of the transformer is demonstrated. The per-unit system of measurements is elucidated. The autotransformer is encompasses. The three-phase transformer connections, standard terminal markings, nameplates, and load division are also included. Finally, several laboratories are conducted in this course by using the software for better understanding.

**Course Outcomes:**

1. Ability to identify and analyze the parameters of the three-phase system as well as the electromagnetism problem and its application in magnetic circuit.
2. Ability to design solutions the performance of single and three-phase transformers.
3. Ability to apply the ethical principles in investigating the three-phase system.
4. Ability to analyze and evaluate the three-phase system, electromagnetism, as well as single and three-phase transformers to provide valid conclusions.

**EMJ23103****CONTROL SYSTEMS ENGINEERING****No of Credits: 3****Course Synopsis:**

This is an introduction course to control systems engineering. Students will be exposed to the mathematical modeling for electrical and electro-mechanical systems using block diagram, transfer functions, and signal-flow graphs. They will conduct system performance analysis in time and frequency domain. The course also covers system compensation design using PID and lead-lag controllers. This also includes a mini project/assignment for the system analysis and controller design.

**Course Outcomes:**

1. Ability to produce mathematical model from physical systems (electrical/mechanical/block diagram) by employingsuitable techniques such as Mason's law, Laplace transform and etc..
2. Ability to design solutions for complex engineering problems/ design systems / components or processes to solve control system problems.
3. Ability to select and apply appropriate simulation tools to solve control system problems.

**EMJ26103****SIGNALS & LINEAR SYSTEMS****No of Credits: 3****Course Synopsis:**

This course provides the fundamentals of signals and their transformation techniques. The signal transformation methods are based on two domains (time and frequency), including the convolution integral, Laplace transform, Fourier series, Fourier transform, and Z-transform. In addition, the students are also exposed to the linear system and its characteristics. Then, the students will analyse and formulate the signal and linear systems and evaluate their performance. In the end, an introduction to digital signal processing is included to extend the student's knowledge of the signal and linear system applications.

**Course Outcomes:**

1. Ability to apply knowledge of signal, linear systems, and the concept of digital signal processing to solve engineering problems.
2. Ability to analyse and evaluate the performance of the signal and linear systems using time and frequency domain techniques.
3. Ability to formulate complex engineering problems using both time-domain and frequency-domain techniques.

**EMJ26203      DIGITAL LOGIC CIRCUIT****No of Credits: 3****Course Synopsis:**

This course provides the fundamental theory of digital logic circuits. It introduces the basic principle of digital electronics which covers the numbering systems, codes, logic gates, Boolean Algebra and logic simplification. The course also introduces logic design, particularly in combinational logic functions, bistable memory devices, sequential circuits design, programmable logic and memory units.

**Course Outcomes:**

1. Ability to describe and apply knowledge of the digital electronic components
2. Ability to analyse and evaluate digital logic circuits
3. Ability to design digital logic circuits to solve specific task

**EMJ26303      INSTRUMENTATION & MEASUREMENTS****No of Credits: 3****Course Synopsis:**

This course introduces the knowledge of measurement and instrumentation with various transducers and sensors. This includes an overview of a general measurement system, errors and signal characteristics, various type of sensors and respective interfacing, with their application in measuring electronic signal, temperature, humidity, strain, displacement, velocity, acceleration, force, fluid flow, fluid velocity and fluid level.

**Course Outcomes:**

1. Ability to analyse error and statistical theory in a measurement.
2. Ability to analyse and evaluate interfacing concept between sensor, signal and computer obtained in a measurement.
3. Ability to apply suitable software for measurement related problems.

**EMJ26403      ENGINEERING DYNAMICS****No of Credits: 3****Course Synopsis:**

This course introduces the basic laws of motion involving kinematics and kinetics of a particle and rigid body. The concepts of force, energy, momentum, and

impulse are reviewed for both particle and rigid body where several techniques are introduced to assist in the analysis of a mechanical system. At the end of the course, the students are expected to be able to solve engineering problems related to mechanisms and motions.

**Course Outcomes:**

1. Ability to apply basic principles of motion analysis related to law of motions and concept of mechanics
2. Ability to analyse basic principles of kinematics and kinetics of a particle involving force, work and impulse.
3. Ability to analyse and solve motion problems of planar kinematics and kinetics of a rigid body, involving force, work and impulse.

**EMJ26503      DATA COMMUNICATION & NETWORKING****No of Credits: 3****Course Synopsis:**

The objective of this course is to cover the fundamental concepts in data communication and networking, including OSI and TCP/IP models, data transmission methods, error-correcting techniques, and network protocols, and to investigate problems related to computer networks. Modern topics such as wireless communication, IoT, cloud computing, software-defined networks, and network security are also introduced in this course to boost student understanding of current state-of-the-art technologies.

**Course Outcomes:**

1. Ability to analyze networking scenarios to identify, troubleshoot, and resolve issues related to data communication protocols and networking performance.
2. Ability to evaluate the types of transmission methods and error correction techniques in communication systems as well as the network protocols in networking systems and their related apparatus.
3. Ability to design solutions for industrial communication and network technology by proposing suitable equipment, protocols, and security measures.



**EMJ26703****DESIGN OF MACHINERY****No of Credits: 3****Course Synopsis:**

This course enables students to comprehend the design theories as well as machine elements that are necessary for the machine design processes. The course introduces the basic principles of design concept and design phases. It focuses mainly on the machine kinematics and dynamics which include the machine mechanism, velocity and acceleration analysis. The components of the machine design such as shafts, bearings, gear systems, power screws, belts, chains and cams are also discussed.

**Course Outcomes:**

1. Ability to apply the concepts of various machine elements and mechanisms for specific applications.
2. Ability to analyse position, velocity and acceleration of point in a linkage.
3. Ability to combine various machine elements for specific design of mechanism.

**EMJ27103****ELECTROMAGNETIC FIELD THEORY****No of Credits: 3****Course Synopsis:**

This course enables students to comprehend the design theories as well as machine elements that are necessary for the machine design processes. The course introduces the basic principles of design concept and design phases. It focuses mainly on the machine kinematics and dynamics which include the machine mechanism, velocity and acceleration analysis. The components of the machine design such as shafts, bearings, gear systems, power screws, belts, chains and cams are also discussed.

**Course Outcomes:**

1. Ability to apply the concepts of various machine elements and mechanisms for specific applications.
2. Ability to analyse position, velocity and acceleration of point in a linkage.
3. Ability to combine various machine elements for specific design of mechanism.

**EMJ27204****EMBEDDED SYSTEM AND INTERFACING****No of Credits: 4****Course Synopsis:**

The aim of this course is to enable the students to learn the concepts and requirements, as well as design a self-contained embedded system. This includes the study on the characteristics of embedded systems, hardware and software development, single chip microcontroller, programming techniques and developing an embedded system application.

**Course Outcomes:**

1. Ability to analyze and prepare a structured programming language for embedded system application.
  2. Ability to construct and apply input output devices to embedded system for interfacing.
- Ability to evaluate and develop a self-contained embedded system application.

**EMJ27303****POWER ELECTRONICS****No of Credits: 3****Course Synopsis:**

This course introduces Power Electronics as a Multidisciplinary & Interdisciplinary Applications Orientated Technology emphasising the main criterion of energy efficiency. AC-DC, AC-AC, DC-DC and DC-AC converter performance, including waveform analysis, is developed from theory. This course also will gives overview different types of power semiconductor devices and their switching characteristics and also covers the operation, characteristics and performance parameters of controlled rectifiers.

**Course Outcomes:**

1. Ability to describe power electronic systems operation, applications area and need for efficiency design
2. Ability to analyze different types of power semiconductor device
3. Ability to analyze and design different type of converter

**EMJ30105****INDUSTRIAL TRAINING****No of Credits: 5****Course Synopsis:**

This course exposes students to a company's technical functions, organizational structure and operation such as departmental function, work procedure, safety procedure, communication, technical skills and project management. The students will be able to apply knowledge learned in the university, gain working experience and improve related skills for their future profession.

**Course Outcomes:**

1. Ability to demonstrate technical knowledge and practical skills.
2. Ability to adapt to health, safety, legal, cultural and sustainability requirements in working environment.
3. Ability to execute tasks with professional ethics and responsibilities.
4. Ability to work independently, interact with co-workers and work in a team.
5. Ability to communicate effectively on the complex engineering activities performed in training.

**EMJ32004****POWER SYSTEM ENGINEERING****No of Credits: 4****Course Synopsis:**

This course covers four significant disciplines in power system analysis. The first section introduces the power system, problems in power system, single line diagram representation of a power system and the use of the per-unit system on power system's component calculation. The second section includes the calculation of bus admittance to solve power flow problems using the Gauss-Seidel method, Newton-Raphson method and Fast-Decoupled method. The third section incorporates the construction of the bus impedance matrix to solve the symmetrical and asymmetrical fault. The last section is designed to expose the student to solving engineering problems related to power system stability.

**Course Outcomes:**

1. Ability to analyze and differentiate load flow analysis in power system.
2. Ability to identify and analyze the symmetrical and unsymmetrical fault in the power system network.
3. Ability to design a solution in solving power system stability.

**EMJ32103****ELECTROMAGNETIC THEORY****No of Credits: 3****Course Synopsis:**

The course provides fundamental knowledge on electromagnetic. Students will be exposed to basic postulates of electrostatic, magnetostatic and magnetic fields and able to solve related problems. Besides, students will be exposed to the application of electromagnetic in a transmission line. On completion of this course, students should have a firm grasp of basic electromagnetic and identify their characteristic in different situations.

**Course Outcomes:**

1. Ability to apply knowledge of mathematics to solve vector analysis related to electromagnetic theory.
2. Ability to analyze necessary knowledge in electrostatic and magnetostatic fields to the solution of engineering problems.
3. Ability to analyze and evaluate problems related to electromagnetic theory in transmission line.

**EMJ32204****ELECTRICAL MACHINE****No of Credits: 4****Course Synopsis:**

This course aims to equip students with the knowledge on a DC and AC electrical machines on their characteristic, behavior and responses. This course would enable students' consciousness on the different theoretical and performance expectation on various kind of machines which commonly used by consumers, commercial, industries and etc. Primarily this course can be divided into three parts. Part 1, begins by reviewing the basic concept of electromechanical conversions. Part 2, consisting of theoretical and performance analysis of DC machines, i.e. DC motors and DC Generators. Part 3 will cover the theoretical and performance analysis of single/three-phase AC machines which consist of Induction motor and Synchronous generators and also special motors.

**Course Outcomes:**

1. Ability to analyze the characteristic of DC Machines using standard equivalent circuit model.
2. Ability to evaluate the characteristic of AC Machines using standard equivalent circuit model.
3. Ability to investigate and analyze the characteristic of electrical machines.
4. Ability to apply appropriate simulation tools for electrical machine analysis.

**EMJ32304****POWER ELECTRONICS I****No of Credits: 4****Course Synopsis:**

This course introduces Power Electronics as a multidisciplinary application orientated technology emphasising on the main criterion of power electronic concept and devices. Power electronic devices which include circuit topologies, semiconductor switches and protection circuits are introduced to grasp the understanding of this course. Following, topologies of AC-DC, DC-DC and DC-AC converters, including operational features, waveform analysis and performances along with protection circuits are developed from theoretical followed by laboratory works.

**Course Outcomes:**

1. Ability to analyze power electronic converter topologies and operation.
2. Ability to analyze and evaluate the protection circuits for power converters.
3. Ability to design power electronic converter system.
4. Ability to analyze and design power electronic converter topologies and performances through theoretical and simulation.

**EMJ33003****COMMUNICATION SYSTEM ENGINEERING****No of Credits: 3****Course Synopsis:**

This subject will cover all the basic principles and concepts of communication system including the basic elements of communications, noise, amplitude modulation, angle modulations and digital modulations, as well as transmission channels and medium. In addition, introduction to signal propagation and calculations of signal to noise ratio are also introduced to relate the students with real applications.

**Course Outcomes:**

1. Ability to engage in independent and life-long learning on the principles of communication systems.
2. Ability to evaluate signal gain, attenuation and the effect of noise in communication systems.
3. Ability to evaluate analog modulation, digital modulation techniques and transmission protocols.
4. Ability to function effectively in a group / team to identify and analyze the principles of communication systems.

**EMJ33103****POWER SYSTEM ANALYSIS****No of Credits: 3****Course Synopsis:**

This course covers four significant disciplines in power system analysis. The first section introduces the power system, problems in power system, single line diagram representation of a power system and the use of the per-unit system on power system's component calculation. The second section includes the calculation of bus admittance to solve power flow problems using the Gauss-Seidel method, Newton-Raphson method and Fast-Decoupled method. The third section incorporates the construction of the bus impedance matrix to solve the symmetrical and asymmetrical fault. The last section is designed to expose the student to solving engineering problems related to power system stability.

**Course Outcomes:**

1. Ability to apply knowledge of load flow analysis in power system.
2. Ability to analyze the symmetrical and unsymmetrical fault in the power system network.
3. Ability to design a solution in solving power system stability.

**EMJ33303****ELECTRICAL ENERGY UTILIZATION****No of Credits: 3****Course Synopsis:**

This course intends to give students fair knowledge of the electrical tariffs, electrical energy calculation, energy audit and energy management. This course also introduces students to the energy efficiency and conservation in order to reduce energy costs and promote economic and environmental sustainability. At the end of the course, the students are expected to be able to solve engineering problems related to electrical energy utilization.

**Course Outcomes:**

1. Ability to analyze solutions related to efficient electrical energy utilization and energy management.
2. Ability to function effectively in a group to design energy saving solutions based on electrical energy audits.
3. Ability to communicate effectively on energy saving design solution based on electrical energy audit through writing/oral presentation.
4. Ability to evaluate the energy saving solution based on electrical energy audit with consideration of sustainability and environmental issues.

**EMJ33404****ELECTRICAL INSTALLATION DESIGN I****No of Credits: 4****Course Synopsis:**

This course is designed to provide electrical engineers with the application skills needed in modern electrical engineering practice. This course uses a combination of theory and real project to demonstrate and reinforce the principles. A project plan with milestones shall be made, and the student shall continuously report progress/assignment and results. The project/assignments are based on actual installations and projects.

**Course Outcomes:**

1. Ability to apply electrical knowledge and conduct thorough evaluation in providing solution to the
2. electrical installation system.
3. Ability to design solution to the electrical installation system that comply with the standard.
4. Ability to function constructively in a group and demonstrate effective communication through writing and oral assessments.

**EMJ36103****CONTROL ENGINEERING I****No of Credits: 3****Course Synopsis:**

This course introduces the fundamental aspects of control engineering. It covers topic of mathematical modelling of dynamical systems (electrical, mechanical and electromechanical systems), transfer function, analysis of first-order and second-order systems, transient response, steady-state errors, stability, root locus, frequency response analysis, Bode plot, PID and Lead/Lag compensators design.

**Course Outcomes:**

1. Ability to apply laws of physics for mathematical modeling of control systems.
2. Ability to analyse the performance of control systems in time and frequency domains.
3. Ability to design appropriate PID controller or lead/lag compensators for system performance improvement

**EMJ36203****MACHINE VISION****No of Credits: 3****Course Synopsis:**

This course is designed to introduce the concepts of machine vision and its application in the industries. It provides crucial knowledge on image acquisition, image and video interfacing, color processing and the cutting-edge methods in image processing such as image noise filtering, image segmentation and edge detection, morphological image processing, feature extraction and also the introduction to classification algorithms. The course also requires the students to comprehend the components of machine vision, which will lead to the ability to develop the design of machine vision systems for industrial application and related research topics.

**Course Outcomes:**

1. Ability to analyze and formulate the machine vision system to solve complex engineering problems
2. Ability to design a machine vision system for a specific engineering application.
3. Ability to apply appropriate image processing techniques to develop solutions for machine vision system.

**EMJ36303****FLUID POWER SYSTEMS****No of Credits: 3****Course Synopsis:**

This course is designed to provide students with fundamentals of fluid power systems, components, and devices specific to industrial, commercial, and mobile power equipment applications such as pumps, valves, actuators, electrical controls, and troubleshooting techniques. It teaches the fundamentals of fluid power and provides details on the design and operation of hydraulic and pneumatic components, circuits, and systems. Students are expected to acquire knowledge of physical behavior of pneumatics and hydraulics control system, the pneumatics and hydraulics components and applications. Knowledge on theory acquired in lecture is also enhanced with a practical work conducted in laboratory.

**Course Outcomes:**

1. Ability to analyze and formulate the machine vision system to solve complex engineering problems
2. Ability to analyse and evaluate pneumatic, hydraulic, electro-pneumatic and electro-hydraulic systems for various applications.
3. Ability to select and apply appropriate simulation tools to develop pneumatic, hydraulic, electro-pneumatic and electro-hydraulic circuits.



**EMJ36404****ELECTRICAL MACHINES & POWER SYSTEMS****No of Credits: 4****Course Synopsis:**

This course is intended to introduce to the Mechatronic students both theories and applications of: 1) Fundamentals, operating principles and performance analysis of Electromechanical drives, which consists of DC and AC machines and stepper motor, 2) Three phase circuit and industrial motor control and 3) Introduction to high voltage power system in electrical management systems, safety and utilization.

**Course Outcomes:**

1. Ability to apply knowledge of the concept and operating principle of particular electrical machines and power systems.
2. Ability to investigate and solve the system integration of electrical machines and power systems.
3. Ability to analyse and interpret data related to characteristic of electrical machines

**EMJ37103****CONTROL ENGINEERING II****No of Credits: 3****Course Synopsis:**

This course introduces the state-space in control engineering to the students. The chapter includes system modelling and analysis for dynamic systems such as RLC circuit, spring-mass-damper and inverted pendulum in state-space. Furthermore, state-space are also converting to different forms while focusing on the controller design: the pole-placement and observer design controller. Finally, the state-space modelling is also expanding to the digital systems with the introduction to sample-data and controller design with output's performance analysis.

**Course Outcomes:**

1. Ability to apply knowledge of the dynamic physical systems for continuous-time and digital into state-space form.
2. Ability to analyse and evaluate the system's response for a continuous-time and digital control system.
3. Ability to design appropriate controllers via state-space to meet the desired performance specifications for the continuous-time and digital system.
4. Ability to select and apply appropriate techniques to produce engineering solutions.

**EMJ37203****MECHATRONIC SYSTEMS DESIGN I****No of Credits: 3****Course Synopsis:**

This course focuses on the methodologies, processes and elements for the design an integrated mechatronic system. It covers the philosophy of product system design including needs identification, conceptual generation and selection and embodiment design, for an optimum mechatronics system. It also reviews all elements of a mechatronic system and introduces the first part of the mechatronic system design project. This course will require students to work in a group to design a mechatronic system solving a problem based on a predefined theme Students need to identify needs, develop design specifications, generate possible concept design. The conceptual design of the design project will be continued in EMJ47204 Mechatronic System Design II.

**Course Outcomes:**

1. Ability to design solution for mechatronic system by using suitable engineering instruments with consideration of public health safety/ cultural/ societal and environmental.
2. Ability to conduct investigation and evaluate solution that meets customer needs.
3. Ability to function in a team for the successful delivery of design project

**EMJ37303****ROBOTIC SYSTEMS****No of Credits: 3****Course Synopsis:**

This course is designed to introduce various aspects of Robotics such as the Types of robots, Capabilities, Characteristics, Robot Control Systems and Software, Kinematic Analysis, Principles of Inverse kinematics, Robot Sensors and Drive mechanisms, Robot Work Cell design and various industrial applications.

**Course Outcomes:**

1. Ability to choose suitable robots, analyse robot object manipulations and schedule a robot work cell for maximum productivity in industrial applications.
2. Ability to choose and analyse suitable robot sensor for integration into a robot control system.
3. Ability to practice robotic systems using hardware and software applications.
4. Ability to communicate effectively on robotic programming solution through technical report and demonstration.

**EMJ37603****AUTOMATION SYSTEM****No of Credits: 3****Course Synopsis:**

The objective of this course is to impart knowledge about automation technologies. This course explores the integration of automation technology principles with assembly processes and systems, incorporating sensor, actuator, and motor technology as input/output components in automation technology. Additionally, it encompasses the utilization of automation technology and methodology in both hardware and software control. It addresses the challenges and concerns related to automation technology in areas like design, engineering analysis, planning, tooling, and manufacturing.

**Course Outcomes:**

1. Capability to conduct analyses on production system automation.
2. Capability to conduct evaluations and analyses of automation system components.
3. Capability to design and assess the automation system controller to ensure optimal functionality across a range of applications.

**EMJ40002****FINAL YEAR PROJECT I****No of Credits: 2****Course Synopsis:**

This course is designed to introduce an investigative for a small-scale research-based project to solve engineering problems. Student must identify the problems, develop techniques for information gathering, conduct a literature review and select proper methodology. In addition, students must deliver individual analysis and judgement and utilise appropriate modern technology/tools to conduct the research and be assessed independently. Students will prepare and have written and oral presentations using computers and multimedia technology at the end of the semester

**Course Outcomes:**

1. Ability to conduct research literature on the relevant principles and theories via independent learning to solve engineering problems.
2. Ability to design the appropriate research methodology to solve engineering problems.  
Ability to conduct investigation, analyse and interpret data to solve engineering problems.
3. Ability to communicate effectively on engineering problem solving through technical report (progress report/dissertation) and presentation.

**EMJ40004****FINAL YEAR PROJECT II****No of Credits: 4****Course Synopsis:**

This course is designed to introduce an investigative research-based project to solve engineering problems. Students must identify problems, develop techniques for information gathering, conduct literature review and select proper methodology. In addition, students must deliver individual analysis and judgement and utilise appropriate modern technology/tools to conduct the research and be assessed independently. Students will prepare and have written and oral presentations using computers and multimedia technology at the end of the semester.

**Course Outcomes:**

1. Ability to conduct research literature on the relevant principles and theories via independent learning to solve engineering problems
2. Ability to design the appropriate research methodology to solve engineering problems.
3. Ability to conduct investigation, analyse and interpret data to solve engineering problems.
4. Ability to select and apply appropriate modern tools in researching to solve engineering problems.
5. Ability to communicate effectively on engineering problem solving through technical report (progress report/dissertation) and presentation.

**EMJ41003****MANAGEMENT FOR ENGINEERS****No of Credits: 3****Course Synopsis:**

This course aims to teach students on how to apply project management skills when undertaking projects and to provide basic tools of engineering economy to enable the students to carry out professional quality economic evaluations. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineers relating to project management in the current economic scenarios.

**Course Outcomes:**

1. Ability to apply principles of engineering management to engineering project.
2. Ability to apply economic decision - making principles to engineering project and business venture.
3. Ability to communicate effectively on project management and engineering economics tools in solving engineering problems through technical report and presentation.
4. Ability to apply professional ethics related to engineering management and economic decisions.

**EMJ41102****PROFESSIONAL ENGINEER****No of Credits: 2****Course Synopsis:**

This course aims to explain the main concepts in engineering ethics, engineering sustainability, risk management, and occupational safety and health as well as to expose the students to the basics of law in the engineering context. The materials will be of introductory nature to enable engineers to appreciate factors that have to be taken into account in decision-making. At the end of the course, students will be able to identify and discuss issues and challenges faced by the engineers relating to engineering ethics, engineering sustainability, risk management and to understand the legal requirements related to the engineering field.

**Course Outcomes:**

1. Ability to identify and evaluate the issues and challenges of engineering ethics.
2. Ability to understand and evaluate the engineering sustainability impact in societal and environmental context and propose solutions to the sustainable development issues.
3. Ability to apply and propose assessment on hazards, risk management, occupational safety & health (OSHA) and procedures of legal on engineering issues.

**EMJ42003****HIGH VOLTAGE ENGINEERING****No of Credits: 3****Course Synopsis:**

This course will introduce the students about insulating materials and their applications, breakdown phenomena in insulating material such as solids, liquids, and gases. The course will also generation and measurement of high DC, AC and impulse voltages and currents, overvoltage phenomena, insulation coordination, high voltage testing techniques and testing of apparatus and equipment.

**Course Outcomes:**

1. Ability to analyze the various breakdown mechanism and applications of gas, liquid and solid dielectrics
2. Ability to design generation and measurement technique of high voltage AC, DC and impulse generator.
3. Ability to analyze and evaluate the over-voltage phenomena and insulation coordination in power system, types of high voltage testing for electrical apparatus and non-destructive testing of materials.

**EMJ42202****ELECTRICAL INSTALLATION DESIGN II****No of Credits: 2****Course Synopsis:**

This course is designed to provide electrical engineers with the application skills needed in modern electrical engineering practice. This course is continuing from subject Electrical Installation Design 1 (EMJ33404) where the combination of theory and real project to demonstrate and reinforce the principles. A project plan with milestones shall be made, and the student shall continuously report progress/assignment and results. The project/assignments are based on actual installations and projects.

The course topics include:

1. Energy Management
2. Project Management
3. Project Financial and Supervision
4. Business Presentation
5. Technical Report Writing
6. Sustainability in engineering design solution
7. Engineering impact on society, legal, health and safety

**Course Outcomes:**

1. Ability to assess any societal, health, safety, legal, and cultural issues that are relevant to the energy management aspect of electrical installation design.
2. Ability to analyze societal, environmental issues and entrepreneurship opportunities in completing an engineering project.
3. Ability to apply ethical awareness and responsibility in completing an engineering project.
4. Ability to function effectively within a group in completing an engineering project.
5. Ability to communicate effectively in explaining an engineering project through writing and oral assessments.
6. Ability to evaluate an engineering project through project management and economic decision-making principles.

**EMJ43003****ELECTRICAL DRIVES****No of Credits: 3****Course Synopsis:**

This course purposes to equip students with the knowledge of DC and AC electrical drive systems which are commonly used in industries. The course covers the basic components of electrical drive systems and the speed control of the drive systems. The electrical braking and dynamics of the drive systems will also be introduced.

**Course Outcomes:**

1. Ability to evaluate a suitable drive solution for a DC motor.
2. Ability to evaluate a suitable drive solution for an AC motor.
3. Ability to analyse suitable electrical braking strategy and dynamic model for DC and AC electrical drive systems.
4. Ability to apply appropriate simulation tools for electrical drive systems.

**EMJ44103****POWER SYSTEM OPERATION AND CONTROL****No of Credits: 3****Course Synopsis:**

This course aims to provide further understanding power system operation and control. It mainly focuses on various aspects in operation of power system such as energy source and transfer, power plant operation and characteristics, optimal dispatch of generation, unit commitment, power system control, interconnected power systems and high voltage direct current (HVDC) system.

**Course Outcomes:**

1. Ability to analyze and evaluate the fundamental and operation of energy generation, power system behavior, economics of generating costs and optimal dispatch of power generation with and without transmission losses.
2. Ability to analyze and evaluate the unit commitment in thermal power plant and to evaluate power system control of power system network.
3. Ability to communicate effectively on communication in Power Systems through technical report and presentation.
4. Ability to design the interconnection and operation of generators in parallel with large power system and tie-line interchange between interconnected utilities.

**EMJ44203****ELECTRICAL MACHINE DESIGN****No of Credits: 3****Course Synopsis:**

This course covers the importance of magnetic materials employed in various electric machines and the fundamental of magnetic circuit. The design principle of the static electric machine, i.e. transformer, is included, and the performance of transformer is analyzed. In addition, this course consists of the fundamental design of rotating electric machines, e.g. induction machine and permanent magnet synchronous machine. The laboratories test upon the characteristic of electric machine and its performance are also included. This course also comprises the heating and cooling methods in electric machines. Additionally, the design principle, simulation, performance prediction, and evaluation of electric machine using Finite Element Method (FEM) are encompassed.

**Course Outcomes:**

1. Ability to analyse magnetic materials and magnetic circuits for electrical machine.
2. Ability to design the transformer with cooling system and electrical machine as well as evaluate its performance.
3. Ability to analyse and design the electrical machines and its performances to provide valid conclusions.
4. Ability to communicate effectively the design principle of electrical machine in the form of presentation.

**EMJ44303****POWER ELECTRONICS II****No of Credits: 3****Course Synopsis:**

Efficient power management systems are essential for the proper operation of all modern electronic systems. This course provides an in-depth study of switched-mode power supplies (SMPS) and includes topology variations, operational modes, performance analysis including the effects of parasitic elements and waveform analysis. Design aspects include understanding the manufacturer's data, co-relating data to select power semiconductors and passive components, and thermal management.

**Course Outcomes:**

1. Ability to analyze and evaluate the modulation techniques, waveforms, and effects of related parameters on switch-mode power supplies.
2. Ability to design solutions for complex engineering problems in switch mode power supplies.
3. Ability to design thermal management solutions for switch mode power supplies.



**EMJ44403 ELECTRICAL ENERGY SYSTEM****No of Credits: 3****Course Synopsis:**

This course introduces energy sources technology and develops an understanding of several types of energy sources whose outputs are suitable for conversion into electrical power generation, emphasising renewable energy resources. The class will then analyse and evaluate the economic, social and environmental impact of renewable energy implementation. The new technology of power system transmission and distribution and the interconnection of renewable energy sources to the grid also will be investigated. Worldwide future steps towards the sustainability electric supply system, policy and constraint in renewable energy implementation also will be discussed and exposed to the students.

**Course Outcomes:**

1. Ability to analyze and evaluate the energy conversion of the conventional energy system and renewable energy resources.
2. Ability to understand and evaluate the conversion of conventional energy system and renewable energy resources with consideration of societal and environmental impact.
3. Ability to analyze the transmission and distribution technology in power systems and renewable energy systems.
4. Ability to design the conversion of the conventional energy systems and renewable energy resources.

**EMJ44503 INDUSTRIAL ELECTRONIC CONTROL****No of Credits: 3****Course Synopsis:**

This course will have a wide explore of industrial electronics control for the students. The course will be covered the components, circuits, instruments, equipment, and control technique used in industrial automatic systems. This course is divided into three parts. The first part will be discussed about the basic principle of industrial electronics control and interfacing devices such as operational amplifiers, signal processors, opto-electronic interface devices, transducers, detection sensors, actuators, digital-to-analog converter, and analog-to-digital converter. The next part of this course will be discussed the design of the controller such as proportional, proportional-integral, proportional-integral-derivative, pressure, and temperature controllers, and servo and stepper motor control design. The last part will be exposed to a programmable logic controller (PLC), PLC components, PLC programming, and operational procedure.

**Course Outcomes:**

1. Ability to analyze the principle of industrial electronics control and interfacing devices
2. Ability to evaluate the type of controller for industrial electronic control applications.
3. Ability to design solutions using PLC programming for industrial electronic control applications.

**EMJ44603 SUBSTATION DESIGN****No of Credits: 3****Course Synopsis:**

This course aims to introduce the student to the fundamentals of substation design which include the classifications, important equipment and their sizing. This course also covers the design of protection system of a substation that follows the IEEE standard which encompasses the grounding grid system, protection relay as well as the lightning and insulation coordination. Towards the end of the course, student will also learn about substation auxiliary power supply, substation setting and equipment sizing as well as equipment testing and commissioning.

**Course Outcomes:**

1. Ability to analyse and evaluate the fundamentals of substation design.
2. Ability to design the substation busbar, grounding grid and protection system of substation.
3. Ability to investigate the components of substation and the substation protection system.

**EMJ44703 RENEWABLE ENERGY SYSTEM****No of Credits: 3****Course Synopsis:**

This course introduces basic system design for renewable energy integration into electrical grid and calculates the potential energy generation for different renewable energy technologies. This course also exposes students with relevant energy conversion, energy storage, network interfacing and economic assessment techniques for renewable energy systems.

**Course Outcomes:**

1. Ability to design the conversion of solar photovoltaic, energy from wind, hydro, biomass, biogas and fuel cell to electrical power.
2. Ability to design the energy system of Solar Photovoltaic, energy from wind, hydro, biomass, biogas and fuel cell for economic analysis.
3. Ability to analyze and evaluate the conversion of Solar Photovoltaic, energy from wind, hydro, biomass, biogas, and fuel cell for system performance.

**EMJ44803 POWER SYSTEM PROTECTION****No of Credits: 3****Course Synopsis:**

This course provides an advanced understanding of knowledge on purposes of power system protection, protection techniques, protection scheme, relays and fault diagnostic. It covers the introduction of power system protection, the protection device and control, the protection concepts, transmission protection and apparatus protection. The design of renewable power generation protection and the system aspect of protection will also be covered in this course. Besides lectures, this course is supported by series of laboratory where related computer simulations are executed. Together, these two courses will provide the students a comprehensive treatment of the theory and application of the power system protection.

**Course Outcomes:**

1. Ability to evaluate knowledge of the protective devices and protective controls.
2. Ability to evaluate and design the protection concepts.
3. Ability to analyse and design the transmission protection and the apparatus protection.

**EMJ47002 PRODUCTION & QUALITY CONTROL****No of Credits: 2****Course Synopsis:**

This course introduces the concepts and practices of managing production and quality in contemporary organizations. It is designed to highlight the practical and applied techniques which can improve the organization's production and quality performances. Topics which will be covered in this course include production strategies, Just in Time production, continuous quality improvement, linear programming, statistical process control and Six Sigma concept.

**Course Outcomes:**

1. Ability to apply knowledge of production and quality control in operational management.
2. Ability to recommend and justify appropriate techniques for production and quality improvement.

**EMJ47204 MECHATRONIC SYSTEMS DESIGN II****No of Credits: 4****Course Synopsis:**

This course focuses on the design of an integrated mechatronic system and it is a continuation from Mechatronic System Design I. The students are expected to design a mechatronic system to solve real engineering problems on selected predefined scope, including economic and sustainability analysis, under the guidance of project supervisor

**Course Outcomes:**

1. Ability to design solution for mechatronic system by using suitable engineering instruments with consideration of public health safety/ cultural/ societal and environmental.
2. Ability to conduct investigation and evaluate solution that meets customer and financial needs.
3. Ability to apply ethical principles and evaluate issues and challenges related to engineering ethics.
4. Ability to communicate effectively via oral presentation and demonstration of the design solution.
5. Ability to function in a team for the successful delivery of design project

**EMJ47303****ARTIFICIAL INTELLIGENCE FOR MECHATRONIC ENGINEERING****No of Credits: 3****Course Synopsis:**

This course is designed to introduce the fundamentals of Artificial Intelligence (AI). It provides an introduction to definitions of human and artificial intelligence. The students will be introduced to Fuzzy systems, Evolutionary Computation and Artificial Neural Networks. The latter will be used as a fundamental to Deep Learning. At the end of this course students should comprehend the major techniques in AI and ability to build simple intelligent systems in Mechatronic Engineering applications.

**Course Outcomes:**

1. The knowledge of different AI techniques for engineering applications.
2. The ability to implement and analyse different AI techniques.
3. The ability to develop AI application in Mechatronic engineering

**EMJ47402****AUTOMATION SYSTEM APPLICATION****No of Credits: 2****Course Synopsis:**

The objective of this course is to impart hand-on knowledge about automation system development for various applications. This course explores the automation system design and simulation using Automation Studio software by integration of automation technology principles with assembly processes and systems, incorporating sensor, actuator, and motor technology as input/output components in automatic sequence control. Additionally, it encompasses the utilization of PLC as main automation system controller and methodology in both hardware and software control interface. It addresses the challenges and concerns related to automation technology in areas like design, installation and engineering analysis.

**Course Outcomes:**

1. Capability to design and simulate pneumatic & hydraulic system application for automated sequential control.
2. Capability to design and apply the PLC programming and interface to ensure optimal functionality in automated system applications.
3. Capability to apply technologies related to PLC such as Human Machine Interface, Field Bus Communication and SCADA system.

**EMJ47603****AUTONOMOUS MOBILE ROBOTS (ELECTIVE I)****No of Credits: 3****Course Synopsis:**

This course introduces the basic concepts of autonomous mobile robots which include the fundamentals of mobile robotics such as mechanical design, kinematics, perception, localization and planning. The course emphasizes wheeled mobile robotics and presents the recent technology on autonomous mobile robots and Automated Guided Vehicles (AGVs). At the end of the course, the students are expected to be able to construct and operate a basic autonomous mobile robot.

**Course Outcomes:**

1. Ability to apply basic concepts of mobile robotics such as locomotion, drive mechanisms and perception techniques.
2. Ability to solve kinematics and propose appropriate specifications for autonomous mobile robots.
3. Ability to construct and manipulate autonomous mobile robots.

**EMJ47703****IOT & DATA ANALYTICS****No of Credits: 3****Course Synopsis:**

The course covers an introduction to the Internet-of-Things (IoT), IoT structures and its related environment including cloud platforms, data exploration and IoT data visualization. Furthermore, the students are introduced to data analysis within the IoT application environment such as statistical and probability theorem, hypothesis testing, regressions, dimensionality reduction and classification technique. At the end of the course, the students are expected to acquire new knowledge on IoT and data analytics and be able to apply the knowledge in real applications, particularly on the emerging IR4.0.

**Course Outcomes:**

1. Ability to apply knowledge of IoT structure and data analytics in engineering.
2. Ability to design IoT framework and evaluate the data structure within the designed IoT environment.
3. Ability to apply the appropriate framework to develop a functional IoT system.

**EMJ47803****ADVANCED CONTROL DESIGN****No of Credits: 3****Course Synopsis:**

The aim of this course is to introduce advanced controllers that can be used not only for linear but also nonlinear systems. Parameter estimation and an adaptive mechanism is used in self-tuning regulation and model reference adaptive control. The concept of choosing the most appropriate setting of the feedback controller is discussed in optimal control. Robustness issues in understanding control system operating conditions are also presented. At the end of the course, the students are expected to be able to solve engineering problems by using an adaptive, optimal, or robust control system.

**Course Outcomes:**

1. Ability to apply knowledge of nonlinear system, adaptive control systems and optimal control
2. Ability to identify and evaluate the suitability in choosing adaptive control systems and optimal control.
3. Ability to apply appropriate simulation tools for control engineering related problems.

**EMJ48603****ADVANCED PLC SYSTEMS****No of Credits: 3****Course Synopsis:**

Programmable logic controllers (PLC) are the brains of complex automated production lines and process automation systems and must be properly programmed to ensure safe and reliable operation. This requires a strong familiarity with the specifics of the programming environment and languages. Controlled Development System or CoDeSys is a complete development environment for new generation of PLC. CoDeSys puts a simple approach to the powerful IEC language at the disposal of the PLC programmer. Through programming of PLC industrial application examples, students learn how to use of the editors and debugging functions based upon the proven development program environments of advanced programming languages. The student will be able establish communication between devices, program PLC routines in various languages, and transfer projects to a high-end PLC, HMI and motion control.

**Course Outcomes:**

1. Ability to interpret PLCs control algorithms using CoDesys programming software.
2. Ability to apply technologies related to PLCs, such as Human Machine Interface, motion control and Field Bus Communication.
3. Ability to apply advanced PLC methods in engineering problems.

**EMJ48703****SMART SYSTEM DESIGN****No of Credits: 3****Course Synopsis:**

Smart Systems Design presents state-of-the-art technologies and available systems in the domains of smart systems and AI. The solutions from an augmented intelligence perspective show that these technologies can be used to benefit, instead of replacing humans by augmenting the information and actions of their daily lives. This course aims to introduce all smart systems which combining sensing, activation, and control functions to visualize and analyze situations and make decisions based on predictively or adaptively available data.

**Course Outcomes:**

1. Ability to comprehend the concepts of smart system design particularly in Mechatronic engineering application.
2. Ability to apprehend the system integration between smart devices and instrumentations.
3. Ability to design a smart system framework particularly for Mechatronic engineering application

**EMJ48803****SYSTEM IDENTIFICATION MODELLING****No of Credits: 3****Course Synopsis:**

This course is an introduction to the alternative modelling using system identification and parameter estimation approach. It covers an introduction to system identification technique, acquiring and pre-processing data on parametric model estimation methods, parametric model estimation methods, partially known estimation methods, model estimation methods in closed loop systems, recursive model estimation methods, analyzing, validating, and converting models and system identification case study. This requires an in-depth understanding of control system engineering, modern control system and digital control system. The emphasis will be on the theoretical basis as well as practical implementations. Key components studied in details are time response analysis, frequency response analysis, correlation analysis, power spectrum density analysis, model structure, parametric model, parameter estimation method, test signals and model validation methods.

**Course Outcomes:**

1. Ability to explain the fundamental basic of system identification
2. Ability to comprehend the fundamental basic of parameter estimation
3. Ability to apply both fundamental above in real case study.

**UR6522002****Bachelor of Electrical Engineering Technology (Industrial Power) with Honours****PROGRAMME EDUCATIONAL OBJECTIVES (PEO)****PEO 1**

Engineering technology graduates engaged in the field of electrical engineering technology as demonstrated through career advancement.

**PEO 2**

Engineering technology graduates who are members and contribute to professional society.

**PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities.

**PEO 4**

Engineering technology graduates who are technopreneurs.



## PROGRAMME OUTCOMES (PO)

### PO 1

Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization respectively to the solution of complex engineering problems.

### PO 2

Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

### PO 3

Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental consideration.

### PO 4

Conduct investigation of complex engineering problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### PO 5

Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations.

### PO 6

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problem.

### PO 7

Understand and evaluate the sustainability and impact of professional engineering work in the solutions of complex engineering problems in societal and environmental contexts including ability to have entrepreneurship skills.

### PO 8

Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

### PO 9

Function effectively as an individual, and as a member or leader in diverse teams and multi-disciplinary settings.

### PO 10

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### PO 11

Demonstrate knowledge and understand of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.

### PO 12

Recognise the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

| CURRICULUM STRUCTURE                                                                                     |                                                            |                                                             |                                                                 |                                                    |                                                  |                                                              |                                                        |                                 |
|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------|---------------------------------|
| UR6522002 BACHELOR OF ELECTRICAL ENGINEERING TECHNOLOGY (INDUSTRIAL POWER) WITH HONOURS INTAKE 2024/2025 |                                                            |                                                             |                                                                 |                                                    |                                                  |                                                              |                                                        |                                 |
| YEAR                                                                                                     | FIRST                                                      |                                                             | SECOND                                                          |                                                    | THIRD                                            |                                                              | FOURTH                                                 |                                 |
| SEMESTER                                                                                                 | 1                                                          | 2                                                           | 3                                                               | 4                                                  | 5                                                | 6                                                            | 7                                                      | 8                               |
| DISCIPLINE<br>CORE & ELECTIVE<br>COURSES<br>(116 CREDITS)                                                | EMK11003<br>Computer<br>Programming                        | EMK11203<br>Electric Circuit Theory<br>I                    | EMK21203<br>Electric Circuit Theory II                          | EMK21403<br>Electrical Machines<br>Technology I    | EMK32003<br>Electrical Machines<br>Technology II | EMK30004<br>Final Year Project I                             | EMK40006<br>Final Year Project II                      | EMK40112<br>Industrial Training |
|                                                                                                          | EMK12003<br>Computer Aided<br>Drawing                      | EMK11403<br>Digital<br>Electronics                          | EMK21103<br>Measurement &<br>Instrumentation                    | EMK21503<br>Microcontroller System                 | EMK32103<br>Electrical Installation              | EMK32303<br>Renewable Energy<br>System                       | EMK42003<br>Power System<br>Protection &<br>Switchgear |                                 |
|                                                                                                          | EMK10103<br>Engineering Skills I                           | EMK11303<br>Electronics I                                   | EMK21303<br>Electronics II                                      | EMK21603<br>Power Electronics                      | EMK32703<br>Electrical Drive<br>Technology       | EMK31203<br>Programmable Logic<br>Controller                 | Elective II/3                                          |                                 |
|                                                                                                          | EMK11103<br>Engineering Science                            | EMK10203<br>Engineering Skills II                           | EMK22003<br>Control System<br>Technology                        | EMK21703<br>Communication<br>System                | EMK32203<br>Electrical Power<br>System           | Elective I/3                                                 | Elective III/3                                         |                                 |
|                                                                                                          |                                                            |                                                             |                                                                 | EMK21803<br>Signal & Systems                       | EMK32603<br>Electromagnetic Field<br>Theory      | EMK31303<br>Engineering<br>Technology<br>Management          | EMK41003<br>Technologist in Society                    |                                 |
|                                                                                                          |                                                            |                                                             |                                                                 |                                                    | EMK33504<br>Design Project                       |                                                              |                                                        |                                 |
| COMMON<br>CORE COURSES<br>(9 CREDITS)                                                                    | QMQ11103<br>Mathematics for<br>Engineering<br>Technology I | QMQ11203<br>Mathematics for<br>Engineering<br>Technology II | QMQ21303<br>Mathematics for<br>Engineering Technology<br>III    |                                                    |                                                  |                                                              |                                                        |                                 |
| UNIVERSITY REQUIREMENT<br>COURSES<br>(16 CREDITS)                                                        | SMU13102<br>Appreciation of Ethics<br>and Civilizations    | SMB41002<br>University Malay<br>Language <sup>[3]</sup>     | SMB20102<br>English for General<br>Communication <sup>[2]</sup> | SMU22402<br>Engineering<br>Entrepreneurship        |                                                  | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup> |                                                        |                                 |
|                                                                                                          | SMU13002<br>Philosophy and<br>Current Issues               | SMZXXX01<br>Co-curriculum II                                | **SMB1XX02<br>Option Subject<br>(Foreign Language)              | SMB31202<br>English for Technical<br>Communication |                                                  |                                                              |                                                        |                                 |
|                                                                                                          | SMZXXX01<br>Co-Curriculum I                                |                                                             |                                                                 |                                                    |                                                  |                                                              |                                                        |                                 |
| TOTAL CREDITS<br>(141 CREDITS)                                                                           | 20                                                         | 18                                                          | 17                                                              | 19                                                 | 19                                               | 18                                                           | 18                                                     | 12                              |
| AUDIT COURSES                                                                                            |                                                            | SMB10102<br>Preparatory English <sup>[1]</sup>              |                                                                 |                                                    |                                                  |                                                              |                                                        |                                 |

- Elective I : EMK32403 Power Quality [Kualiti Kuasa] Elective A1, EMK32803 Electrical Substation Technology [Teknologi Elektrik Pencawang] Elective A2, EMK32903 Artificial Intelligence [Kecerdikan Buatan] Elective A3.
- Elective II : EMK42503 Power Electronics & Applications [Elektronik Kuasa & Aplikasi] Elective B1, EMK42603 Energy Storage Technology [Teknologi Penyimpanan Tenaga] Elective B2, EMK42203 Industrial Automation [Automasi Industri] Elective B3.
- Elective III : EMK42303 Energy Efficiency & Management [Kecekapan Tenaga & Pengurusan] Elective C1, EMK42403 High Voltage Technology [Teknologi Voltan Tinggi] Elective C2, EMK42703 Electric Vehicle Technology [Teknologi Kenderaan Elektrik] Elective C3.

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

**UR6523006**  
**Bachelor of Electrical Engineering Technology**  
**(Robotic And Automation Technology) with Honours**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1**

Engineering technology graduates engaged in the field of electrical engineering technology as demonstrated through career advancement

**PEO 2**

Engineering technology graduates who are members and contribute to professional society.

**PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities.

**PEO 4**

Engineering technology graduates who are technopreneurs.

## PROGRAMME OUTCOMES (PO)

### PO 1

Knowledge: Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialisation to defined and applied engineering procedures, processes, systems or methodologies.

### PO 2

Problem analysis: Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialisation.

### PO 3

Design/development of solutions: Design solutions for broadly-defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

### PO 4

Investigation: Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, data-bases and literature, design and conduct experiments to provide valid conclusions.

### PO 5

Modern Tool Usage: Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to broadly-defined engineering problems, with an understanding of the limitations

### PO 6

The Engineer and Society: Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and solutions to broadly-defined engineering problems.

### PO 7

Environment and Sustainability: Understand the impact of engineering technology solutions of broadly-defined engineering problems in societal and environmental context and demonstrate knowledge of and need for sustainable development.

### PO 8

Ethics: Understand and commit to professional ethics and responsibilities and norms of engineering technology practice.

### PO 9

Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse technical teams.

### PO 10

Communications: Communicate effectively on broadly defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### PO 11

Project Management and Finance: Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments.

### PO 12

Life-Long Learning: Recognize the need for, and have the ability to engage in independent and life-long learning in specialist technologies.

| CURRICULUM STRUCTURE                                                                                                      |                                                          |                                                              |                                                       |                                          |                                         |                                               |                                                 |                                 |
|---------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------|------------------------------------------|-----------------------------------------|-----------------------------------------------|-------------------------------------------------|---------------------------------|
| UR6523006 BACHELOR OF ELECTRICAL ENGINEERING TECHNOLOGY (ROBOTIC AND AUTOMATION TECHNOLOGY) WITH HONOURS INTAKE 2024/2025 |                                                          |                                                              |                                                       |                                          |                                         |                                               |                                                 |                                 |
| YEAR                                                                                                                      | FIRST                                                    |                                                              | SECOND                                                |                                          | THIRD                                   |                                               | FOURTH                                          |                                 |
| SEMESTER                                                                                                                  | 1                                                        | 2                                                            | 3                                                     | 4                                        | 5                                       | 6                                             | 7                                               | 8                               |
| <b>DISCIPLINE CORE &amp; ELECTIVE COURSES</b><br>(116 CREDITS)                                                            | EMK11003<br>Computer Programming                         | EMK11203<br>Electric Circuit Theory I                        | EMK21203<br>Electric Circuit Theory II                | EMK21003<br>Electromagnetic Field Theory | EMK31103<br>Control System Technology   | EMK30004<br>Final Year Project I              | EMK40006<br>Final Year Project II               | EMK40112<br>Industrial Training |
|                                                                                                                           | EMK18003<br>Computer Aided Drawing                       | EMK11403<br>Digital Electronics                              | EMK21103<br>Measurement & Instrumentation             | EMK21603<br>Power Electronics            | EMK36103<br>Mechanics & Machine Design  | EMK36003<br>Industrial Networking             | EMK49003<br>Modern Control                      |                                 |
|                                                                                                                           | EMK18103<br>Engineering Skills I                         | EMK11303<br>Electronics I                                    | EMK21303<br>Electronics II                            | EMK29003<br>Data Communication           | EMK38004<br>Design Project              | EMK36303<br>Industrial Robotics               | EMK4XXX03<br>Elective II                        |                                 |
|                                                                                                                           | EMK11103<br>Engineering Science                          | EMK10203<br>Engineering Skills II                            | EMK28203<br>Programmable Logic Controller             | EMK21803<br>Signal & Systems             | EMK39103<br>Electrical Machines & Drive | EMK31303<br>Engineering Technology Management | EMK41003<br>Technologist in Society             |                                 |
|                                                                                                                           |                                                          |                                                              |                                                       | EMK21503<br>Microcontroller System       | EMK36203<br>Industrial Automation       | EMK3XXX03<br>Elective I                       |                                                 |                                 |
|                                                                                                                           |                                                          |                                                              |                                                       | EMK28103<br>Pneumatic & Hydraulic        | EMK36703<br>Artificial Intelligence     |                                               |                                                 |                                 |
| <b>COMMON CORE COURSES</b><br>(9 CREDITS)                                                                                 | QM11103<br>Mathematics for Engineering Technology I      | QM11203<br>Mathematics for Engineering Technology II         | QM21303<br>Mathematics for Engineering Technology III |                                          |                                         |                                               |                                                 |                                 |
| <b>UNIVERSITY REQUIREMENT COURSES</b><br>(16 CREDITS)                                                                     | SMU12102<br>Integrity and Anti-Corruption <sup>[4]</sup> | SMB20102<br>English for General Communication <sup>[2]</sup> | SMB41002<br>University Malay Language <sup>[3]</sup>  |                                          |                                         |                                               | **SMB1XX02<br>Option Subject (Foreign Language) |                                 |
|                                                                                                                           | SMU13102<br>Appreciation of Ethics and Civilizations     | SMU13002<br>Philosophy and Current Issues                    | SMB31202<br>English for Technical Communication       | SMU22402<br>Engineering Entrepreneurship |                                         |                                               |                                                 |                                 |
|                                                                                                                           | SMZXXX01<br>Co-Curriculum I                              | SMZXXX01<br>Co-curriculum II                                 |                                                       |                                          |                                         |                                               |                                                 |                                 |
| <b>TOTAL CREDITS</b><br>(141 CREDITS)                                                                                     | <b>20</b>                                                | <b>18</b>                                                    | <b>19</b>                                             | <b>20</b>                                | <b>19</b>                               | <b>16</b>                                     | <b>17</b>                                       | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                                                                      | SMB10102<br>Preparatory English <sup>[1]</sup>           |                                                              |                                                       |                                          |                                         |                                               |                                                 |                                 |

Elective I : EMK36503 Robotics Control, EMK39203 Computer Integrated Manufacturing, EMK39303 Data Analytic & IoT

Elective II : EMK46203 Mechatronics Systems, EMK46303 Vision Systems, EMK46103 Automated Guided Vehicle

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.



**LIST OF COURSES**

| COURSE CODE | COURSE NAME                                                   |
|-------------|---------------------------------------------------------------|
| EMK12003    | Computer Aided Drawing [Lukisan Terbantu Komputer]            |
| EMK10103    | Engineering Skills I [Kemahiran Kejuruteraan I]               |
| EMK18003    | Computer Aided Drawing [Lukisan Terbantu Komputer]            |
| EMK18103    | Engineering Skills I [Kemahiran Kejuruteraan I]               |
| EMK10203    | Engineering Skills II [Kemahiran Kejuruteraan II]             |
| EMK11003    | Computer Programming [Pengaturcaraan Komputer]                |
| EMK11103    | Engineering Science [Sains Kejuruteraan]                      |
| EMK11203    | Electric Circuit Theory I [Teori Litar Elektrik I]            |
| EMK11303    | Electronics I [Elektronik I]                                  |
| EMK11403    | Digital Electronics [Elektronik Digit]                        |
| EMK12103    | Engineering Skills II                                         |
| EMK20002    | Industrial Attachment [Sangkutan Industri]                    |
| EMK21003    | Electromagnetic Field Theory [Teori Medan Elektromagnet]      |
| EMK21103    | Measurement & Instrumentation [Pengukuran & Peralatan]        |
| EMK21203    | Electric Circuit Theory II [Teori Litar Elektrik II]          |
| EMK21303    | Electronics II [Elektronik II]                                |
| EMK21403    | Electrical Machines Technology I [Teknologi Mesin Elektrik I] |
| EMK21503    | Microcontroller System [Sistem Mikropengawal]                 |
| EMK21603    | Power Electronics [Elektronik Kuasa]                          |

| COURSE CODE | COURSE NAME                                                                |
|-------------|----------------------------------------------------------------------------|
| EMK21703    | Communication System [Sistem Komunikasi]                                   |
| EMK21803    | Signal & Systems [Isyarat & Sistem]                                        |
| EMK22003    | Control System Technology [Teknologi Sistem Kawalan]                       |
| EMK28103    | Pneumatic & Hydraulic [Pneumatik & Hidraulik]                              |
| EMK29003    | Data Communication [Komunikasi Data]                                       |
| EMK30004    | Final Year Project I [Projek Tahun Akhir I]                                |
| EMK38004    | Design Project [Projek Rekabentuk]                                         |
| EMK31103    | Control System Technology [Teknologi Sistem Kawalan]                       |
| EMK31203    | Electrical Machines & Drive [Mesin Elektrik & Pemacu]                      |
| EMK31303    | Engineering Technology Management [Pengurusan Teknologi Kejuruteraan]      |
| EMK32103    | Electrical Installation [Pemasangan Elektrik]                              |
| EMK32003    | Electrical Machines Technology II [Teknologi Mesin Elektrik II]            |
| EMK32203    | Electrical Power System [Sistem Kuasa Elektrik]                            |
| EMK32303    | Renewable Energy System [Sistem Boleh Baharu]                              |
| EMK32403    | Power Quality (Elective) [Kualiti Kuasa]                                   |
| EMK32603    | Electromagnetic Field Theory [Teori Medan Elektromagnet]                   |
| EMK32803    | Electrical Substation Technology (Elective) [Teknologi Elektrik Pencawang] |
| EMK32903    | Artificial Intelligence (Elective) [Kecerdikan Buatan]                     |
| EMK33504    | Design Project [Projek Rekabentuk]                                         |

| COURSE CODE | COURSE NAME                                                                           |
|-------------|---------------------------------------------------------------------------------------|
| EMK36003    | Industrial Networking [Rangkaian Perindustrian]                                       |
| EMK36103    | Mechanics & Machine Design [Rekabentuk Mekanik & Mesin]                               |
| EMK36203    | Industrial Automation [Automasi Industri]                                             |
| EMK36303    | Industrial Robotics [Robotik Industri]                                                |
| EMK36503    | Robotics Control (Elective) [Kawalan Robotik (Elektif)]                               |
| EMK36703    | Artificial Intelligence [Kecerdikan Buatan]                                           |
| EMK39103    | Electrical Machines And Drives [ <i>Mesin Elektrik Dan Penggerak</i> ]                |
| EMK39203    | Computer Integrated Manufacturing (Elective) [Pembuatan Integrasi Komputer (Elektif)] |
| EMK39303    | Data Analytic & IoT (Elective) [Analitik Data & IoT (Elektif)]                        |
| EMK40006    | Final Year Project II [Projek Tahun Akhir II]                                         |
| EMK40112    | Industrial Training [Latihan Industri]                                                |
| EMK41003    | Technologist In Society [Juruteknologi dalam Masyarakat]                              |
| EMK42003    | Power System Protection and Switchgear [Perlindungan & Peralatansuis Sistem Kuasa]    |
| EMK42203    | Industrial Automation (Elective) [Automasi Industri]                                  |
| EMK42303    | Energy Efficiency and Management (Elective) [Kecekapan dan Pengurusan Tenaga]         |
| EMK42403    | High Voltage Technology (Elective) [Teknologi Voltan Tinggi]                          |
| EMK42503    | Power Electronics and Applications (Elective) [Elektronik Kuasa dan Aplikasi]         |
| EMK42603    | Energy Storage Technology (Elective) [Teknologi Penyimpanan Tenaga]                   |
| EMK42703    | Electric Vehicle Technology [Teknologi Kenderaan Elektrik]                            |

| COURSE CODE | COURSE NAME                                                                  |
|-------------|------------------------------------------------------------------------------|
| EMK46103    | Automated Guided Vehicle (Elective) [Kenderaan Berpandu Automatik (Elektif)] |
| EMK46203    | Mechatronic Systems (Elective) [Sistem Mekatronik (Elektif)]                 |
| EMK46303    | Vision Systems (Elective) [Sistem Penglihatan (Elektif)]                     |
| EMK49003    | Modern Control [Kawalan Moden]                                               |

**EMK12003****COMPUTER AIDED DRAWING****No of Credits: 3****Course Synopsis:**

This course provides an in-depth exploration of Computer-Aided Drawing (CAD) techniques essential for engineering technology applications. It emphasizes the development of proficiency in creating sophisticated 2D, 3D and electrical drawings using industry-standard CAD software. Students will master fundamental CAD techniques, applying them to solve broadly-defined engineering problems and design solutions with a focus on precision, efficiency, and adherence to industry standards.

**Course Outcomes:**

1. Ability to apply appropriate engineering drawing techniques in 2D and 3D model.
2. Ability to demonstrate mastery of CAD techniques in fundamental engineering drawing.
3. Ability to design the product in Computer Aided Drawing to solve broadly-defined engineering technology problems.

**EMK10103****ENGINEERING SKILLS I****No of Credits: 3****Course Synopsis:**

This course is designed to demonstrate the concepts and hands-on skills related to fundamental technical and soft engineering abilities. Students will learn basic electrical knowledge, including basic electronics, creating and assembling printed circuit boards, programming and simulation using common software, and basic mechanical workshop skills.

**Course Outcomes:**

1. Ability to apply basic electronic components to a printed circuit board using appropriate techniques.
2. Ability to apply programming and interfacing techniques to engineering.
3. Ability to apply machining processes and standard practices in mechanical workshops, with consideration for public health and safety procedures.

**EMK11003****COMPUTER PROGRAMMING****No of Credits: 3****Course Synopsis:**

The course introduces basic programming using high level language (C language). The main objective of this course is to prepare the students with the ability of problem solving with programming, familiarize with the programming tools such as organization chart, flowchart and pseudo code and then to implement them by developing C program.

**Course Outcomes:**

1. Ability to apply knowledge of programming techniques and principles.
2. Ability to design solutions for broadly-defined engineering technology related problems and design systems using computer programming techniques.
3. Ability to apply programming software for coding compiling, executing and debugging computer programs.
4. Ability to solve engineering technology related problem in a group project.

**EMK11103****ENGINEERING SCIENCE****No of Credits: 3****Course Synopsis:**

This course introduces the knowledge of material selection and properties changes in the engineering applications/real problems. Engineering science is a broad discipline, allowing students to merge multidisciplinary resources to propose and develop innovative, enduring solutions and transform the latest scientific discoveries into enabling new technologies in future.

**Course Outcomes:**

1. Ability to apply knowledge of the concept and principle of materials science to distinguish the types of material families, structure, properties and performance
2. Ability to identify and analyze the performance of materials using first principles of natural sciences.
3. Ability to communicate effectively on the principle of materials science in engineering applications through technical report and presentation.



**EMK12103****ENGINEERING SKILLS II****No of Credits: 3****Course Synopsis:**

In this course the students will be exposed to electrical safety, practices and precautions, electrical wiring drawing, single-phase and three-phase wiring. At the end of the course, students are expected to be able to solve simple engineering problems which require the engineering skills.

**Course Outcomes:**

1. Ability to apply knowledge of basic skills and standard practiced in electrical wiring according to electrical safety, practices and precautions.
2. Ability to create and assemble the domestic wiring based on standards practice.
3. Ability to apply appropriate techniques in single and three phase wiring.

**EMK11203****ELECTRIC CIRCUIT THEORY I****No of Credits: 3****Course Synopsis:**

This course covers the topics of introduction to the DC circuit's, fundamental laws and theorems. Students also get the knowledge of AC circuits that introduces phasor and sinusoidal steady-state analysis. This course intends to give the student knowledge on understanding the three-phase balance systems.

**Course Outcomes:**

1. Ability to apply knowledge of basic laws and methods of circuit analysis to solve the problems in DC and AC circuits.
2. Ability to analyse and solve the first and second-order circuits containing passive elements, DC sources, and switches using differential equations.
3. Ability to apply appropriate techniques to solve the problems in DC and AC circuits.
4. Ability to design a solution of circuit parameter containing sinusoidal steady-state sources using complex impedances and phasor representations.

**EMK11303****ELECTRONICS I****No of Credits: 3****Course Synopsis:**

This subject will expose the students with basic electronics devices. It provides a depth study on the concept of PN junction, operation and characteristics of the diode. The students will be emphasized to half wave rectifier, full wave rectifier, power supply filters and regulators, clipper and clamper diode circuit and voltage multipliers. The students also learn about the special-purpose of Zener diode in terms of its characteristics and applications. Bipolar junction transistors (BJTs) and various types of Field-effect Transistor (MOSFET) will be introduced in this course as well. Basic theories, principles and practical are stressed in this course.

**Course Outcomes:**

1. Ability to investigate and analyze the fundamental operating principle and output characteristics concepts of electronic devices.
2. Ability to apply knowledge of basic operations and performance electronic circuits through their applications in different areas to the solution of the engineering fundamental.
3. Ability to apply appropriate techniques to develop the basic concept of different construction, operation and characteristics biasing circuits and troubleshooting.

**EMK11403****DIGITAL ELECTRONICS****No of Credits: 3****Course Synopsis:**

The aim of this course is to introduce students to basic knowledge in digital electronics. This course focuses on the introduction and discussion of the fundamental of digital circuit design and analysis. The lectures cover the following topics: Numbering System, Algebraic Switching, Boolean Function, Combinational Logic Design and Sequential Logic Design.

**Course Outcomes:**

1. Ability to apply knowledge the basic principles of digital electronics.
2. Ability to evaluate digital system applications using combinational and sequential logic techniques.
3. Ability to apply appropriate techniques for digital electronics engineering technology-related problems.

**EMK32603****ELECTROMAGNETIC FIELD THEORY****No of Credits: 3****Course Synopsis:**

The purpose of this subject is to learn and understand basic theory of electromagnetism. It provides basic concepts and understanding of fundamentals laws of electrostatics and magnetostatics. Student should be able to understand the basic concept applications of these laws for differences field configurations are also introduced. This course also introduces transmission line theory and use of transmission lines as circuit elements. Student should be understand the theory and application of transmission line such as VSWR, reflection coefficient and impedance matching using smith chart is also introduced in this course.

**Course Outcomes:**

1. Ability to understand and analyse the different concepts of electromagnetic field theory and solve the problems with consideration of public health and safety, cultural and societal and environmental.
2. Ability to communicate effectively the concepts of fundamental laws governing electromagnetic fields and evaluate the physical quantities of electromagnetic fields in different media using the fundamental laws-based cases through technical report and presentation.
3. Ability to engage in independent and life-long learning on the theory and practical knowledge concept to solve problems in electromagnetic field theory based on characteristics of materials and their interactions with electric and magnetic fields.
4. Ability to evaluate the propagation concept of electromagnetic waves in different media in lossless and other environments, their sources, effects and theory of electromagnetic waves in practical problems.

**EMK22003****CONTROL SYSTEM TECHNOLOGY****No of Credits: 3****Course Synopsis:**

This course introduces to control system for engineering technology students. Students will be exposed to the mathematical modeling for electrical, electro-mechanical using block diagram, transfer functions, and signal-flow graphs. They will conduct system performance analysis in root locus, time and frequency domain. The course also covers system compensation design using PID and Ziegler-Nichols. The laboratory sessions will be conducted to enable the students to strengthen the theory.

**Course Outcomes:**

1. Ability to apply knowledge of mathematical models to the solution of the control system.
2. Ability to design solutions for broadly defined engineering technology problems using feedback control.
3. Ability to demonstrate experiments using modern tools for control system analysis.
4. Ability to function effectively in a group/team to design feedback control systems based on different types of controllers.

**EMK21103****MEASUREMENT & INSTRUMENTATION****No of Credits: 3****Course Synopsis:**

This course covers the basic concepts of modern measurement and instrumentation system. It is divided into several main topics namely the fundamentals of electronics instrumentation and measurement system, the working principles and application of sensors and transducers, principles and application of signal conditioning circuit including bridges, amplifier and filters, and finally display, data acquisition and interfacing techniques.

**Course Outcomes:**

1. Ability to apply knowledge of electronic instrumentation and measurement techniques.
2. Ability to analyze the standardization and quality system knowledge in measuring electronic circuits using electrical measurement techniques.
3. Ability to apply the appropriate techniques for various sensors and signal conditioning/processing in instrumentation and
4. Measurements.

**EMK21203****ELECTRIC CIRCUIT THEORY II****No of Credits: 3****Course Synopsis:**

This course introduces the basic concepts and engineering methods of AC circuit analysis. The contents include the concepts of mutual inductance, frequency response in AC circuit and two port networks. The student also will expose to the mathematical modelling in the electrical circuit.

**Course Outcomes:**

1. Ability to apply knowledge of standard parameters and elements for AC circuits in circuit theory analysis.
2. Ability to analyse techniques of mathematical modelling with respect to certain parameters in electric system.
3. Ability to design solutions to electrical circuits using mathematical modelling in circuit theorem.
4. Ability to apply appropriate tools for software and hardware to validate the electric circuit theory.

**EMK21303****ELECTRONICS II****No of Credits: 3****Course Synopsis:**

This course offers fundamental knowledge in analogue circuits, especially in operational principles and applications. It covers small-signal models and frequency response of amplifier circuits including Operational Amplifier, Active Filters and Voltage Regulator.

**Course Outcomes:**

1. Ability to apply and analyse the theoretical principles related to the operation of electronic circuits.
2. Ability to design the electronic circuits using discrete components.
3. Ability to evaluate operational principles in electronic circuits for real applications.
4. Ability to apply appropriate techniques with the suitability of electronic circuitry according to the associated applications.

**EMK21403****ELECTRICAL MACHINES TECHNOLOGY I****No of Credits: 3****Course Synopsis:**

This course offers the students with knowledge about magnetic circuits, electromagnetic, electromechanical, transformer and DC machines. The practical and laboratory work are designed to give the students a practical perspective of electromagnetic, transformer and DC machines. They are given the opportunity to fully utilize the latest available facilities to realize the knowledge of practical electromagnetic, transformer, and DC machine.

**Course Outcomes:**

1. Ability to apply knowledge of the basic concept of electromagnetism, transformer, DC motor and DC generator into the electrical machine.
2. Ability to analyze and solve the performance of transformer, DC motor and DC generator.
3. Ability to apply appropriate techniques to evaluate the performance of transformer, DC motor and DC generator.
4. Ability to investigate and evaluate the performance of DC Motor and DC generators.

**EMK21503****MICROCONTROLLER SYSTEM****No of Credits: 3****Course Synopsis:**

The aims of this course is to study the PIC microcontroller architecture. The programming languages using C and basic interfacing with input and output devices.

These knowledges are implemented to design a simple microcontroller based system.

**Course Outcomes:**

1. Ability to apply knowledge of a microcontroller programming language in C program
2. Ability to design an input and output devices with Timers, PWM and ADC using microcontroller programming language in C program
3. Ability to apply and design appropriate techniques related to the input and output devices with Timers, PWM and ADC in microcontroller
4. Ability to communicate effectively with justification of simple applications in microcontroller-based system.

**EMK21603****POWER ELECTRONICS****No of Credits: 3****Course Synopsis:**

This course introduces power electronics as a multidisciplinary and interdisciplinary application-oriented technology emphasizing the main criterion of electrical energy conversion: AC-DC, AC-AC, DC-DC, and DC-AC converters performance via waveform analysis. It also covers electronic devices such as diodes and transistors, but the emphasis is on circuit topology and function rather than on devices.

The primary background required is the understanding of the voltage-current relationships for linear devices as well as the concept of the Fourier Series.

**Course Outcomes:**

1. Ability to apply knowledge of power electronics devices and topologies to the solution of the engineering technology fundamental.
2. Ability to investigate and evaluate converter topologies and their performances through theoretical and simulation.
3. Ability to analyze and differentiate the various types of converter topologies.
4. Ability to apply appropriate techniques for power electronics-related problems.

**EMK21703****COMMUNICATION SYSTEM****No of Credits: 3****Course Synopsis:**

This subject will cover all the basic principles and concepts of a communication system including the basic elements of communication such as modulation techniques (amplitude modulation, angle modulations and digital modulations), transmission channels and transmission medium. In addition, signal propagations and noise in the communication system will be discussed.

**Course Outcomes:**

1. Ability to apply knowledge of the basic requirement of communication systems to solve the engineering fundamental.
2. Ability to select and apply appropriate types of modulation in communication systems.
3. Ability to design the appropriate research methodology to solve communication system technology.

**EMK21803****SIGNAL & SYSTEMS****No of Credits: 3****Course Synopsis:**

The course aims are to introduce students to the signals and systems in engineering technology. The concept of signals, linear time-invariant (LTI) systems characterization, and analysis through the Fourier Transform method for continuous-time signals (CTS) and discrete-time signals (DTS) are reviewed in this course. At the end of the course, the students are expected to be able to solve engineering problems related to signals and systems.

**Course Outcomes:**

1. Ability to analyze and differentiate the characteristic, process, and analysis method in signals and systems.
2. Ability to select and apply appropriate simulation tools for signals and systems.
3. Ability to engage in independent and life-long learning on the theory and practical knowledge in signals and systems.

**EMK20002****INDUSTRIAL ATTACHMENT****No of Credits: 2****Course Synopsis:**

This course exposes the Bachelor of Engineering Technology degree students with industrial experience, in addition to the compulsory industrial training. This course provides students with significant skills and practical knowledge, motivating them to become professional and successful technologist. The student will be exposed to the company's technical functions, organizational structure and operations, such as departmental function, work procedure, safety procedure, communication, technical skills and project management. The students will gain theoretical and practical knowledge during the industrial attachment period. The attachment period can be as minimum as four weeks.

**Course Outcomes:**

1. Ability to adapt to health, safety, legal and cultural requirements in working environment
2. Ability to execute tasks with professional ethics and responsibilities
3. Ability to work independently, interact with co-workers and work in a team
4. Ability to communicate effectively on the complex engineering technology activities performed in training

**EMK32003****ELECTRICAL MACHINES TECHNOLOGY II****No of Credits: 3****Course Synopsis:**

This course intends to give students fair knowledge of single-phase and three-phase induction motor, synchronous machine, motor starter, testing and maintenance of electrical machines. The practical and laboratory work are designed to give the students the practical perspective of the three-phase AC motor, open and fix motors, star-delta starter and testing the AC motor.

**Course Outcomes:**

1. Ability to apply knowledge of the concepts, related testing, and maintenances in understanding the principle of electrical machines.
2. Ability to analyze the classification of motor starter method for AC Machines.
3. Ability to design solutions for broadly defined engineering technology-related problems in synchronous generator and synchronous motor for electrical machines applications.
4. Ability to select and apply appropriate techniques for the three-phase induction motor and single phase induction motor and its application to electrical machines.

**EMK32103****ELECTRICAL INSTALLATION****No of Credits: 3****Course Synopsis:**

This course is designed to educated next electrical engineers with the application skills needed in modern electrical engineering practice. This course uses a combination of theory and practical based on real case project to demonstrate and reinforce the principles and skills. Students in this course are expected to work through the project based. The project are require student design complete electrical system in new building.

**Course Outcomes:**

1. Ability to identify and analyze the design of electrical installation to the solution of engineeing technology problems.
2. Ability to select and apply appropriate modern engineering and IT tools for electrical installation design.
3. Ability to communicate effectively on electrical installation design through technical report and presentation.
4. Ability to design the solution of electrical installation with consideration of public health and safety, cultural, societal and environmental.

**EMK32203****ELECTRICAL POWER SYSTEM****No of Credits: 3****Course Synopsis:**

This course offers a basic principle in electrical power system engineering which covers the topic of generation, transmission and distribution systems. The sub-topics that will be emphasized are such as the per-unit system, transmission line parameters and models, load characteristics, representations of components in power systems, symmetrical fault and unsymmetrical fault.

**Course Outcomes:**

1. Ability to analyze and solve the type and operation of power system generation.
2. Ability to select and apply appropriate engineering tools for generation, transmission and distribution systems.
3. Ability to investigate and evaluate the load characteristics and distribution system components in power systems.
4. Ability to communicate effectively on type and operation of power system generation through technical report and presentation.

**EMK33504****DESIGN PROJECT****No of Credits: 4****Course Synopsis:**

This course introduces the project that inclined towards engineering designs that is necessary for each Electrical Engineering Technology students during 3rd Year of study. The student will be given an engineering problem (or to identify the problem on their own) and gain experience by problem solving, investigation, research writing and effective presentation in the form of report and presentation. It is expected the students can be presented this project during exhibition or even poster presentation.

**Course Outcomes:**

1. Ability to design solutions for allocated engineering technology related problems and case study throughout stage of product development.
2. Ability to investigate appropriate methods or techniques to assist in complex engineering integrated design projects.
3. Ability to evaluate design project with consideration of public health and safety, cultural, societal and environment.
4. Ability to function effectively as an individual, and as a member or leader in diverse teams in developing an integrated design prototype.



5. Ability to communicate effectively on engineering technology problem through technical report and presentation.
6. Ability to demonstrate understanding of engineering technology project management principles and engineering economics by applying them in decision making process.

### EMK31203 PROGRAMMABLE LOGIC CONTROLLER

**No of Credits: 3**

#### Course Synopsis:

The course covers basic concept of PLC, PLC input and output components, PLC programming languages and PLC special programming techniques. Knowledge on theory acquired in lecture is also enhanced with a practical work conducted in laboratory. In the end of this course, the students are able to develop a PLC programming sequence operation system typically found in industrial or manufacturing environment.

#### Course Outcomes:

1. Ability to apply and analyze knowledge of PLC I/O components, operation and communications to the solution of the engineering specialization.
2. Ability to design solutions for broadly-defined engineering technology related problems and design systems using PLC programming languages.
3. Ability to apply PLC programming language and create programming sequence using a special programming techniques.

### EMK31303 ENGINEERING TECHNOLOGY MANAGEMENT

**No of Credits: 3**

#### Course Synopsis:

This course exposes the management skills and economic techniques of project development to engineering technology students. The role of economics is to assess the appropriateness of a given project, estimate its value, and justify it from an engineering technology standpoint. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineering technologist relating to project management.

#### Course Outcomes:

1. Ability to apply knowledge of project management and economic techniques to engineering technology project.
2. Ability to identify and evaluate the process of project management, work plans and cost estimation project.

3. Ability to apply and analyse the principles of engineering technology management to engineering technology project.
4. Ability to evaluate economic scenarios and apply decision making process in engineering technology project consideration of public health and safety, cultural, societal, and environmental.

### EMK32303 RENEWABLE ENERGY SYSTEM

**No of Credits: 3**

#### Course Synopsis:

This course will introduce students with conversion, storage, integration and economic assessment techniques for renewable energy systems. This course also enables students to assess and design basic system configuration of renewable energy technologies for both off-grid and grid-connected power generation.

#### Course Outcomes:

1. Ability to identify and analyze the principles renewable energy.
2. Ability to design the conversion of renewable energy technology.
3. Ability to apply appropriate techniques to develop for renewable energy technology related problems.

### EMK30004 FINAL YEAR PROJECT I

**No of Credits: 4**

#### Course Synopsis:

This course consists of lectures and independent study on the techniques of conducting laboratory and/or field experiments. The students are guided on the techniques and implementation of research and monitored based on the research plan, data analysis, interpretation and conclusion. The students are required to write, submit and defend their thesis to the internal examiners.

#### Course Outcomes:

1. Ability to design the appropriate research methodology to solve broadly defined engineering technology problems.
2. Ability to communicate effectively on engineering technology problem through technical report and presentation.
3. Ability to apply ethical principles and demonstrate responsibility in completing a technical project.
4. Ability to have the preparation on the theory and practical knowledge with organized arrangements

**EMK41003      TECHNOLOGIST IN SOCIETY****No of Credits: 3****Course Synopsis:**

This course introduces the main concepts in engineering and technology ethics, risk management and occupational safety and health as well as to expose the students to basic of law in the engineering and technology context. The course presents the introductory nature to enable technologists to appreciate factors that have to be taken into account in decision-making. At the end of the course, students are expected to be able to examine and assess issues and challenges faced by technologists relating to engineering and technology ethics, risk management and to understand the legal requirements related to engineering and technology field.

**Course Outcomes:**

1. Ability to apply ethical principles and evaluate the aspects and procedures of legal on engineering and technology issues.
2. Ability to apply and assess hazards, risk management, occupational safety and health (OSHA) and procedures of legal related to professional engineering technology practice.
3. Ability to apply principles of engineering management to engineering project.
4. Ability to engage in independent and life-long learning on the theory and practical knowledge of the necessities and development of sustainable energy.

**EMK42003      POWER SYSTEM PROTECTION AND SWITCHGEAR****No of Credits: 3****Course Synopsis:**

This course introduces varieties of circuit breakers, isolators, earthing switches, bus-bar and relays for protection of generators, motors, transformers from short circuits, over-voltage and other hazards caused by internal and external faults. This course also describes various neutral grounding of the equipment related to the protection systems.

**Course Outcomes:**

1. Ability to analyze the restriking phenomenon, operation and selection of switchgear equipment.
2. Ability to design neutral grounding concepts and performances.
3. Ability to apply appropriate techniques to investigate the abnormal condition on equipment, application, choice of protective relay correctly.

4. Ability to engage in independent and life-long learning on causes of overvoltage, evaluate the application of arrester to equipment protection the related insulation coordination problems and necessity of earthing neutral.

**EMK40006      FINAL YEAR PROJECT II****No of Credits: 6****Course Synopsis:**

This course consists of lectures and independent study on the techniques of conducting laboratory and field experiments. The students are guided on the techniques and implementation of research and monitored based on research plan, data analysis, interpretation and conclusion. In addition, students are required to write, submit and defend their final year project report to the examiners, as well as presenting the report in technical form.

**Course Outcomes:**

1. Ability to design a solution for a project in technical and scientific knowledge with consideration of public health and safety, cultural, societal, and environmental.
2. Ability to communicate effectively on engineering technology problem through technical report and presentation.
3. Ability to apply ethical principles and demonstrate responsibility in completing a technical project.
4. Ability to have the preparation on the theory and practical knowledge with organized arrangements.
5. Ability to demonstrate knowledge and understand of engineering management principles and economic decision-making to manage projects in electrical engineering technology.

**EMK40112****INDUSTRIAL TRAINING****No of Credits: 12****Course Synopsis:**

This practical-based course exposes students to a company technical functions and organizational structure and operation such as departmental function, work procedure, safety procedure, communication, technical skills and project management. During this course, the students will apply knowledge learned in the university and increased the related skills required in their future profession

**Course Outcomes:**

1. Ability to demonstrate technical knowledge and practical skills.
2. Ability to practice the health, safety, legal and cultural issues in working environment.
3. Ability to apply societal environmental and sustainable development in engineering problems.
4. Ability to demonstrate good work performance, work ethics during training period.
5. Ability to perform as individual, a member or leader in diverse technical teams.
6. Ability to communicate and operate assigned task given by host company.
7. Ability to engage in independent and life-long learning in specialist technologies.

**EMK32403****POWER QUALITY****No of Credits: 3****Course Synopsis:**

This course covers topics of power quality in power system. The student is exposed to specialist knowledge in power system such as voltage sags, transient and harmonics. This course will also cover mitigation or preventive method in power quality issue.

**Course Outcomes:**

1. Ability to apply and analyse knowledge of power quality disturbances in electrical power systems.
2. Ability to design solutions for electrical power quality disturbances that related to power quality problems.
3. Ability to select and apply appropriate techniques for typical problems associated with electrical power systems.
4. Ability to communicate effectively on electrical power quality disturbance design solutions in electrical power systems problem through report and

presentation.

**EMK32803****ELECTRICAL SUBSTATION TECHNOLOGY****No of Credits: 3****Course Synopsis:**

Substation Engineering is one of the specializations of the Industrial Power courses. Knowledge in this course covers the substation equipment in generation, transmission and distribution that is useful for students to understand electrical industrial power.

**Course Outcomes:**

1. Ability to apply and analyze the basic principles of substation equipment operation, maintenance and testing
2. Ability to identify and evaluate the substation principles and operations
3. Ability to investigate and analyze the operational parameters for busbar, circuit breaker, power transformer and grounding system.

**EMK32903****ARTIFICIAL INTELLIGENCE****No of Credits: 3****Course Synopsis:**

This course provides the knowledge of artificial intelligence (AI) and application of AI in robotic industries. The course covers conceptual framework in search techniques and implementation of machine learning in AI. In addition to these topics, specific domains such as speech and image recognitions.

**Course Outcomes:**

1. Ability to identify and analyze the right artificial intelligence techniques for robotic applications.
2. Ability to apply appropriate techniques using computer programming for artificial intelligence operation.
3. Ability to investigate and evaluate different type of artificial intelligence techniques.

**EMK42503 POWER ELECTRONICS AND APPLICATIONS****No of Credits: 3****Course Synopsis:**

This course provides the student an exposure application of Power Electronics and applications. It emphasizes fundamental concepts of power electronics, electrical machines types, and related applications.

**Course Outcomes:**

1. Ability to identify and analyze the suitable converter's parameters for power electronics & applications.
2. Ability to select and apply appropriate techniques for different types of power electronics applications
3. Ability to engage in independent and life-long learning on the theory and practical knowledge of the power electronics application.

**EMK42203 INDUSTRIAL AUTOMATION****No of Credits: 3****Course Synopsis:**

This course exposes the student the advance automation concept in the industries. The subject exposes the implementation of automation technology such as sensor, actuator and drives in manufacturing process. It also covers the hardware and software control techniques in industrial application.

**Course Outcomes:**

1. Ability to apply knowledge of automation concepts with consideration of public health and safety, cultural, societechnology in manufacturing process.
2. Ability to select and apply appropriate tools for pneumatic and PLC applications.
3. Ability to understand and evaluate the automation tal and environmental.

**EMK42303 ENERGY EFFICIENCY AND MANAGEMENT****No of Credits: 3****Course Synopsis:**

This course exposes the students to national and worlds economic perspectives on energy in terms of economics, problems and the current status of energy. Through plans and operations for energy management and energy-efficient

equipment, students will learn how efficient energy can be achieved. At the end of this course, students will be exposed to the techniques for energy audit such as analyzing energy consumptions and estimate a solution for energy-saving programs.

**Course Outcomes:**

1. Ability to apply and analyze the electricity tariff and energy management calculation in Malaysia.
2. Ability to select and apply appropriate simulation tools for energy management related problems.
3. Ability to understand and evaluate the problem-related demand-side management and evaluate an energy-saving solutions based on electrical energy audits with consideration of public health and safety, cultural, societal and environmental.
4. Ability to recognize the need for energy efficiency based on theory and practical knowledge of electrical systems and their conservation potentials.

**EMK42403 HIGH VOLTAGE TECHNOLOGY (ELECTIVE)****No of Credits: 3****Course Synopsis:**

This course exposes the students about insulating materials and their applications, breakdown phenomena in insulating material such as solids, liquids and gases. The course also covers generation and measurement of high DC, AC and impulse voltages and currents, high voltage testing techniques and testing of apparatus and equipment.

**Course Outcomes:**

1. Ability to apply and analyse knowledge of high voltage technology in engineering technology practice.
2. Ability to identify and evaluate the breakdown mechanism, generations and measurements of high voltage.
3. Ability to select and apply appropriate tools to validate the voltage and current in high voltage technology.
4. Ability to communicate effectively on design solutions in high voltage technology problem through report and presentation.

**EMK42603 ENERGY STORAGE TECHNOLOGY****No of Credits: 3****Course Synopsis:**

This course provides an in-depth understanding of various energy storage technologies, their applications, design principles, and integration into electrical systems. Students will explore different types of energy storage systems, including electrochemical, mechanical, thermal, and electromagnetic storage. Emphasis will be placed on battery technology, supercapacitors, and their role in renewable energy systems and smart grids.

**Course Outcomes:**

1. Ability to integrate energy storage systems with the applications of renewable energy and smart grids.
2. Ability to evaluate the economic viability and environmental impact of energy storage technologies, considering lifecycle assessment and sustainability principles.
3. Ability to apply appropriate techniques to optimize energy storage systems using modern engineering tools and software.

**EMK42703 ELECTRIC VEHICLE TECHNOLOGY****No of Credits: 3****Course Synopsis:**

This core course equips students with comprehensive knowledge and practical skills in electric vehicle (EV) technology. It encompasses the principles, design, and operation of electric vehicles, including detailed coverage of battery technologies and charging infrastructure. Additionally, the course addresses control strategies for driving electric motors.

**Course Outcomes:**

1. Ability to apply knowledge of different types of electric vehicle systems
2. Ability to evaluate the battery and charging technologies
3. Ability to analyze the control circuits for electric vehicle systems

**EMK18003 COMPUTER AIDED DRAWING [LUKISAN TERBANTU KOMPUTER]****No of Credits: 3****Course Synopsis:**

This course allows the students to develop proficiency in CAD software, 2D drafting, 3D modelling, and electrical wiring diagrams to create precise and according the industry-standard designs. The first part of the course involves sketching techniques, multi-view projections, dimension and assembly parts. The second part of the course concerns on Electrical and Electronic drawing.

**Course Outcomes:**

1. Ability to apply appropriate techniques of Computer Aided Drawing in 2D & 3D drawing
2. Ability to apply appropriate techniques of Computer Aided Drawing in electrical & electronic drawing.

**EMK18103 ENGINEERING SKILLS I [KEMAHIRAN KEJURUTERAAN I]****No of Credits: 3****Course Synopsis:**

This course focused entirely on practical, hands-on learning, essential for students in the Engineering Technology program. This course is designed to equip students with the foundational skills related to basic electronic, engineering software and basic mechanical.

**Course Outcomes:**

1. Ability to apply the health, safety procedures and regulations based on Regulations and Requirements.
2. Ability to apply knowledge of basic electrical skills within engineering equipment and software tools.
3. Ability to create the complete design of 3d model using appropriate software tools.
4. Ability to apply appropriate techniques in operating of mechanical equipment and tools.



**EMK10203 ENGINEERING SKILLS II [KEMAHIRAN KEJURUTERAAN II]****No of Credits: 3****Course Synopsis:**

This course is divided into three parts which are electrical domestic wiring, printed circuit board (PCB) and computer. In electrical domestic wiring students will be exposed to the single-phase and three-phase wiring including the introduction to all equipment's of wiring. In PCB part, students will be exposed to the skill of preparing a PCB from scratch until it complete. In computer part, student will learn the process of assembling, formatting and networking. At the end of the course, students are expected to be able to solve simple engineering problems which is require the engineering skills.

**Course Outcomes:**

1. Ability to apply knowledge of basic skills and standard practiced in electrical wiring, PCB and computer assembling, formatting and networking.
2. Ability to create and assemble the domestic wiring based on standards practice.
3. Ability to apply appropriate techniques and calibration skills to construct a complete PCB and computer assembling, formatting and networking.

**EMK28203 PROGRAMMABLE LOGIC CONTROLLER [PENGAWAL LOGIK BOLEHATURCARA]****No of Credits: 3****Course Synopsis:**

A Programmable Logic Controller (PLC) is a digital computer used to automate industrial processes, such as controlling machinery on factory assembly lines, and automation system. It consists of several key components, including a Central Processing Unit (CPU) that executes control instructions, Input/Output (I/O) modules that interface with sensors and actuators, a power supply, and communication interfaces for networking. PLCs are programmed using languages like Ladder Logic, Function Block Diagram (FBD) and Sequential Function Chart (SFC), enabling them to process inputs, execute control programs, and update outputs in real-time.

**Course Outcomes:**

1. Ability to apply appropriate tools of PLC I/O components, operation and communications to the solution of the engineering specialization.
2. Ability to conduct investigation on PLC programming language and create programming sequence using a special programming technique.
3. Ability to design solutions for broadly-defined engineering technology related problems and design systems using PLC programming languages.

**EMK28103 PNEUMATIC AND HYDRAULIC [PNEUMATIC AND HYDRAULIC]****No of Credits: 3****Course Synopsis:**

This course is designed to provide students with fundamentals actuators of pneumatic and hydraulic in system control. Students are expected to acquire knowledge of physical behavior of pneumatic and hydraulic symbols, components, electro-pneumatic and electro-hydraulic systems in applications. Knowledge on theory acquired in lecture is also enhanced with a practical work conducted in laboratory.

**Course Outcomes:**

1. Ability to analyze the fundamental and operation of pneumatic and hydraulic system.
2. Ability to design solutions for broadly-defined engineering technology related problems and design systems using pneumatic and hydraulic systems techniques.
3. Ability to apply appropriate techniques and calibration skills to construct a complete PCB and computer assembling, formatting and networking

**EMK29003 DATA COMMUNICATION [KOMUNIKASI DATA]****No of Credits: 3****Course Synopsis:**

This course provides a foundational understanding of communication systems, covering key topics such as the basics of signal transmission and reception, including Amplitude Modulation (AM) and Frequency Modulation (FM) techniques. Students will explore the design and operation of radio transmitters and receivers, essential for effective communication over radio frequencies. The course also introduces data communication principles, emphasizing the importance of reliable data transmission and error correction. The course concludes with an introduction to cybersecurity, where students will explore basic encryption techniques and the role of firewalls in protecting communication systems from potential threats.

**Course Outcomes:**

1. Ability to apply knowledge of the principles of data communication.
2. Ability to analyze the characteristic and method in data communication
3. Ability to apply appropriate simulation tools and types of modulation in data communication.

**EMK31103 CONTROL SYSTEM TECHNOLOGY [TEKNOLOGI SISTEM KAWALAN]****No of Credits: 3****Course Synopsis:**

This course introduces to control system for engineering technology students. Students will be exposed to mathematical modeling in time and frequency domain. This course also cover system compensation design using PID and lead-lag controllers.

**Course Outcomes:**

1. Ability to apply knowledge of mathematical models to the solution of the control system.
2. Ability to design solutions for broadly-defined engineering technology problems and design systems using feedback control.
3. Ability to select and apply appropriate controllers for system analysis.
4. Ability to function effectively in a group/team to design feedback control systems based on different types of controllers.

**EMK36103 MECHANICS & MACHINE DESIGN [REKABENTUK MEKANIK & MESIN]****No of Credits: 3****Course Synopsis:**

This course exposes the students in mechanics and mechanical fields. The objective of the course is to provide students with concepts and principles of mechanics in term of mathematical and design. Emphasis is given to the application of Computer Aided Engineering and Design in synthesizing elements and material selection within mechanical system design. The basic element of dynamics such as kinematics, machine mechanism, velocity and acceleration analysis will be covered. The component of machine design will include shaft, bearing, gear systems, power screw, belts and chain, shafts and bearings maybe added. Students will be exposed to the laboratory work and research using the latest design software.

**Course Outcomes:**

1. Ability to apply and analyse knowledge of mechanics concept and machine design.
2. Ability to analyze the force and equilibrium of rigid body for the structures.
3. Ability to investigate and evaluate machine elements to develop a mechanism.
4. Ability to select and apply appropriate tools to analyze the Stress, Deformation Analysis and general case of combine stress

**EMK36203****INDUSTRIAL AUTOMATION [AUTOMASI INDUSTRI]****No of Credits: 3****Course Synopsis:**

This course aims to convey the knowledge and application of industrial automation technologies. It combines the automation technology principles and its relationship with assembly process & system, sensor, actuator and drives technology. It also covers an industrial application in hardware and software control techniques, design, engineering analysis, planning, tooling and manufacturing.

**Course Outcomes:**

1. Ability to apply and assess the automation technology principles and its relationship with assembly process and material handling system in relation of public health and safety, cultural, societal and environmental.
2. Ability to apply knowledge of automation components such as sensor, actuator and drive/motion system.
3. Ability to select and apply appropriate tools using PLC, sensor, actuator and drive/motion in automation system.
4. Ability to understand and evaluate the principles of SCADA systems and the concept of CAD, CAM and CIM with consideration of public health and safety, cultural, societal and environmental.

**EMK38004****DESIGN PROJECT [PROJEK REKABENTUK]****No of Credits: 4****Course Synopsis:**

This course introduces the project that inclined towards engineering designs that is necessary for each Electrical Engineering Technology students during 3rd Year of study. The student will be given an engineering problem (or to identify the problem on their own) and gain experience by problem solving, investigation, research writing and effective presentation in the form of report and presentation. It is expected the students can be presented this project during exhibition or even poster presentation.

**Course Outcomes:**

1. Ability to design solutions for allocated engineering technology related problems and case study throughout stage of product development.
2. Ability to apply ethical principles and demonstrate responsibility in completing an integrated design project
3. Ability to function effectively as an individual, and as a member or leader in diverse teams in developing an integrated design prototype

4. Ability to understand and evaluate design project with consideration of public health and safety, cultural, societal and environment.
5. Ability to communicate effectively on engineering technology problem through technical report and presentation.

### EMK36703 ARTIFICIAL INTELLIGENCE [KECERDIKAN BUATAN]

**No of Credits: 3**

#### Course Synopsis:

This course provides the knowledge of artificial intelligence (AI) and application of AI in robotic industries. The course covers conceptual framework in search techniques and implementation of machine learning in AI. In addition to these topics, specific domains such as speech and image recognitions

#### Course Outcomes:

1. Ability to identify and analyze the right artificial intelligence techniques for robotic applications.
2. Ability to apply appropriate techniques using computer programming for artificial intelligence operation
3. Ability to investigate and evaluate different type of artificial intelligence techniques.

### EMK39103 ELECTRICAL MACHINES AND DRIVES [MESIN ELEKTRIK DAN PENGGERAK]

**No of Credits: 3**

#### Course Synopsis:

This course provides students with knowledge about the characteristics of electrical machines and drives. Students will analyze and evaluate the designs of various types, including motors, generators, and transformers. By the end of the course, students will be able to analyze, appraise, and design suitable electrical machines for engineering applications..

#### Course Outcomes:

1. Ability to apply knowledge of electrical machines and drives to specific design application.
2. Ability to design solution of related problem for electrical machines and drives to solve broadly-defined engineering technology.
3. Ability to conduct appropriate tools for electrical machines task related problems

### EMK36003

### INDUSTRIAL NETWORKING [RANGKAIAN PERINDUSTRIAN]

**No of Credits: 3**

#### Course Synopsis:

This course is designed to introduce the principles of network and communication system along with its applications in communication and other modern equipments. At the end of the course, the students are expected to provide clear understanding in fundamental concept of communication system and relate the principles to various applications in the industry. Students will learn the data communications and IP networks, then the field of industrial data communications. It includes Quality of Service (QoS), Real-Time Transmission, copper cable, Fiber Optics cable, Industrial Ethernet, Wireless Ethernet, Modbus, DeviceNet and Profibus.

#### Course Outcomes:

1. Ability to identify and analyze the principle of network and communication system.
2. Ability to investigate and evaluate the principle of various types of network and communication systems
3. Ability to select and apply appropriate equipment for the industrial network and communication technology.

### EMK36303

### INDUSTRIAL ROBOTICS [ROBOTIK INDUSTRI]

**No of Credits: 3**

#### Course Synopsis:

The objective of the course is to provide students with concepts and principles of robot system that is required in design of robot. Emphasis is given to the application of industrial robot design and task selection within robot system design. The basic element of robot system will understand such as the types of robots, capabilities, characteristics, robot control systems and software, kinematics analysis, principles of inverse kinematics, robot, robot work cell design, various industrial applications, sensors and drive mechanism.

#### Course Outcomes:

1. Ability to apply the robot system for specific design
2. Ability to design the robot system for specific task
3. Ability to conduct appropriate tools for industrial robot task related problems.

**EMK49003 MODERN CONTROLS [KAWALAN MODEN]****No of Credits: 3****Course Synopsis:**

This course introduces the state-space control technology to the students. This includes system modelling in state-space, state space representation in various form and more importantly controller design.

**Course Outcomes:**

1. Ability to apply the concept of state-space modelling technique
2. Ability to investigate and analyze the state-space representation model of a system
3. Ability to design controllers based on state-space model

**EMK36503 ROBOTICS CONTROL [KAWALAN ROBOTIK]****No of Credits: 3****Course Synopsis:**

In this course, the student will be able to use analysis tools and computer-aided design of control systems in the tasks usual analysis, simulation and controller design. The student will have knowledge to analyze, design and implement advanced robotic applications.

**Course Outcomes:**

1. Ability to apply knowledge of the fundamental concepts in robotics and applications.
2. Ability to analyze and design the operation of sensors, robots control and robotic programming.
3. Ability to investigate and analyze operational parameters for robots control in software or hardware development.
4. Ability to apply appropriate technique of object manipulations by robots for an intelligent system in industrial manufacturing.

**EMK39203 COMPUTER INTEGRATED MANUFACTURING [PEMBUATAN INTEGRASI KOMPUTER]****No of Credits: 3****Course Synopsis:**

This course introduces important concepts of material handling and identification and their applications in automation systems. The concept include introduction to

material transport system, conveyor system, storage system, automated storage system, automated identification and data technology, industrial robot. A significant improvement in the efficiency of operations and to maximize overall productivity of the plant or warehouse.

**Course Outcomes:**

1. Ability to apply and analyze knowledge of material handling principles and its relationship with assembly process.
2. Ability to investigate and evaluate the material handling equipment to meet desired industry needs.
3. Ability to investigate and evaluate the material handling equipment to meet desired industry needs.

**EMK39303 DATA ANALYTIC AND IOT [ANALITIK DATA DAN IOT]****No of Credits: 3****Course Synopsis:**

The course covers an introduction to the Internet-of-Things (IoT), IoT structures and its related environment including cloud platforms, data exploration and IoT data visualization. Furthermore, the students are introduced to data analysis within the IoT application environment such as statistic and probability theorem, hypothesis testing, regressions, dimensionality reduction and classification technique. At the end of the course, the students are expected to acquire new knowledge on IoT and data analytics and be able to apply the knowledge in real applications, particularly on the emerging IR4.0.

**Course Outcomes:**

1. Ability to apply and analyze knowledge of material handling principles and its relationship with assembly process.
2. Ability to investigate and evaluate the material handling equipment to meet desired industry needs.
3. Ability to investigate and evaluate the material handling equipment to meet desired industry needs.

**EMK46103 AUTOMATED GUIDED VEHICLE [KENDERAAN BERPANDU AUTOMATIK]****No of Credits: 3****Course Synopsis:**

This course introduces the students to the concepts and design of wheeled and walking robot mechanisms with a study on their kinematics and dynamics aspects. The course also introduces the principles and applications of Autonomous Guided Vehicles (AGV)

**Course Outcomes:**

1. Ability to apply knowledge of the moving mechanisms for mobile robots such as wheeled, walking, swimming, flying, and climbing robots
2. Ability to analyse the force-torque requirements of mobile robots and deciding the servo and stepper motor specifications.
3. Ability to select and apply the requirements of sensors, motor specifications and control systems for wheeled robot mechanisms
4. Ability to analyse the operation of mobile robots with consideration of professional engineering technology practice.

**EMK46203 MECHATRONIC SYSTEMS [SISTEM MEKATRONIK]****No of Credits: 3****Course Synopsis:**

This course aims to provide knowledge of mechatronics system. The effectiveness of measurement and actuation system in mechatronic systems will be explained. The theoretical aspects are validated with laboratory works.

**Course Outcomes:**

Ability to apply knowledge of a systems using sensors/transducers and relevant conditioning circuits  
 Ability to design the actuation systems, programmable logic controllers (PLC) and microprocessors & microcontrollers  
 Ability to apply appropriate techniques for Electro pneumatic and electro hydraulic system, input/output systems using programmable logic controllers (PLC) and microprocessors & microcontrollers.

**EMK46303 VISION SYSTEMS [SISTEM PENGLIHATAN]****No of Credits: 3****Course Synopsis:**

This course is designed to introduce the basic concepts of machine vision and

provide an understanding of the concepts of vision as well as image acquisition and processing. Basic techniques for classification and neural network will also be introduced. The course also helps the students to develop the ability of designing machine vision systems for industrial applications.

**Course Outcomes:**

1. Ability to apply knowledge of components of machine vision systems, image acquisition and sampling techniques to the solution of specialist knowledge
2. Ability to investigate and analyze the image processing techniques
3. Ability to design the machine vision system by utilizing image processing concepts
4. Ability to apply appropriate techniques to develop machine vision system



**UR6522003**  
**Bachelor of Technology in Electrical Maintenance System with Honours**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1**

To produce electrical system maintenance technologist that perform maintenance related work including electrical maintenance, facility manager, and energy manager.

**PEO 2**

To produce technopreneurs in electrical related technology.

**PEO 3**

To produce relevant, respected, and referred professionals in electrical maintenance technology.

## PROGRAMME OUTCOMES (PO)

### PO 1

**Knowledge:** Apply knowledge of technology fundamentals to broadly defined procedures, processes, systems, and methodologies in Electrical System Maintenance.

### PO 2

**Practical Skills and High Technology:** Able to suggest and apply latest tools and techniques to solve broadly defined problems.

### PO 3

**Analytical, Critical Thinking and Scientific Approach:** Demonstrate strong analytical and critical thinking skills to solve broadly defined problems in Electrical System Maintenance.

### PO 4

**Communication Skills:** Able to communicate and articulate effectively in both verbal and written among technologist communities and society at large

### PO 5

**Social Responsibility in Society and Technologist Community:** Demonstrate understanding of the societal related issues and the consequent responsibilities relevant to broadly defined technology practices

### PO 6

**Lifelong Learning and Information Management:** Recognize the needs for professional development and to engage independent lifelong learning in specialist technologists.

### PO 7

**Technopreneurship and Management Skills:** Demonstrate an awareness of management and technopreneurship practices in real perspective

### PO 8

**Ethics and Professionalism:** Demonstrate professionalism and social and ethical consideration.

### PO 9

**Teamwork and Leadership:** Demonstrate leadership quality, mentoring and work effectively in diverse teams.

| CURRICULUM STRUCTURE                                                                            |                                                          |                                                                 |                                                       |                                                                 |                                                              |                                                       |           |                                 |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------|-----------|---------------------------------|
| UR6522003 BACHELOR OF TECHNOLOGY IN ELECTRICAL MAINTENANCE SYSTEM WITH HONOURS INTAKE 2024/2025 |                                                          |                                                                 |                                                       |                                                                 |                                                              |                                                       |           |                                 |
| YEAR                                                                                            | FIRST                                                    |                                                                 | SECOND                                                |                                                                 | THIRD                                                        |                                                       |           | FOURTH                          |
| SEMESTER                                                                                        | 1                                                        | 2                                                               | 3                                                     | 4                                                               | 5                                                            | 6                                                     | BREAK     | 7                               |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES</b><br>(108 CREDITS)                          | EMT10104<br>Electrical System Drafting<br>and Simulation | EMT10405<br>Solar PV installation and<br>Maintenance            | EMT20105<br>Building Electrical<br>System Maintenance | EMT20405<br>Electrical Machine &<br>Drive System<br>Integration | EMT30105<br>Industrial Machinery<br>Control System<br>Design | EMT30710<br>Final Year Project                        |           | EMT40112<br>Industrial Training |
|                                                                                                 | EMT10204<br>Technical Reporting                          | EMT10505<br>Switchboard<br>Maintenance and<br>Calibration       | EMT20205<br>Renewable Energy<br>System Maintenance    | EMT20505<br>Energy Efficiency<br>Optimization                   | EMT30205<br>Monitoring system<br>Integration                 | EMT30504<br>Maintenance<br>Management<br>System (MMS) |           |                                 |
|                                                                                                 | EMT10305<br>Electrical System<br>Measurement & Testing   | EMT10603<br>Professional Practices                              | EMT20305<br>Generator System<br>Maintenance           | EMT20603<br>Collegiality<br>Interaction and<br>Management       | EMT30304<br>Industrial Data<br>Analysis                      | EMT30604<br>Project Planning<br>and Execution         |           |                                 |
|                                                                                                 |                                                          |                                                                 |                                                       | EMT20704<br>Technopreneur<br>Project 1                          | EMT30404<br>Technopreneur<br>Project 2                       |                                                       |           |                                 |
| <b>UNIVERSITY<br/>REQUIREMENT COURSES</b><br>(18 CREDITS)                                       | SMZ1XX01<br>Co-Curriculum I                              | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup>    | SMB1XX02<br>Third Language <sup>[5]</sup>             |                                                                 |                                                              |                                                       |           |                                 |
|                                                                                                 | SMB41002<br>University Malay<br>Language <sup>[3]</sup>  | SMZ2XX01<br>Co-Curriculum II                                    | SMB31202<br>English for Technical<br>Communication    | SMU22402<br>Engineering<br>Entrepreneurship                     | SMU13102<br>Appreciation of<br>Ethics and Civilization       |                                                       |           |                                 |
|                                                                                                 | SMU13002<br>Philosophy and Current<br>Issues             | SMB20102<br>English for General<br>Communication <sup>[2]</sup> |                                                       |                                                                 |                                                              |                                                       |           |                                 |
| <b>TOTAL CREDITS</b><br>(124 CREDITS)                                                           | <b>18</b>                                                | <b>18</b>                                                       | <b>19</b>                                             | <b>19</b>                                                       | <b>20</b>                                                    | <b>8</b>                                              | <b>10</b> | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                                            | SMB10102<br>Preparatory English <sup>[1]</sup>           |                                                                 |                                                       |                                                                 |                                                              |                                                       |           |                                 |

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

[5] SMB1XX02: Germany, Mandarin or Japanese

**LIST OF COURSES**

| COURSE CODE | COURSE NAME                                                                                  |
|-------------|----------------------------------------------------------------------------------------------|
| EMT10104    | Rangkaian Dan Simulasi Sistem Elektrik [Electrical System Drafting And Simulation]           |
| EMT10204    | Laporan Teknikal [Technical Reporting]                                                       |
| EMT10305    | Pengukuran Dan Pengujian Sistem Elektrik [Electrical System Measurement And Testing]         |
| EMT10405    | Pemasangan Dan Penyelenggaraan PV Solar [Solar PV Installation And Maintenance]              |
| EMT10505    | Penyelenggaraan Dan Penentuan Papan Suis [Switchboard Maintenance And Calibration]           |
| EMT10603    | Amalan Profesional [Professional Practice]                                                   |
| EMT20105    | Penyelenggaraan Sistem Elektrik Bangunan [Building Electrical System Maintenance]            |
| EMT20205    | Penyelenggaraan Sistem Tenaga Boleh Diperbaharui [Renewable Energy System Maintenance]       |
| EMT20305    | Penyelenggaraan Sistem Penjana [Generator System Maintenance]                                |
| EMT20405    | Integrasi Mesin Elektrik Dan Sistem Pemacu [Electrical Machine And Drive System Integration] |
| EMT20505    | Pengoptimuman Kecekapan Tenaga [Energy Efficiency Optimization]                              |
| EMT20603    | Interaksi Dan Pengurusan 'Collegiality' [Collegiality Interaction And Management]            |
| EMT20704    | Projek Keusahawanan Teknologi 1 [Technopreneur Project 1]                                    |
| EMT30105    | Rekabentuk Sistem Kawalan Jentera Industri [Industrial Machinery Control System Design]      |
| EMT30205    | Integrasi Sistem Pemantauan [Monitoring System Integration]                                  |
| EMT30304    | Analisis Data Perindustrian [Industrial Data Analysis]                                       |
| EMT30404    | Projek Keusahawanan Teknologi 2 [Technopreneur Project 2]                                    |
| EMT30504    | Sistem Pengurusan Penyelenggaraan (MMS) [Maintenance Management System (MMS)]                |
| EMT30604    | Perancangan Dan Pelaksanaan Projek [Project Planning And Execution]                          |

**LIST OF COURSES**

| COURSE CODE | COURSE NAME                                 |
|-------------|---------------------------------------------|
| EMT30704    | Projek Tahun Akhir 1 [Final Year Project 1] |
| EMT30806    | Projek Tahun Akhir 2 [Final Year Project 2] |
| EMT40112    | Latihan Industri [Industrial Training]      |



**EMT10104 RANGKAIAN DAN SIMULASI SISTEM ELEKTRIK [ELECTRICAL SYSTEM DRAFTING AND SIMULATION]****No of Credits: 4****Course Synopsis:**

The main objective of this course is to expose students with skills of applying Computer Aided Drafting and its application. This course provides the student an exposure of electrical installation design for low voltage application. It introduces the student with electrical symbol, design lighting and switch socket outlet (S/S/O) required and design schematic diagram for Distribution Board, Sub Switch Board and Main Switch Board. An introduction to OrCAD software also given.

**Course Outcomes:**

1. Ability to demonstrate general characteristic of electrical installation into the concepts of Computer Aided Drafting.
2. Ability to build electrical installation apparatus drawing for low voltage application.
3. Ability to demonstrate actual working drawings of electrical project.

**EMT10204 LAPORAN TEKNIKAL [TECHNICAL REPORTING]****No of Credits: 4****Course Synopsis:**

The objective of this course is to expose students to knowledge and skill in technical reporting using Excel, Word, and PowerPoint applications. In this course, students will be exposed to techniques and tips on producing a good formal report. Overall, it emphasizes the precise use of language and graphics to communicate technical and procedural information safely, legally, and ethically.

**Course Outcomes:**

1. Ability to apply knowledge of problem solving process to the effective reporting technique
2. Ability to show significant thinking abilities in analysing technical and professional documentation.
3. Ability to propose appropriate techniques to convey technical information in a clear and easily accessible format
4. Ability to manage information related to various technical information in order to produce good proposal reports

**EMT10305 PENGUKURAN DAN PENGUJIAN SISTEM ELEKTRIK [ELECTRICAL SYSTEM MEASUREMENT AND TESTING]****No of Credits: 5****Course Synopsis:**

To provide student with the concept, knowledge and skill in Electrical System Measurement And Testing especially in developing themselves as good technologist upon graduation.

**Course Outcomes:**

1. Ability to apply the relevant parameter to the measurement.
2. Ability to perform the tests and measurements using the proper tools and technique.
3. Ability to comply proper safety procedures in handling tools during measurement works.

**EMT10405 PEMASANGAN DAN PENYELENGGARAAN PV SOLAR [SOLAR PV INSTALLATION AND MAINTENANCE]****No of Credits: 5****Course Synopsis:**

This course is the first gateway for students to understand the photovoltaic system technology. This course will introduce students with terminologies used in solar photovoltaic (PV) system technology. It will enables student to assess, install and maintain solar PV system configuration for stand-alone and grid-connected power generation based on standard requirement by the agencies involved.

**Course Outcomes:**

1. Ability to apply appropriate knowledge to solve or interpret the fundamentals, main characteristics and components of PV system
2. Ability to apply suitable tools or techniques for specific purposes related to PV system.
3. Ability to demonstrate the awareness of standards or policies related to PV system in Malaysia.

**EMT10505 PENYELENGGARAAN DAN PENENTUKURAN PAPAN SUIS [SWITCHBOARD MAINTENANCE AND CALIBRATION]****No of Credits: 5****Course Synopsis:**

This course covers the acquiring of knowledge on the maintenance and calibration aspects of switchboard. All the associated components of switchboard including circuit breaker, relays and others will be looked into, to establish good knowledge on their functions, operations and others. In general, it emphasizes on the principles and safe practice in accordance to operations of switchboard.

**Course Outcomes:**

1. Ability to analyze basic principle of operation, construction and connections of a switchboard components and related equipment
2. Ability to demonstrate the calibration procedures on switchboard equipment using specific parameters
3. Ability to demonstrate proper safety procedures in maintenance work of switchboard equipment.

**EMT10603 AMALAN PROFESIONAL [PROFESSIONAL PRACTICE]****No of Credits: 3****Course Synopsis:**

Profesional Practices course aims to explain the main concepts in engineering and technology ethics, risk management and occupational safety and health as well as to expose the students to basic of law in the engineering and technology context.

**Course Outcomes:**

1. Ability to apply knowledge of the aspects and procedures of legal on engineering and technology issues.
2. Ability to show significant thinking abilities in analyzing hazards, the function of risk management and occupational safety and health (OSHA).
3. Ability to apply ethical principles on issues and challenges related to technology ethics.

**EMT20105 PENYELENGGARAAN SISTEM ELEKTRIK BANGUNAN [BUILDING ELECTRICAL SYSTEM MAINTENANCE]****No of Credits: 5****Course Synopsis:**

This course covers tools and maintenance tasks that can develop knowledge of basic building maintenance tools and materials, applied skills and techniques, industry health and safety standards, and preventive maintenance and troubleshooting practices in the building trades and facilities maintenance fields.

**Course Outcomes:**

1. Ability to perform safe practice of common maintenance tasks electrical systems used in buildings
2. Ability to demonstrate basic preventive and reactive maintenance procedures for residential homes, apartments, and appliances.
3. Ability to demonstrate an ethical awareness on safety and health while doing maintenance tasks.

**EMT20205 PENYELENGGARAAN SISTEM TENAGA BOLEH DIPERBAHARUI [RENEWABLE ENERGY SYSTEM MAINTENANCE]****No of Credits: 5****Course Synopsis:**

This course covers the fundamentals of renewable energy technologies such as solar, wind, hydro, biomass and fuel cells. Students will be taught about the principal of operation and maintenance of renewable energy systems where necessary. In addition, exposure to HOMER software will be conducted through this course to equip students with knowledge of techno-economic analysis. Complementary to the syllabus, there will be mini projects designed to enhance students' understanding about the control mechanism in renewable energy systems.

**Course Outcomes:**

1. Ability to apply appropriate knowledge to solve or interpret the fundamentals, main characteristics and components of different renewable energy sources and systems.
2. Ability to apply suitable tools or techniques in maintenance activities of renewable energy systems
3. Ability to perform simple techno-economical assessments and compare environmental impact of renewable energy systems.

**EMT20305 PENYELENGGARAAN SISTEM PENJANA [GENERATOR SYSTEM MAINTENANCE]****No of Credits: 5****Course Synopsis:**

This course covers the operation, maintenance, and service of the DC and AC generator systems. The DC and AC generator and its function in the electrical system are introduced. The principle of the control system, instrument, and metering, as well as generator protection system, are included. This course comprised of the maintenance strategy for DC and AC generator systems according to standard, which includes preventive maintenance. Also, this course encompasses the servicing method for DC and AC generator that related to fault diagnosis.

**Course Outcomes:**

1. Ability to apply knowledge of the concepts and principles of diesel generator operation to the solution of load balance and protection system.
2. Ability to demonstrate a deep investigative ability to solve problems related to 3 Phase AC and DC generator systems and load characteristics.
3. Ability to apply operational procedures, preventive maintenance strategy, and problem-solving for diesel generator systems according to standard.
4. Ability to demonstrate understanding of generator system and safety issues related to diesel generator to follow IEEE Standard Criteria for Diesel Generator.

**EMT20405 INTEGRASI MESIN ELEKTRIK DAN SISTEM PEMACU [ELECTRICAL MACHINE AND DRIVE SYSTEM INTEGRATION]****No of Credits: 5****Course Synopsis:**

This course is designed to introduce the student the principles of DC and AC motors drive control. This includes studying the concept of control modes for motor drives, connections and applications. The integration practices among PLC, microcontroller, motors, software, drives, computers, and other industrial equipment will be provided. Lectures and labs will place emphasis on the above items will allow the student to build a working integrated motor drive system throughout the semester.

**Course Outcomes:**

1. Ability to apply the concepts and techniques used in electrical machines drive system.
2. Ability to propose and employ control algorithm of Programmable Logic Controller (PLC), microcontroller and Variable Frequency Drive (VFD)

3. Ability to comply safety regulation in handling electrical machine and drive integration equipment.

**EMT20505 PENGOPTIMUMAN KECEKAPAN TENAGA [ENERGY EFFICIENCY OPTIMIZATION]****No of Credits: 5****Course Synopsis:**

This course exposes the students to national and world economic perspectives on energy in term of economics, problems and current status of energy. In addition, safety aspect of electrical equipments will also be exposed to the student to create awareness and safe working practice. Through plans and operation for energy management and energy efficient equipments, student will learn on how efficient energy utilization can be achieved. At the end of this course, students will be exposed to the techniques for energy audit such as analyzing energy consumptions and identify a solution for energy saving programs.

**Course Outcomes:**

1. Ability to understand energy management, standards, and safety aspect of efficient electrical energy utilization.
2. Ability to demonstrate the instrument and measurement tools of efficient electrical energy utilization.
3. Ability to demonstrate compliance to the energy policies and legislation, Electrical Hazards and Safety while performing energy management-related works.

**EMT20603 INTERAKSI DAN PENGURUSAN 'COLLEGIALITY' [COLLEGIALITY INTERACTION AND MANAGEMENT]****No of Credits: 3****Course Synopsis:**

The course provides a skill on how to develop and use the knowledge and skills needed for effective professional collaboration, including team meetings, parent conferences, co-teaching, and problem solving with colleagues..

**Course Outcomes:**

1. Ability to apply knowledge of pedagogical aids and organization behaviour.
2. Ability to function effectively in a group/team of managerial practice and application exercise.
3. Ability to discuss the role of systematic planning in solving problems related to organization management to follow the organizational behavior theory.

**EMT20704 PROJEK KEUSAHAWANAN TEKNOLOGI 1 [TECHNOPRENEUR PROJECT 1]****No of Credits: 4****Course Synopsis:**

Technopreneur Project 1 course exposes students to the various financial aspects of new ventures. These include approaches to securing start-up capital and venture financing. Students learn about basic accounting, essential financial indicators, the types of funds available, the different categories of investors, and the importance of intellectual property in securing finance. The financial details to be included in a business plan are required for investment purposes, valuation of the company, and the art of negotiation with investors.

**Course Outcomes:**

1. Ability to apply knowledge of various financial indicators & tools to prepare for financial information for a new business venture.
2. Ability to show significant thinking abilities in analysing financial statements.
3. Ability to communicate effectively on the art of negotiation.
4. Ability to demonstrate management and technopreneurship skills in completing mini project related to business models and revenue models.

**EMT30105 REKABENTUK SISTEM KAWALAN JENTERA INDUSTRI [INDUSTRIAL MACHINERY CONTROL SYSTEM DESIGN]****No of Credits: 5****Course Synopsis:**

One of the aspects of a good technologies is to have the capability of integrating the hardware and the software, thus an electrical technologies should be competence in programming. This course introduces basic programming using high level language (C language) includes study of PIC microcontroller architecture, its programming using C language and interfacing with input and output devices. These knowledge are gathered and applied to design microcontroller based system. Applying and analyse control system problems by utilizing controller system such as P, PI, PID and Ziegler-nichols into water level & flow, temperature and servo motor. The course also to understanding of the PLC central processing unit, input-output system, programming and peripheral devices, and programming languages and will developed skills in programming PLC ( omron and siemens) and applying in industrial PLC.

**Course Outcomes:**

1. Ability to apply knowledge of the concept in PLCs central processing unit, input-output system, programming and peripheral devices.
2. Ability to employ appropriate tools and techniques for control system

problems by utilizing controller system: such as P, PI, PID and Ziegler-Nichols into broadly defined industrial problem e.g. water level & flow, temperature and servo motor.

3. Ability to communicate effectively in evaluating the appropriate input and output devices for selected control system and programmable logic controller through technical report and presentation.

**EMT30205 INTEGRASI SISTEM PEMANTAUAN [MONITORING SYSTEM INTEGRATION]****No of Credits: 5****Course Synopsis:**

The course provides an introduction to the fundamentals of Supervisory Control And Data Acquisition (SCADA), the architecture, the componets, Human Machine Interface (HMI) and the applications of SCADA. Students also introduced to the concept of Internet of Things (IoT), network communications and the applications. Lectures and labs will place emphasis on the above items will allow the student to operate the monitoring system and make data analysis throughout the semester.

**Course Outcomes:**

1. Ability to apply the concept used in SCADA system development.
2. Ability to construct Human Machine Interface (HMI) in SCADA system and their the network communication.
3. Ability to demonstrate teamwork and leadership skills while doing group task.

**EMT30304 ANALISIS DATA PERINDUSTRIAN [INDUSTRIAL DATA ANALYSIS]****No of Credits: 4****Course Synopsis:**

This course introduces students to several exploratory data analyses that are useful in collecting, organizing, analysing and interpreting data based on numerical and graphical data presentation. Probability concepts and several probability distributions that are useful in dealing with different types of random variables are also covered. For the preparation of making decisions and performing statistical inferences, point and interval estimations will be introduced. Then, few techniques to perform statistical inferences using hypothesis testing and statistical modelling techniques to data using simple linear regression will be taught. The statistical knowledge and data analysis skills taught in this course are explored using suitable statistical software.

**Course Outcomes:**

1. Ability to apply knowledge of exploratory data analysis, probability concepts and inferential statistics.
2. Ability to apply statistical data analysis using suitable software.
3. Ability to employ data analysis in industrial practice.

**EMT30404 PROJEK KEUSAHAWANAN TEKNOLOGI 2 [TECHNOPRENEUR PROJECT 2]****No of Credits: 4****Course Synopsis:**

The start-up and growth of an enterprise invariably involves both human and financial capital. To manage the increasing pool of human resources and to convince venture capitalists to invest become two main issues especially for growing venture. This course consists of two parts: in the first part, organization and human resource management are introduced; in the second part, the focus is on writing a convincing business plan to attract venture capital investment. When enterprise starts to take shape and grow, more people will be hired, proper organization, team building and human resource management will become important issues. In this course, students will be exposed to the various organizational aspects relevant to new ventures and established companies. These include the pros and cons of the different organization structures, conflicts that may arise among employees, and approaches to building strong teams. Human resource management techniques will also be introduced and discussed. In the second part of the course, the business model canvas will be described listing the connections among the different components of a business. The value of a business plan and the techniques of writing a business plan will be introduced.

**Course Outcomes:**

1. Ability to apply knowledge of the business model canvas incorporating human and financial elements.
2. Ability to show significant thinking abilities in evaluating convincing business plan.
3. Ability to function effectively in a group to motivate all stakeholders and build a cohesive venture team.
4. Ability to display technopreneurship routine to complete a design project and business venture.



# FACULTY OF ELECTRONIC ENGINEERING & TECHNOLOGY (FKTEN)

## Programmes Offered:

1. Bachelor of Microelectronic Engineering with Honours
2. Bachelor of Computer Engineering with Honours
3. Bachelor of Biomedical Electronic Engineering with Honours
4. Bachelor of Electronic Engineering with Honours
5. Bachelor of Electronic Engineering Technology (Electronic Systems) with Honours
6. Bachelor of Electronic Engineering Technology (Electronic Telecommunication Design) with Honours
7. Bachelor of Electronic Engineering Technology (Electronic Network Design) with Honours
8. Bachelor of Technology in Industrial Electronic Automation with Honours
9. Diploma in Computer Engineering
10. Diploma in Electronic Engineering

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02600 Arau Perlis

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**UR6523001**  
**Bachelor of Microelectronic Engineering with Honours**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1**

Graduates who have demonstrated career advancement in the field of Microelectronic engineering or related engineering field.

**PEO 2**

Graduates who have contributed to a professional body or society.

**PEO 3**

Graduates who have engaged in lifelong learning or pursuing continuing education opportunities.

## PROGRAMME OUTCOMES (PO)

### PO 1

Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to the solution of complex engineering problems.

### PO 2

Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK1 to WK4).

### PO 3

Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.(WK5)

### PO 4

Conduct investigations of complex problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### PO 5

Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations. (WK6)

### PO 6

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (WK7)

### PO 7

Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (WK7)

### PO 8

Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)

### PO 9

Function effectively as an individual, and as a member or leader in diverse teams and in multi disciplinary settings.

### PO 10

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### PO 11

Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environment

### PO 12

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



| CURRICULUM STRUCTURE<br>UR6523001 BACHELOR OF MICROELECTRONIC ENGINEERING WITH HONOURS INTAKE 2024/2025 |                                                         |                                                |                                                                 |                                                    |                                                              |                                               |                                 |                                                           |                                                 |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------|---------------------------------|-----------------------------------------------------------|-------------------------------------------------|
| YEAR                                                                                                    | FIRST                                                   |                                                | SECOND                                                          |                                                    | THIRD                                                        |                                               |                                 | FOURTH                                                    |                                                 |
| SEMESTER                                                                                                | 1                                                       | 2                                              | 3                                                               | 4                                                  | 5                                                            | 6                                             | BREAK                           | 7                                                         | 8                                               |
| DISCIPLINE<br>CORE & ELECTIVE<br>COURSES<br>(102 CREDITS)                                               | NMJ11303<br>Circuit Theory                              | NMJ11203<br>Electrical Power<br>System         | *NMJ20303<br>Analog Electronic II                               | NMJ21603<br>Integrated Circuit<br>Design           | NMJ32303<br>Digital Integrated<br>Circuit Design             | NMJ32603<br>Computer<br>Architecture          | NMJ30905<br>Industrial Training | NMJ41802<br>Final Year<br>Project I                       | NMJ41904<br>Final Year<br>Project II            |
|                                                                                                         | NMJ10603<br>Electronic<br>Engineering Skills            | NMJ10303<br>Digital Electronic I               | *NMJ20503<br>Digital Electronic II                              | NMJ21203<br>Microprocessor                         | NMJ30203<br>Microelectronic<br>Fabrication I                 | NMJ30303<br>Microelectronic<br>Fabrication II |                                 | NMJ41103<br>Semiconductor<br>Packaging                    | NMJ40303<br>Reliability and<br>Failure Analysis |
|                                                                                                         | NMJ10403<br>Physics for<br>Electronics                  | NMJ10903<br>Computer<br>Programming            | NMJ20603<br>Semiconductor<br>Physics                            | *NMJ21803<br>Electromagnetic<br>Theory             | NMJ32903<br>Communication<br>Systems                         | NMJ31403<br>Digital Signal<br>Processing      |                                 | NMJXXXX3<br>Elective I                                    | NMJXXXX3<br>Elective IV                         |
|                                                                                                         | NMJ11103<br>Electronic Devices                          | NMJ10203<br>Analog Electronic I                | NMJ20703<br>Signal and Systems                                  | NMJ32703<br>Control Systems                        | NMJ30403<br>Instrumentation                                  | NMJ32004<br>Integrated Design<br>Project      |                                 | NMJXXXX3<br>Elective II                                   |                                                 |
|                                                                                                         |                                                         |                                                |                                                                 |                                                    |                                                              |                                               |                                 | NMJXXXX3<br>Elective III                                  |                                                 |
| COMMON<br>CORE COURSES<br>(17 CREDITS)                                                                  | QMQ10103<br>Engineering<br>Mathematics I                | QMQ10203<br>Engineering<br>Mathematics II      | QMQ20303<br>Engineering<br>Mathematics III                      | QMQ27103<br>Engineering<br>Statistics              | NMJ31603<br>Management for<br>Engineers                      | NMJ30602<br>Professional<br>Engineers         |                                 |                                                           |                                                 |
| UNIVERSITY<br>REQUIREMENT COURSES<br>(16 CREDITS)                                                       | SMB41002<br>University Malay<br>Language <sup>[4]</sup> | SMZXXX01<br>Co-Curriculum 2                    | SMB20102<br>English for General<br>Communication <sup>[2]</sup> | SMB31202<br>English for Technical<br>Communication | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[3]</sup> | SMU22402<br>Engineering<br>Entrepreneurship   |                                 | SMU13102<br>Appreciation of<br>Ethics and<br>Civilization | SMU13002<br>Philosophy and<br>Current Issues    |
|                                                                                                         | SMZXXX01<br>Co-Curriculum 1                             |                                                |                                                                 |                                                    |                                                              |                                               |                                 |                                                           |                                                 |
| TOTAL CREDITS<br>(135 CREDITS)                                                                          | 18                                                      | 16                                             | 17                                                              | 17                                                 | 17                                                           | 17                                            | 5                               | 16                                                        | 12                                              |
| AUDIT COURSES                                                                                           |                                                         | SMB10102<br>Preparatory English <sup>[1]</sup> |                                                                 |                                                    |                                                              |                                               |                                 |                                                           |                                                 |

Elective I, II, III (select any 3 courses) : NMJ30803 Reliability and Testability in Integrated Circuit Design, NMJ31703 Advanced Devices, NMJ40703 Micro-Electro-Mechanical Systems, NMJ40903 Optical Communication

Elective IV (select any 1 course) : NMJ40403 Nanoelectronic Engineering, NMJ42403 Optoelectronic System, NMJ40203 Data Analytics

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students should register SMU13202 Malaysian Studies.

[4] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

\*Courses with prerequisite

| Courses  | Prerequisite |
|----------|--------------|
| NMJ20303 | NMJ10203     |
| NMJ20503 | NMJ10303     |
| NMJ21803 | QMQ10103     |

## UR6523002

### Bachelor of Computer Engineering with Honours

#### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

##### PEO 1

Graduates who have demonstrated career advancement in the field of Computer Engineering or related engineering field

##### PEO 2

Graduates who have contributed to a professional body or society

##### PEO 3

Graduates who have engaged in lifelong learning or pursuing continuing education opportunities

## PROGRAMME OUTCOMES (PO)

### PO 1

Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to the solution of complex engineering problems.

### PO 2

Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK1 to WK4)

### PO 3

Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (WK5)

### PO 4

Conduct investigations of complex problems using research- based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### PO 5

Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations. (WK6)

### PO 6

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (WK7)

### PO 7

Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts including ability to have entrepreneurship skills. (WK7)

### PO 8

Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)

### PO 9

Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

### PO 10

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### PO 11

Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environment.

### PO 12

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

| CURRICULUM STRUCTURE<br>UR6523002 BACHELOR OF COMPUTER ENGINEERING WITH HONOURS INTAKE 2024/2025 |                                                     |                                                |                                                              |                                                      |                                                      |                                                |                                 |                                     |                                                            |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------|------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|------------------------------------------------|---------------------------------|-------------------------------------|------------------------------------------------------------|
| YEAR                                                                                             | FIRST                                               |                                                | SECOND                                                       |                                                      | THIRD                                                |                                                |                                 | FOURTH                              |                                                            |
| SEMESTER                                                                                         | 1                                                   | 2                                              | 3                                                            | 4                                                    | 5                                                    | 6                                              | BREAK                           | 7                                   | 8                                                          |
| DISCIPLINE<br>CORE & ELECTIVE<br>COURSES<br>(102 CREDITS)                                        | NMJ11303<br>Circuit Theory                          | NMJ10803<br>Circuit Theory II                  | NMJ20303<br>Analog Electronics II                            | NMJ21803<br>Electromagnetic Theory                   | NMJ30504<br>Electronic Instrumentation & Measurement | NMJ32404<br>Embedded System Design             | NMJ30905<br>Industrial Training | NMJ41802<br>Final Year Project I    | NMJ41904<br>Final Year Project II                          |
|                                                                                                  | NMJ11004<br>Computer Programming                    | NMJ10203<br>Analog Electronics I               | NMJ20404<br>Digital Electronics II                           | NMJ32703<br>Control Systems                          | NMJ32903<br>Communication Systems                    | NMJ31804<br>Principle of Computer Architecture |                                 | NMJ42503<br>Modern Operating System | NMJ42303<br>Real Time System                               |
|                                                                                                  | NMJ11103<br>Electronic Devices                      | NMJ10303<br>Digital Electronics I              | NMJ20003<br>Algorithm and Data Structures                    | NMJ21704<br>Microprocessor Systems                   | NMJ32203<br>Computer Networks                        | NMJ32004<br>Integrated Design Project          |                                 | NMJ40603<br>Artificial Intelligence | Open Elective /3                                           |
|                                                                                                  |                                                     | NMJ10503<br>Electrical Engineering             | NMJ20703<br>Signals and Systems                              | NMJ21403<br>Object-oriented Programming              | NMJ31403<br>Digital Signal Processing                |                                                |                                 | Program Elective I /3               |                                                            |
|                                                                                                  |                                                     |                                                |                                                              |                                                      |                                                      |                                                |                                 | Program Elective II /3              |                                                            |
| COMMON<br>CORE COURSES<br>(17 CREDITS)                                                           | QMQ10103<br>Engineering Mathematics I               | QMQ10203<br>Engineering Mathematics II         | QMQ22103<br>Discrete Mathematics and Linear Algebra          | QMQ27203<br>Probability and Statistic                | NMJ31603<br>Management for Engineers                 | NMJ30602<br>Professional Engineers             |                                 |                                     |                                                            |
| UNIVERSITY<br>REQUIREMENT COURSES<br>(16 CREDITS)                                                | SMZXXX01<br>Co-Curriculum 1                         | SMZXXX01<br>Co-curriculum 2                    | SMB20102<br>English for General Communication <sup>[2]</sup> | SMB41002<br>University Malay Language <sup>[3]</sup> | SMB31202<br>English for Technical Communication      | SMU22402<br>Engineering Entrepreneurship       |                                 |                                     | SMU12102<br>Integrity and Anti - Corruption <sup>[4]</sup> |
|                                                                                                  | SMU13002<br>Philosophy and Current Issues           |                                                |                                                              |                                                      |                                                      |                                                |                                 |                                     |                                                            |
|                                                                                                  | SMU13102<br>Appreciation of Ethics and Civilization |                                                |                                                              |                                                      |                                                      |                                                |                                 |                                     |                                                            |
| TOTAL CREDITS<br>(135 CREDITS)                                                                   | 18                                                  | 16                                             | 18                                                           | 18                                                   | 18                                                   | 16                                             | 5                               | 14                                  | 12                                                         |
| AUDIT COURSES                                                                                    |                                                     | SMB10102<br>Preparatory English <sup>[1]</sup> |                                                              |                                                      |                                                      |                                                |                                 |                                     |                                                            |

Elective I & II (select any 2 courses) : NMJ41203 Image Processing, NMJ40503 Software Engineering, NMJ40803 Internet of Things, NMJ42603 Computer Security, NMJ42703 Cloud Computing  
Open Elective (select 1 course) : NMJ41403 Network Programming, NMJ40203 Data Analytics, NMJ42803 FPGA Programming

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.



**UR6523004**  
**Bachelor of Biomedical Electronic Engineering with Honours**

## **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

### **PEO 1**

Graduates who have demonstrated career advancement in the field of Biomedical Electronic Engineering or related engineering field

### **PEO 2**

Graduates who are involved in a professional body or society

### **PEO 3**

Graduates who pursue life-long learning



## PROGRAMME OUTCOMES (PO)

### PO 1

Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to the solution of complex engineering problems.

### PO 2

Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK1 to WK4)

### PO 3

Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (WK5)

### PO 4

Conduct investigations of complex problems using research- based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### PO 5

Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations. (WK6)

### PO 6

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (WK7)

### PO 7

Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts including ability to have entrepreneurship skills. (WK7)

### PO 8

Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)

### PO 9

Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

### PO 10

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### PO 11

Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environment.

### PO 12

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

| CURRICULUM STRUCTURE<br>UR6523004 BACHELOR OF BIOMEDICAL ELECTRONIC ENGINEERING WITH HONOURS INTAKE 2024/2025 |                                                              |                                                                 |                                                      |                                                    |                                                                           |                                             |                                 |                                         |                                       |
|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------|---------------------------------|-----------------------------------------|---------------------------------------|
| YEAR                                                                                                          | FIRST                                                        |                                                                 | SECOND                                               |                                                    | THIRD                                                                     |                                             |                                 | FOURTH                                  |                                       |
| SEMESTER                                                                                                      | 1                                                            | 2                                                               | 3                                                    | 4                                                  | 5                                                                         | 6                                           | BREAK                           | 7                                       | 8                                     |
| DISCIPLINE<br>CORE & ELECTIVE<br>COURSES<br>(102 CREDITS)                                                     | NMJ11303<br>Circuit Theory                                   | NMJ10903<br>Computer<br>Programming                             | NMJ21103<br>Engineering<br>Mechanics                 | NMJ20103<br>Biomaterials                           | NMJ31003<br>Mechanics of<br>Materials                                     | NMJ32903<br>Communication<br>System         | NMJ30905<br>Industrial Training | NMJ41802<br>Final Year Project I        | NMJ41904<br>Final Year Project II     |
|                                                                                                               | NMJ10603<br>Electronic<br>Engineering Skills                 | NMJ11503<br>Analog Electronic                                   | NMJ20303<br>Analog Electronics<br>II                 | NMJ21803<br>Electromagnetic<br>Theory              | NMJ32804<br>Linear Control Systems                                        | NMJ31103<br>Electrical Drives &<br>Machines |                                 | NMJ40003<br>Bioinstrumentation II       | NMJ41003<br>Artificial Organs         |
|                                                                                                               | NMJ10004<br>Anatomy &<br>Physiology                          | NMJ10303<br>Digital Electronic I                                | NMJ20703<br>Signals & Systems                        | NMJ20203<br>Biomechanics                           | NMJ30703<br>Safety, Standards and<br>Ethics In Biomedical<br>Engineering  | NMJ32004<br>Integrated<br>Design Project    |                                 | NMJ41503<br>Medical Imaging             | NMJXXX03<br>Elective II               |
|                                                                                                               |                                                              | NMJ10103<br>Biochemistry                                        | NMJ21003<br>Computer Aided<br>Design                 | NMJ21304<br>Microcontrollers &<br>Interfaces       | NMJ31303<br>Digital Signal<br>Processing in<br>Biomedical<br>Applications | NMJ30003<br>Bioinstrumentation I            |                                 | NMJXXX03<br>Elective I                  |                                       |
|                                                                                                               |                                                              |                                                                 |                                                      |                                                    |                                                                           | NMJ33003<br>Thermofluids                    |                                 |                                         |                                       |
| COMMON<br>CORE COURSES<br>(17 CREDITS)                                                                        | QMQ10103<br>Engineering<br>Mathematics I                     | QMQ10203<br>Engineering<br>Mathematics II                       | QMQ20303<br>Engineering<br>Mathematics III           | QMQ27103<br>Engineering<br>Statistics              |                                                                           |                                             |                                 | NMJ31603<br>Management for<br>Engineers | NMJ30602<br>Professional<br>Engineers |
| UNIVERSITY<br>REQUIREMENT<br>COURSES<br>(16 CREDITS)                                                          | SMZ1XX01<br>Co-Curriculum I                                  | SMZ2XX01<br>Co-Curriculum II                                    | SMU13102<br>Appreciation of<br>Ethics & Civilization | SMB31202<br>English for Technical<br>Communication | SMU22402<br>Engineering<br>Entrepreneurship                               |                                             |                                 |                                         |                                       |
|                                                                                                               | SMU13002<br>Philosophy and<br>Current Issues                 | SMB20102<br>English for General<br>Communication <sup>[2]</sup> |                                                      |                                                    | SMB41002<br>University Malay<br>Language <sup>[3]</sup>                   |                                             |                                 |                                         |                                       |
|                                                                                                               | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup> |                                                                 |                                                      |                                                    |                                                                           |                                             |                                 |                                         |                                       |
| TOTAL CREDITS<br>(135 CREDITS)                                                                                | 18                                                           | 18                                                              | 17                                                   | 18                                                 | 17                                                                        | 16                                          | 5                               | 14                                      | 12                                    |
| AUDIT COURSES                                                                                                 | SMB10102<br>Preparatory English <sup>[1]</sup>               |                                                                 |                                                      |                                                    |                                                                           |                                             |                                 |                                         |                                       |

Elective I : NMJ41303 Medical Image Processing, NMJ40103 Biosensor & BioMEMS.

Elective II : NMJ40603 Artificial Intelligence, NMJ41603 Medical Robotics.

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.



**UR6523005**  
**Bachelor of Electronic Engineering with Honours**

## **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

### **PEO 1**

Graduates who have demonstrated career advancement in the field of Electronic Engineering or related engineering field.

### **PEO 2**

Graduates who have contributed to a professional body or society

### **PEO 3**

Graduates who have engaged in lifelong learning or pursuing continuing education opportunities.

## PROGRAMME OUTCOMES (PO)

### PO 1

Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to the solution of complex engineering problems.

### PO 2

Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK1 to WK4)

### PO 3

Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (WK5)

### PO 4

Conduct investigations of complex problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### PO 5

Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations. (WK6)

### PO 6

Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (WK7)

### PO 7

Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (WK7)

### PO 8

Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)

### PO 9

Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

### PO 10

Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions

### PO 11

Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

### PO 12

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

| CURRICULUM STRUCTURE<br>UR6523005 BACHELOR OF ELECTRONIC ENGINEERING WITH HONOURS INTAKE 2024/2025 |                                                         |                                                |                                                                 |                                                    |                                                              |                                             |                                    |                                                                               |                                              |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------------|---------------------------------------------|------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------|
| YEAR                                                                                               | FIRST                                                   |                                                | SECOND                                                          |                                                    | THIRD                                                        |                                             |                                    | FOURTH                                                                        |                                              |
| SEMESTER                                                                                           | 1                                                       | 2                                              | 3                                                               | 4                                                  | 5                                                            | 6                                           | BREAK                              | 7                                                                             | 8                                            |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES</b><br>(103 CREDITS)                             | NMJ11303<br>Circuit<br>Theory                           | NMJ11203<br>Electrical Power<br>System         | *NMJ20303<br>Analog<br>Electronic II                            | NMJ21603<br>Integrated Circuit<br>Design           | NMJ32303<br>Digital Integrated<br>Circuit Design             | NMJ32603<br>Computer<br>Architecture        | NMJ30905<br>Industrial<br>Training | NMJ41802<br>Final Year<br>Project I                                           | NMJ41904<br>Final Year<br>Project II         |
|                                                                                                    | NMJ10603<br>Electronic<br>Engineering Skills            | NMJ10303<br>Digital<br>Electronic I            | *NMJ20503<br>Digital<br>Electronic II                           | NMJ21203<br>Microprocessor                         | NMJ31203<br>Microcontroller                                  | NMJ32503<br>VLSI Design                     |                                    | NMJ42003<br>MEMS Design and<br>Fabrication                                    | NMJ42203<br>System on Chip                   |
|                                                                                                    | NMJ10403<br>Physics for Electronic                      | NMJ10903<br>Computer<br>Programming            | NMJ20603<br>Semiconductor<br>Physics                            | *NMJ21803<br>Electromagnetic<br>Theory             | NMJ32903<br>Communication<br>Systems                         | NMJ31403<br>Digital Signal<br>Processing    |                                    | NMJ42103<br>Analogue<br>Integrated Circuit<br>Design                          | NMJXXXXX<br>Elective Course 2                |
|                                                                                                    | NMJ11103<br>Electronic<br>Devices                       | NMJ10203<br>Analog<br>Electronic I             | *NMJ20703<br>Signal and Systems                                 | NMJ32703<br>Control Systems                        | NMJ30403<br>Instrumentation                                  | NMJ32004<br>Integrated<br>Design Project    |                                    | NMJ30803<br>Reliability and<br>Testability in<br>Integrated Circuit<br>Design |                                              |
|                                                                                                    |                                                         |                                                |                                                                 |                                                    |                                                              |                                             |                                    | NMJXXXXX<br>Elective Course 1                                                 |                                              |
| <b>COMMON<br/>CORE COURSES</b><br>(17 CREDITS)                                                     | QMQ10103<br>Engineering<br>Mathematics I                | QMQ10203<br>Engineering<br>Mathematics II      | QMQ20303<br>Engineering<br>Mathematics III                      | QMQ27103<br>Engineering Statistics                 | NMJ31603<br>Management for<br>Engineers                      | NMJ30602<br>Professional<br>Engineers       |                                    |                                                                               |                                              |
| <b>UNIVERSITY<br/>REQUIREMENT COURSES</b><br>(16 CREDITS)                                          | SMB41002<br>University Malay<br>Language <sup>[4]</sup> | SMZXXX01<br>Co-Curriculum II                   | SMB20102<br>English for General<br>Communication <sup>[2]</sup> | SMB31202<br>English for Technical<br>Communication | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[3]</sup> | SMU22402<br>Engineering<br>Entrepreneurship |                                    | SMU13102<br>Appreciation of<br>Ethics and<br>Civilization                     | SMU13002<br>Philosophy and<br>Current Issues |
|                                                                                                    | SMZXXX01<br>Co-Curriculum I                             |                                                |                                                                 |                                                    |                                                              |                                             |                                    |                                                                               |                                              |
| <b>TOTAL CREDITS</b><br>(135 CREDITS)                                                              | <b>18</b>                                               | <b>16</b>                                      | <b>17</b>                                                       | <b>17</b>                                          | <b>17</b>                                                    | <b>17</b>                                   | <b>5</b>                           | <b>16</b>                                                                     | <b>12</b>                                    |
| <b>AUDIT COURSES</b>                                                                               |                                                         | SMB10102<br>Preparatory English <sup>[1]</sup> |                                                                 |                                                    |                                                              |                                             |                                    |                                                                               |                                              |

Elective Course 1 : NMJ42403 Optoelectronic System, NMJ31703 Advanced Devices  
 Elective Course 2 : NMJ40303 Reliability and Failure Analysis, NMJ40403 Nanoelectronic Engineering

\*Courses with prerequisite

- [1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.  
 [2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.  
 [3] International students should register SMU13202 Malaysian Studies.  
 [4] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

| Courses  | Prerequisite |
|----------|--------------|
| NMJ20503 | NMJ10303     |
| NMJ20303 | NMJ10203     |
| NMJ21803 | QMQ10103     |
| NMJ20703 | QMQ20303     |



**LIST OF COURSES**

| COURSE CODE | COURSE NAME                                                             |
|-------------|-------------------------------------------------------------------------|
| NMJ11303    | Teori Litar [Circuit Theory]                                            |
| NMJ10603    | Kemahiran Kejuruteraan Elektronik [Electronic Engineering Skills]       |
| NMJ10403    | Fizik untuk Elektronik [Physics for Electronic]                         |
| NMJ11103    | Peranti Elektronik [Electronic Devices]                                 |
| NMJ11203    | Sistem Kuasa Elektrik [Electrical Power System]                         |
| NMJ10303    | Elektronik Digit I [Digital Electronic I]                               |
| NMJ10903    | Pengaturcaraan Komputer [Computer Programming]                          |
| NMJ10203    | Elektronik Analog I [Analog Electronic I]                               |
| NMJ20303    | Elektronik Analog II [Analog Electronic II]                             |
| NMJ20503    | Elektronik Digital II [Digital Electronic II]                           |
| NMJ20603    | Fizik Semikonduktor [Semiconductor Physics]                             |
| NMJ20703    | Isyarat Dan Sistem [Signal And Systems]                                 |
| NMJ21603    | Rekabentuk Litar Bersepadu [Integrated Circuit Design]                  |
| NMJ21203    | Mikropemproses [Microprocessor]                                         |
| NMJ21803    | Teori Elektromagnet [Electromagnetic Theory]                            |
| NMJ32703    | Sistem Kawalan [Control Systems]                                        |
| NMJ32303    | Rekabentuk Litar Bersepadu Digital [Digital Intergrated Circuit Design] |
| NMJ30203    | Fabrikasi Mikroelektronik I [Microelectronic Fabrication I]             |
| NMJ32903    | Sistem Perhubungan [Communication Systems]                              |

| COURSE CODE | COURSE NAME                                                                                                            |
|-------------|------------------------------------------------------------------------------------------------------------------------|
| NMJ30403    | Instrumentasi [Instrumentation]                                                                                        |
| NMJ31603    | Pengurusan Untuk Jurutera [Management For Engineers]                                                                   |
| NMJ32603    | Senibina Komputer [Computer Architecture]                                                                              |
| NMJ30303    | Fabrikasi Mikroelektronik II [Microelectronic Fabrication II]                                                          |
| NMJ31403    | Pemprosesan Isyarat Digital [Digital Signal Processing]                                                                |
| NMJ32004    | Projek Rekabentuk Bersepadu [Integrated Design Project]                                                                |
| NMJ30602    | Jurutera Profesional [Professional Engineers]                                                                          |
| NMJ41802    | Projek Tahun Akhir I [Final Year Project I]                                                                            |
| NMJ41103    | Pembungkusan Semikonduktor [Semiconductor Packaging]                                                                   |
| NMJ41904    | Projek Tahun Akhir II [Final Year Project II]                                                                          |
| NMJ40303    | Kebolehharapan Dan Analisa Kegagalan [Reliability and Failure Analysis]                                                |
| NMJ30803    | Ketahanan dan Kebolehujian Dalam Rekabentuk Litar Bersepadu [Reliability and Testability In Integrated Circuir Design] |
| NMJ31703    | Peranti-peranti Termanju [Advanced Devices]                                                                            |
| NMJ40403    | Kejuruteraan Nanoelektronik [Nanoelectronic Engineering]                                                               |
| NMJ42403    | Sistem Optoelektronik [Optoelectronic System]                                                                          |
| NMJ40703    | Sistem Mikroelektromekanikal [Microelectromechanical System]                                                           |
| NMJ40903    | Perhubungan Optik [Optical System]                                                                                     |
| NMJ40203    | Data Analitik [Data Analytics]                                                                                         |
| NMJ30905    | Latihan Industri [Industrial Training]                                                                                 |

| COURSE CODE | COURSE NAME                                                                                                               |
|-------------|---------------------------------------------------------------------------------------------------------------------------|
| NMJ31203    | Mikropengawal [Microcontroller]                                                                                           |
| NMJ31602    | Pengurusan Untuk Jurutera [Management For Engineers]                                                                      |
| NMJ32503    | Rekabentuk VLSI [VLSI Design]                                                                                             |
| NMJ42003    | Rekabentuk Dan Fabrikasi MEMS [MEMS Design And Fabrication]                                                               |
| NMJ42103    | Rekabentuk Litar Bersepadu Analog [Analogue Integrated Circuit Design]                                                    |
| NMJ42203    | Sistem Atas Cip [System on Chip]                                                                                          |
| NMJ10004    | Anatomi dan Fisiologi [Anatomy & Physiology]                                                                              |
| NMJ11503    | Elektronik Analog [Analog Electronic]                                                                                     |
| NMJ10103    | Biokimia [Biochemistry]                                                                                                   |
| NMJ21103    | Mekanik Kejuruteraan [Engineering Mechanics]                                                                              |
| NMJ21003    | Reka Bentuk Terbantu Komputer [Computer Aided Design]                                                                     |
| NMJ20103    | Biobahan [Biomaterials]                                                                                                   |
| NMJ20203    | Biomekanik [Biomechanics]                                                                                                 |
| NMJ21304    | Mikropengawal dan Pengantaramuka [Microcontroller and Interfaces]                                                         |
| NMJ31003    | Mekanik Bahan [Mechanics Of Materials]                                                                                    |
| NMJ32804    | Sistem Kawalan Lelurus [Linear Control Systems]                                                                           |
| NMJ30703    | Keselamatan , Piawaian dan Etika Dalam Kejuruteraan Bioperubatan [Safety, Standards and Ethics In Biomedical Engineering] |
| NMJ31303    | Pemprosesan Isyarat Digit dalam Aplikasi-Aplikasi Bioperubatan [Digital Signal Processing in Biomedical Applications]     |

| COURSE CODE | COURSE NAME                                                                          |
|-------------|--------------------------------------------------------------------------------------|
| NMJ33003    | Termobendalir [Thermofluids]                                                         |
| NMJ31103    | Mesin Elektrik Dan Pemacu [Electrical Drives and Machines]                           |
| NMJ30003    | Bioinstrumentasi I [Bioinstrumentation I]                                            |
| NMJ40003    | Bioinstrumentasi II [Bioinstrumentations II]                                         |
| NMJ41503    | Pengimejan Perubatan [Medical Imaging]                                               |
| NMJ41303    | Pemprosesan Imej Perubatan [Medical Image Processing]                                |
| NMJ40103    | Biopenderia dan BioMEMS [Biosensors and BioMEMS]                                     |
| NMJ41003    | Organ Buatan [Artificial Organs]                                                     |
| NMJ40603    | Kepintaran Buatan [Artificial Intelligence]                                          |
| NMJ41603    | Perubatan Robotik [Medical Robotics]                                                 |
| NMJ11004    | Pengaturcaraan Komputer [Computer Programming]                                       |
| NMJ10803    | Litar Elektrik II [Circuit Theory II]                                                |
| NMJ10503    | Kejuruteraan Elektrik [Electrical Engineering]                                       |
| NMJ20404    | Elektronik Digit II [Digital Electronics II]                                         |
| NMJ20003    | Algorithma Dan Struktur-Struktur Data [Algorithm And Data Structures]                |
| NMJ21704    | Sistem Mikropemproses [Microprocessor Systems]                                       |
| NMJ21403    | Pengaturcaraan Berasaskan Objek [Object Oriented Programming]                        |
| NMJ30504    | Instrumentasi Elektronik Dan Pengukuran [Electronic Instrumentation And Measurement] |

| COURSE CODE | COURSE NAME                                                     |
|-------------|-----------------------------------------------------------------|
| NMJ32203    | Rangkaian Komputer [Computer Networks]                          |
| NMJ32404    | Rekabentuk Sistem Terbenam [Embedded System Design]             |
| NMJ31804    | Prinsip Senibina Komputer [Principles Of Computer Architecture] |
| NMJ42303    | Sistem Masa Nyata [Real Time System]                            |
| NMJ42503    | Sistem Pengoperasian Moden [Modern Operating Systems]           |
| NMJ40503    | Kejuruteraan Perisian [Software Engineering]                    |
| NMJ40803    | Objek Rangkaian Internet [Internet Of Things]                   |
| NMJ41203    | Pemprosesan Imej [Image Processing]                             |
| NMJ42603    | Computer Network Security [Keselamatan Rangkaian Komputer]      |
| NMJ42703    | Cloud Computing [Pengkomputeran Awan]                           |
| NMJ41403    | Pengaturcaraan Rangkaian [Network Programming]                  |
| NMJ42803    | Pengaturcaraan FPGA [FPGA Programming]                          |



**NMJ11303 TEORI LITAR [CIRCUIT THEORY]****No of Credits: 3****Course Synopsis:**

Introduction to Electric Circuit course introduce students the method of analysis for linear electrical circuits based on the direct current (DC) and alternating current (AC) circuit theorems. The course can be categorized into 2 parts. First part is focusing on DC circuit. It covers the fundamental laws & theorem and circuit analytical technique. Second part, it emphasize on AC circuit. It introduces phasors, sinusoidal state analysis, using previous analytical techniques, under sinusoidal state excitation, RLC circuits, AC power calculations & power factor correction, RMS values & 3-phase balanced systems. At the end of the course, the student should be able to apply the theorems and concepts in order to analyze any linear electric circuits.

**Course Outcomes:**

1. Ability to apply circuit theorems and laws to solve simple circuit problems.
2. Ability to analyze complex circuit problems by using various analysis techniques.

**NMJ10603 KEMAHIRAN KEJURUTERAAN ELEKTRONIK [ELECTRONIC ENGINEERING SKILLS]****No of Credits: 3****Course Synopsis:**

This subject is 100% practical coursework and carried out 3 units credit hours. This course contains five modules which are introduction to electronic components and instrumentations, electronic circuit design and simulation, PCB design and fabrication, technical drawing, and electronic product design.

**Course Outcomes:**

1. Ability to measure the electronic components by using appropriate electronic instrumentations tools
2. Ability to construct electronic schematic diagrams and perform circuit simulation using suitable software
3. Ability to build and fabricate a printed circuit board (PCB)
4. Ability to draw a two-dimensional (2D) and a three-dimensional (3D) technical drawing
5. Ability to build a three-dimensional (3D) model of electronic product

**NMJ10403 FIZIK UNTUK ELEKTRONIK [PHYSICS FOR ELECTRONIC]****No of Credits: 3****Course Synopsis:**

This course introduces the principles of physics, which constitute the foundation for electronics, and microelectronics. The topics covered in the course are mechanics, oscillations and waves, thermodynamics, electricity and magnetism, optics, photons, and conduction of electricity in solids.

**Course Outcomes:**

1. Ability to apply concepts and principles of physics to solve engineering problems
2. Ability to analyze and solve engineering problems using concepts and principles of physics

**NMJ11103 PERANTI ELEKTRONIK [ELECTRONIC DEVICES]****No of Credits: 3****Course Synopsis:**

This course focuses on electronic devices namely diodes and transistors. Firstly, types of semiconductor materials and pn junction are introduced. Then, operation, characteristics and applications of diodes are covered. Finally, operation and characteristics of Bipolar Junction Transistors (BJTs) and Field Effect Transistors (FETs) are evaluated under various types of biasing.

**Course Outcomes:**

1. Ability to apply the fundamental concept of semiconductor materials, diodes, bipolar junction transistor (BJTs) and field effect transistors (FETs).
2. Ability to analyze diodes characteristics and application.
3. Ability to examine transistor characteristics and biasing techniques.

**NMJ11203 SISTEM KUASA ELEKTRIK [ELECTRICAL POWER SYSTEM]****No of Credits: 3****Course Synopsis:**

This course discusses the generation, transmission, and application of electrical power. It covers the principles of converting energy between mechanical and electrical forms in motors and generators, the principles of transformers which is used to change current and voltage levels, and the switch-mode circuit techniques for conversion of energy from one voltage to another.

**Course Outcomes:**

1. Ability to apply the fundamental knowledge of power conversion and power system components
2. Ability to analyze the fundamental concepts of electrical transformer, AC machines and DC machines.
3. Ability to evaluate the need of environmental and sustainable development in electrical power systems.

**NMJ10303 ELEKTRONIK DIGIT I [DIGITAL ELECTRONIC I]****No of Credits: 3****Course Synopsis:**

This course is intended to cover the introduction and discussion of the fundamental of digital circuit design and analysis. The lecture covers the following topics: Boolean Algebra, Numbering system, Basic Logic Gates, Combinational Circuit Design, Timing Diagram, Bi-State Memory Device and Sequential Circuit Design

**Course Outcomes:**

1. Ability to apply different numbering systems and to understand basic theory of binary system.
2. Ability to apply method of minimizing Boolean functions for digital logic circuit.
3. Ability to design and evaluate combinational logic circuit in terms of Boolean Function.
4. Ability to design and evaluate sequential logic circuit in terms of Boolean Function.

**NMJ10903 PENGATURCARAAN KOMPUTER [COMPUTER PROGRAMMING]****No of Credits: 3****Course Synopsis:**

This course introduces students the concept of computer programming with emphasis on engineering problems using C language. The aims are to provide students with programming and problem-solving skills. Coverage of the course includes the syntax, variables, data types, control flow, function, arrays, pointers, structures, and file processing. Throughout the course, students are expected to analyse and write a C programming for various applications.

**Course Outcomes:**

1. Ability to analyse programming concepts
2. Ability to develop a program for related problems
3. Ability to compile, execute and debug computer programs

**NMJ10203 ELEKTRONIK ANALOG I [ANALOG ELECTRONIC I]****No of Credits: 3****Course Synopsis:**

This course exposes the students to the fundamental of Analog Circuits encompass the amplifier design based on bipolar junction and field effect transistor, for single as well as multistagedesigns, power amplifiers and frequency response of amplifiers. The course has been design to provide basic analog electronics skills covering theories, practicals and simulations.

**Course Outcomes:**

1. Ability to apply the circuit theory and fundamentals of electronic devices to amplifier circuits.
2. Ability to design amplifier circuits.
3. Ability to simulate and analyze experimentally amplifier circuits

**NMJ20303 ELEKTRONIK ANALOG II [ANALOGUE ELECTRONIC II]****No of Credits: 3****Course Synopsis:**

The students will be exposed to the concept, operation, model, analyze and design of amplifiers. This course also prepares the students a basic understanding of operation amplifiers device and its operating principles as active filters, feedback circuits, oscillators and voltage regulators. In addition, students will be exposed to conduct experiments using operational amplifiers.

**Course Outcomes:**

1. Ability to explain and analyze principles and characteristics of op amp and its electronic circuits application
2. Ability to evaluate and design analogue electronic circuit given any electronic components and specification
3. Ability to apply appropriate techniques and engineering tools in solving experimental problems in analogue electronic

**NMJ20503 ELEKTRONIK DIGITAL II [DIGITAL ELECTRONIC II]****No of Credits: 3****Course Synopsis:**

This course introduces the students to the techniques in solving, designing and implementing complex engineering in digital electronics. The course emphasizes digital systems, focusing on sequential systems, computer design basics as well as memory devices. In this course, the students are exposed to digital basic, digital hardware and digital characteristics and parameters. For sequential systems, students are exposed to sequences in flip-flop systems and problem-solving techniques. Through finite state machines, students learn how to design and solve sequential systems using the Mealy and Moore model and their implementation using flip-flops. In addition, the algorithmic state machines to describe the sequential operations of a digital system are also included. The students will also be introduced to the basic operation of memory, types of memory and computer design basics.

**Course Outcomes:**

1. Ability to apply the necessary knowledge of digital electronics design concepts.
2. Ability to design and recommend solutions for complex digital electronics system.
3. Ability to create, select and apply appropriate techniques, resources and modern engineering tools to solve complex digital electronic problems.

**NMJ20603 FIZIK SEMIKONDUKTOR [SEMICONDUCTOR PHYSICS]****No of Credits: 3****Course Synopsis:**

This course is developed to provide the fundamental knowledge on semiconductor physics, devices characterizations and operation along with semiconductor technology. Recent advancement of semiconductor devices when scaling down the sizes also covers for this course. Semiconductor physics covers topics of introduction to semiconductor material, devices and technology, energy band and carrier concentration in thermal equilibrium, carrier transport phenomena and p-n junction. Meanwhile for semiconductor devices covers topics of bipolar transistor and related devices on the other hand other semiconductor such as MOSFET, MOS, MESFET and advanced devices related to recent semiconductor technology is discussed.

**Course Outcomes:**

1. Ability to apply the theory of semiconductor physics and basic operation of semiconductor device
2. Ability to analyse the semiconductor devices and properties, related to engineering fundamental in terms of its problems and performances.
3. Ability to evaluate semiconductor operation in terms of its enhancement and problems related to advanced semiconductor technology.

**NMJ20703 ISYARAT DAN SISTEM [SIGNAL AND SYSTEMS]****No of Credits: 3****Course Synopsis:**

This course develops the mathematical foundation and computational tools for processing continuous time and discrete-time signals in both time and frequency domains. Key concepts and tools introduced and discussed in this class include linear time-invariant systems, impulse response, frequency response, convolution, filtering, sampling and Fourier transform, Laplace transform and z-Transform.

**Course Outcomes:**

1. Ability to apply the concept of signal and system classifications, impulse response and convolution in both continuous and discrete time domain.
2. Ability to apply the concept of Fourier representation of continuous and discrete signals and their properties.
3. Ability to analyze linear and time-invariant systems using Laplace transform and its application
4. Ability to analyze and evaluate discrete systems using Z transform and their properties.

**NMJ21603 REKABENTUK LITAR BERSEPADU [INTEGRATED CIRCUIT DESIGN]****NO OF CREDITS: 3****Course Synopsis:**

The course will cover the basic logic circuit designs which include the design architecture from transistor and logic level, layout design, layout simulation of integrated circuits, as well as basic integrated circuits design techniques. The use of relevant software will also enable the students to understand better the IC Design concepts through simulations.

**Course Outcomes:**

1. Ability to apply Boolean Algebra and analyze logic circuits at transistor level using schematic.
2. Ability to design the layout of a circuit based on the design rules specified.
3. Ability to evaluate the CMOS transistor characteristics
4. Ability to work individually and as a team member or leader in performing IC Design-related tasks.

**NMJ21203 MIKROPEMROSES [MICROPROCESSOR]****No of Credits: 3****Course Synopsis:**

This course aims to study microprocessor architecture and relate that knowledge to the design of microprocessor-based systems, including the design technique for memory, input, and output. The study of the microprocessor instruction set and various software development tools are also emphasized as the knowledge are needed in the design of the microprocessor-based systems.

**Course Outcomes:**

1. Ability to apply the theory of microprocessor structure and design.
2. Ability to investigate and design the microprocessor programming, interfacing and operation using assembly language.
3. Ability to Ability to construct a microprocessor program to solve engineering related problem

**NMJ21803 TEORI ELEKTROMAGNET [ELECTROMAGNETIC THEORY]****No of Credits: 3****Course Synopsis:**

This course covers the fundamental laws and principles of electromagnetics which is the study of electric and magnetic fields in both static and dynamic cases. The topics covered are electrostatics, magnetostatics, electric and magnetic properties of matter, electromagnetic induction, Maxwell's equations, and electromagnetic wave propagation. At the end of the course, students are expected to have a firm grasp of important concepts and principles in electromagnetics, which will enable them to solve and analyze real-world complex engineering problems.

**Course Outcomes:**

1. Ability to apply vector calculus to electromagnetic problems
2. Ability to solve and analyze electrostatic and magnetostatic problems
3. Ability to solve and analyze problems involving time-varying fields and electromagnetic wave propagation

**NMJ32703 SISTEM KAWALAN [CONTROL SYSTEMS]****No of Credits: 3****Course Synopsis:**

This course will cover topics such as the concepts of control system, mathematical modeling, state variable models, transient response and forced response error. Stability of the system will be evaluated using Routh-Hurwitz Criterion, root locus and frequency response methods. Finally, various compensators and controllers will be designed based on the specification given.

**Course Outcomes:**

1. Ability to formulate mathematical model for electrical and mechanical systems.
2. Ability to evaluate the stability of a system using time and frequency domain analysis.
3. Ability to design various types of controller.

**NMJ32303 REKABENTUK LITAR BERSEPADU DIGITAL [DIGITAL INTEGRATED CIRCUIT DESIGN]****No of Credits: 3****Course Synopsis:**

The course introduces the students to hardware modelling using Verilog Hardware Description Language, as a means of design entry, simulation, and verification of digital circuits. The course provides hands-on experience using EDA tools, ModelSim and Quartus II. The course also teaches the students the logic synthesis and rapid prototyping with FPGAs

**Course Outcomes:**

1. Ability to apply necessary knowledge of an engineering fundamentals and engineering specialization in digital electronic design using Verilog HDL.
2. Ability to evaluate solutions for complex engineering problems and design a complete digital system using Verilog HDL.
3. Ability to create and conduct investigations on principles of Field Programmable Gate Array (FPGA) to provide valid conclusions.

**NMJ30203 FABRIKASI MIKROELEKTRONIK I [MICROELECTRONIC FABRICATION I]****No of Credits: 3****Course Synopsis:**

This introductory course on microelectronic fabrication focuses on the concept and the basics of semiconductor materials, process technology and the fabrication processes of Integrated Circuits (ICs). Topics covered in this course are as follow: Introduction to Microelectronic Fabrication, Cleanroom Technology, Safety & Protocol, Basics of Semiconductor, Wafer Manufacturing, Semiconductor Materials, Wafer Cleaning, Thermal Processes I: Oxidation, Thermal Processes II: Diffusion, Thermal Processes III: Ion Implantation & Annealing, Photolithography I, Photolithography II, Metallization I : CVD, Metallization II : PVD and Etching.

**Course Outcomes:**

1. Ability to analyze and evaluate the fundamental concept of the semiconductor fabrication technology which include materials, devices, processes, facilities and standard practices.
2. Ability to apply and manipulate appropriate parameters of wafer cleaning, photolithography, etching and thermal processes using microelectronic fabrication equipment.
3. Ability to engage and conclude the technological change in microelectronic fabrication technology.

**NMJ32903 SISTEM PERHUBUNGAN [COMMUNICATION SYSTEM]****No of Credits: 3****Course Synopsis:**

This course covers the basic principles of analog and digital communication including elements of communication, signal analysis, amplitude modulation, angular modulation, digital modulation, various application forms and transmission channels in the presence of noise. At the end of this course, students are expected to exhibit a clear understanding of communication systems relating to various engineering applications

**Course Outcomes:**

1. Ability to acquire and apply knowledge of modulation techniques and its application in communication system.
2. Ability to identify, analyze and evaluate the signal power, noise characteristics, application of communication systems
3. Ability to perform effectively as individual, and as a member or leader in diverse teams and in multidisciplinary settings to solve analog and digital communication problems.

**NMJ30403 INSTRUMENTASI [INSTRUMENTATION]****No of Credits: 3****Course Synopsis:**

This course covers the fundamental of electronic instrumentation. This includes the working principle and transduction properties of sensors and transducers. Importance and technique of signal conditioning is emphasized. Element and principle of data handling and acquisition with their application are discussed. Modern stand-alone and computer-based measurement instruments, and control system are also covered.

**Course Outcomes:**

1. Ability to apply and evaluate the fundamental concepts of electronic instrumentation, sensors/transducers, signal conditioning and data handling & processing.
2. Ability to identify, research literature and formulate solutions for measurement setup, data acquisition and control systems.
3. Ability to explain and devise the concept and application of the electronic instrumentation



**NMJ31603 PENGURUSAN UNTUK JURUTERA [MANAGEMENT FOR ENGINEERS]****No of Credits: 3****Course Synopsis:**

This course aims to teach students how to apply project management skills when undertaking projects and provide essential tools of the engineering economy to enable the students to carry out professional-quality economic evaluations. In addition, the students will be able to identify and discuss issues and challenges faced by engineers relating to project management in the current economic scenarios.

**Course Outcomes:**

1. Ability to combine the knowledge of engineering management principles and analyze its requirements in managing projects.
2. Ability to compile information and analyze engineering problems related to economic decision making in managing projects

**NMJ32603 SENIBINA KOMPUTER [COMPUTER ARCHITECTURE]****No of Credits: 3****Course Synopsis:**

This course will focus on the computer system with various designs of interface techniques, organization and architecture. The syllabus will cover the theory of basic computer system, format of instruction set, memory organization and arithmetic logic unit as well as certain issues of designing such as bus structure, parallel processing, pipelining and memory management.

**Course Outcomes:**

1. Ability to analyze the theory of computer system component and the interactions between components
2. Ability to critique and evaluate the theory of operation in term of central processing and control unit.
3. Ability to design and evaluate a computer simulation program to solve engineering related problem.

**NMJ30303 FABRIKASI MIKROELEKTRONIK II [MICROELECTRONIC FABRICATION II]****No of Credits: 3****Course Synopsis:**

This course focuses on the fabrication process module of the CMOS technology, where the students will learn on how to design, produce a mask, prepare the runcard (process flow of the MOSFET), fabricate the MOSFET, analyze and characterize the devices electrically. The students will also learn of the important CMOS process modules such as the well technology, isolation technology, multi-level interconnect technology as well as other related device issues mainly associated with device miniaturization.

**Course Outcomes:**

1. Ability to analyze and develop solutions to different processes problems in sub-integration module for CMOS device technology.
2. Ability to apply the appropriate resources in the CMOS process module for CMOS technology.
3. Ability to function effectively as a member or leader in addressing issues related to CMOS current technology.

**NMJ31403 PEMROSESAN ISYARAT DIGITAL [DIGITAL SIGNAL PROCESSING]****No of Credits: 3****Course Synopsis**

This course is three-hour lectures per week and is designed to give the students the necessary mathematical tools to analyze discrete time signals and systems. The course also includes various techniques for the design and analyzing of digital filters and their application in signal processing application such as speech processing and signal compression

**Course Outcomes:**

1. Ability to apply the knowledge of mathematic tools for analyzing and evaluating the discrete time signal
2. Ability to apply knowledge of discrete fourier transform and evaluate fast fourier transform structure.
3. Ability to design and construct digital finite impulse response and infinite impulse response filters.
4. Ability to analyze various signal processing techniques for a specific digital signal processing application.

**NMJ32004 PROJEK REKABENTUK BERSEPADU [INTEGRATED DESIGN PROJECT]****No of Credits: 4****Course Synopsis:**

An exposure to the students in Electronic design project. This project encompasses practical, innovation and invention elements in designing a solution to a specific engineering application. The students are expected to implement the knowledge and skills obtained in solving the specific engineering problem. The students are also need to practice their professional and social responsibilities in giving a sustainable solution via functioning in a multidisciplinary team.

**Course Outcomes:**

1. Ability to design solutions for complex engineering problems and design systems, components, or processes with appropriate engineering analysis.
2. Ability to propose solution by applying knowledge to solve problem with consideration of public health, safety, and culture in a society.
3. Ability to relate the impact of design solutions on the environmental and sustainability factors.
4. Ability to apply professionalism and ethical responsibilities in project implementation.
5. Ability to function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings to accomplish the design project.
6. Ability to communicate effectively on complex engineering activities via written, oral presentation and demonstration of the design solution.
7. Ability to demonstrate knowledge and understanding of Engineering management principles and economic decision making with clear problem statement, procedures, project management and costing.

**NMJ30602 JURUTERA PROFESIONAL [PROFESSIONAL ENGINEERS]****No of Credits: 3****Course Synopsis**

This course aims to explain the main concepts in engineering ethics, sustainable engineering, risk management, and occupational safety and health as well as to expose the students to basic law in the engineering context. The materials will be of introductory nature to enable engineers to appreciate factors that have to be taken into account in decision-making. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineers relating to engineering ethics, sustainable engineering, risk management and to understand the legal requirements related to the engineering field.

**Course Outcomes:**

1. Ability to interpret and appraise the various hazard, and function of risk management, occupational safety and health (OSHA) as wells as legal issues in professional engineering practice.
2. Ability to determine and discuss the sustainability and impact of engineering work on complex issues pertaining to societal and environmental contexts.
3. Ability to interpret and deduce the issues and challenges of engineering ethics and norms of engineering practice

**NMJ30803 KEBOLEHUJIAN DAN KEBOLEHARAPAN DALAM REKABENTUK LITAR TERKAMIR [RELIABILITY AND TESTABILITY IN INTEGRATED CIRCUIT DESIGN]****No of Credits: 3****Course Synopsis**

This course is basically divided into two areas: Reliability & testability. In the first section of Reliability, students will learn the concept of Reliability, its terms & definitions, the different types of Reliability Distributions and also the different types of Reliability Prediction Techniques. In the second section, which is testability, students will be exposed to overview of testing; components of design for testability such as ad hoc techniques, scan-path design, boundary scan testing (BScan) and built in self test (BIST).

**Course Outcomes:**

1. Ability to apply necessary knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems in Integrated Circuit Design Reliability and Testability
2. Ability to function effectively as individual, and as a member or leader in diverse teams and in multidisciplinary settings to solve Integrated Circuit Design Reliability and Testability problem.
3. Ability to assess the need for, and have the preparation of Integrated Circuit Design Reliability and Testability and engage in independent and lifelong learning in the broadest context of technological change

**NMJ31703 PERANTI-PERANTI TERMAJU [ADVANCED DEVICES]****No of Credits: 3****Course Synopsis:**

In this course, students will learn about the operation of conventional MOSFETs and BJTs, including the investigations on the physical mechanisms underlying the delays and speed limitations of the devices. Moreover, since advances in the electronic industry are rapidly evolving, the aim of this course is to give sufficient background knowledge on the different semiconductor devices such as MESFETs, HEMTs, FinFETs, HBTs and BiCMOS.

**Course Outcomes:**

1. Ability to apply the scientific knowledge and theory on operations, characteristics, and applications of advanced semiconductor devices.
2. Ability to analyze and evaluate scientific investigation on the use of various semiconductor materials in advanced devices using research-based knowledge.
3. Ability to engage and resolve in the broadest context of technological change pertaining to advanced technology.

**NMJ41802 PROJEK TAHUN AKHIR I [FINAL YEAR PROJECT I]****No of Credits: 2****Course Synopsis:**

This course is designed to expose final year students on investigative researchbased projects, related to electronic, computer, biomedical electronics and microelectronic engineering. Students learn to solve engineering problems using appropriate research methodologies, formulating engineering knowledge and performing analysis. Assessments will be on project management, technical writing and oral presentation.

**Course Outcomes:**

1. Ability to identify research problems, conduct literature review then formulate the theory and practical knowledge to solve complex engineering problems.
2. Ability to investigate, conduct research and design solutions using appropriate methodology to solve complex engineering problems.
3. Ability to communicate effectively in written and oral forms to defend and justify the proposed solutions.
4. Ability to plan and execute research activities systematically to meet the required research objectives and timeline

**NMJ41103 PEMBUNGKUSAN SEMIKONDUKTOR [SEMICONDUCTOR PACKAGING]****No of Credits: 3****Course Synopsis:**

This course will cover topics such as microsystems packaging, the general semiconductor proces flow and IC assembly, critical packaging parameters, sealing and encapsulation, interconnection in IC assembly and thermal management in electronic packages. Other topics that will be included are of advanced packaging technologies (i.e TSVs, silicon interposer, 2.5D and 3D integration with TSV and others) and of the latest packaging technology trends and their associated challenges. There will also be 2 labs being embedded in this course which are of wire bonding and manual wet decapsulation.

**Course Outcomes:**

1. Ability to apply knowledge of the semiconductor packaging process and its flow
2. Ability to analyze and justify the solutions to specific packaging issues and processes
3. Ability to conduct investigations and formulate the future trends and challenges of the semiconductor packaging

**NMJ41904 PROJEK TAHUN AKHIR II [FINAL YEAR PROJECT II]****No of Credits: 4****Course Synopsis:**

This course is designed to expose final year students on investigative research-based projects, related to electronic, computer, biomedical electronics and microelectronic engineering. Students learn to solve engineering problems using appropriate research methodologies, formulating engineering knowledge and performing analysis. Assessments will be on project management, technical writing and oral presentation.

**Course Outcomes:**

1. Ability to design, conduct investigative research and select appropriate methodology to solve complex engineering problems.
2. Ability to conduct investigations, data interpretation, deliver individual analysis, judgement in research findings and capable of being assessed independently.
3. Ability to apply appropriate techniques, tools and resources to produce engineering solutions.
4. Ability to communicate effectively in written and oral presentation to defend and justify the engineering solutions.
5. Ability to plan and execute research activities systematically and create a learning portfolio.

**NMJ40303 KEBOLEHARAPAN DAN ANALISA KEGAGALAN [RELIABILITY AND FAILURE ANALYSIS]****No of Credits: 3****Course Synopsis:**

This course intends to give students an extensive knowledge in the field of semiconductor reliability and failure analysis (FA). In the first part of the course, students will learn the concept of reliability, all the related terms & definitions, the different types of Reliability Distributions and also the different types of Reliability Prediction Techniques such as FMEA & FTA. In the second part of the course, students will be exposed to the different types of FA techniques that are commonly conducted on a failed semiconductor devices and the test instrumentation associated with each technique.

**Course Outcomes:**

1. Ability to apply the theories of reliabilities in a reliability system
2. Ability to analyze the types of semiconductor failures and propose the most relevant techniques and tools to perform for Failure Analysis
3. Ability to demonstrate appropriate techniques for conducting failure analysis on semiconductor devices by using relevant tools.

**NMJ40403 KEJURUTERAAN NANOELEKTRONIK [NANOELECTRONIC ENGINEERING]****No of Credits: 3****Course Synopsis:**

The aim of this course is to study the underlying physical principles, the fabrication technologies, and applications of a broad range of nano-electronic devices. This includes field effect transistor (FET) in nanoscale dimensions, quantum effects and electron transport in nanostructures and their applications, nano-characterization, and nanofabrication methods (e.g., submicron optical lithography and electron-beam lithography).

**Course Outcomes:**

1. Ability to analyse and evaluate various nanoscience, nanomaterials and nanoelectronic devices and fabrication techniques with regard to the latest nanoelectronic technology.
2. Ability to function, contribute and communicate effectively in diverse teams on nanoelectronics fabrication and technology..
3. Ability to engage in life-long learning and resolve issues pertaining to nanoelectronic technology in the broadest context of technological change.

**NMJ42403 SISTEM OPTOELEKTRONIK [OPTOELECTRONIC SYSTEM]****No of Credits: 3****Course Synopsis:**

The development of this course basically to enhance knowledge and understanding of the principles and practices of modern optoelectronic device includes fiber optic, semiconductor laser, photodiode, LED and display technology. The broad contents of this course also require for designing a optoelectronic system that acquire the knowledge of optical fiber communication, LED, photodiode or any device sensing. Specific of optical fiber communication software is used to design a communication system which can be apply to the level of network system. The important functions for applications for these optoelectronic devices will acquire in optoelectronic system such as optical communication, photodetection, sensing and display technology.

**Course Outcomes:**

1. Ability to analyse the solution of engineering problems in semiconductor system, optical fiber system, LED, sensing system, photovoltaic system and other optoelectronic technology.
2. Ability to design solutions for engineering problems in communication systems, sensor systems, LED systems or processes that meet specified needs.
3. Ability to explain optoelectronic system problem through effective communication and presentation.

**NMJ40703 SISTEM MIKROELEKTROMEKANIKAL [MICROELECTROMECHANICAL SYSTEM]****No of Credits: 3****Course Synopsis:**

This course will focus on design and simulation of MEMS devices fabrication process. The design will include various types of analysis such as structural, electrical and mechanical while the fabrication technology will focus on bulk micromachining, surface micromachining and LIGA. This course will also discuss the application and technology of MEMS packaging in various fields.

**Course Outcomes:**

1. Ability to investigate the available technology in MEMS fabrication.
2. Ability to design different types of MEMS sensors and actuators for various application areas.
3. Ability to create and apply appropriate techniques and resources in designing MEMS structures.

**NMJ40903 PERHUBUNGAN OPTIK [OPTICAL COMMUNICATION]****No of Credits: 3****Course Synopsis:**

This course is intended to present essential concepts involved in optical communications. Topics studied include communication, networks and signal processing which are main system elements in transmitting and receiving data. Various issues relating to signals propagation in optical fibers such as dispersion compensation, amplification, attenuation and nonlinear effects are presented. Students will have the opportunity for analysis and simulation of optical communication systems and be exposed to the latest trend in optical communication and signal processing engineering.

**Course Outcomes:**

1. Ability to deduce the signal propagation and degradation in optical communication systems
2. Ability to compose the limitations due to performance in transmitter and receiver, amplifications and nonlinear impairments.
3. Ability to evaluate and investigate the applications of optical communication.

**NMJ40203 DATA ANALITIK [DATA ANALYTICS]****No of Credits: 3****Course Synopsis**

This course will introduce students to the analysis and management of big data using current techniques and open-source software tools. Data and case studies will be drawn from diverse sources, including health and informatics, life sciences, web traffic, etc. This course will cover the general principles of analysis, investigation, reporting, and designing analytical models. Students will be encouraged to validate and critically assess the results of the analysis.

**Course Outcomes:**

1. Ability to apply exploratory data analysis (EDA) tool for data exploration, visualization and analysis.
2. Ability to apply basic Structured Query Language (SQL) for in-database analytic
3. Ability to design analytical models by using machine-learning techniques.
4. Ability to evaluate and critically assess the result of the analysis.

**NMJ30905 LATIHAN INDUSTRI [INDUSTRIAL TRAINING]****No of Credits: 5****Course Synopsis:**

The course will expose students to technical and practical application as well as other aspects such as the company's operation, work culture, safety procedure, project management, communication, technical skills, and presentation in achieve appreciation and/or capability of carrying out complex engineering activities. Students are required to submit their logbook and written report at the end of the industrial training.

**Course Outcomes:**

1. Ability to demonstrate technical knowledge and practical skills.
2. Ability to practice to health, legal and cultural requirements in a working environment.
3. Ability to perform tasks with professional ethics and responsibilities.
4. Ability to work independently, interact with co-workers and work in a team.
5. Ability to write reports and communicate verbally on internship knowledge gains and skills.

**NMJ31203 MIKROPENGAWAL [MICROCONTROLLER]****No of Credits: 3****Course Synopsis:**

The aim of this course is to study and expose students to the concept and requirement of embedded microcontroller system. This includes the characteristic of embedded microcontroller system, hardware and software development, single chip microcontroller and programming technique in the relevant language, basic multitasking concept, developing and embedded system application. Students are expected to gain knowledge and skills to analyze and develop embedded microcontroller system thus preparing them for the IC Design job market.

**Course Outcomes:**

1. Ability to apply necessary knowledge of microcontroller-based system architecture.
2. Ability to design solutions for complex engineering problems and design systems, components or processes in programming language for the microcontroller-based system application.
3. Ability to construct and manipulate appropriate techniques, resources, and modern engineering tools in microcontroller-based system



**NMJ31602 PENGURUSAN UNTUK JURUTERA [MANAGEMENT FOR ENGINEERS]****No of Credits: 2****Course Synopsis:**

This course aims to teach students on how to apply project management skills when undertaking projects and To provide basic tools of engineering economy to enable the students to carry out professional-quality economic evaluations. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineers relating to project management in the current economic scenarios.

**Course Outcomes:**

1. Ability to create and analyze project requirements and integrate the processes of project management like work plans, scheduling, cost estimation and perform project evaluation.
2. Ability to create and analyze economic scenarios and integrate decision making process to engineering project and business ventures.

**NMJ32503 REKABENTUK VLSI [VLSI DESIGN]****No of Credits: 3****Course Synopsis:**

This course covers various important elements for VLSI design such as sequential circuit, clock tree, wire interconnect and power dissipation and low power design.

**Course Outcomes:**

1. Ability to apply necessary knowledge to analyze the behavior of the sequential design.
2. Ability to design and analyse circuit characterization and overall performance of VLSI design.
3. Ability to engage and conclude the technological change pertaining to VLSI design.

**NMJ42003 REKABENTUK DAN FABRIKASI MEMS [MEMS DESIGN AND FABRICATION]****No of Credits: 3****Course Synopsis:**

This course covers the fundamentals of MEMS, microfabrication techniques, MEMS materials, MEMS device principle of operation, design, simulation and fabrication.

Different types of MEMS sensors and actuators are introduced in this course i.e. MEMS Electrostatic Sensor, MEMS Electrostatic Actuator, MEMS Thermal Sensor, MEMS Thermal Actuator, MEMS Piezoresistive Sensor, MEMS Piezoelectric Sensor and MEMS Piezoelectric Actuator. The course team project provides students experience in MEMS device design and analysis using Finite Element Method/Analysis (FEM/FEA) simulation tool and fabrication simulation using Computer Aided Design (CAD) tool. At the end of the course, the students are expected to be able to design and simulate MEMS devices.

**Course Outcomes:**

1. Ability to explain MEMS fabrication process
2. Ability to design MEMS device
3. Ability to simulate MEMS device

**NMJ42103 REKABENTUK LITAR BERSEPADU ANALOG [ANALOGUE INTEGRATED CIRCUIT DESIGN]****No of Credits: 3****Course Synopsis:**

This course covers the essential MOS characteristics includes the fundamental analysis of the operation regions involving the second order effect due to scaling issues. In addition, the concepts of single stage amplifier and differential amplifier are introduced to assist the student in real IC design projects utilises the CAD simulation tool. Finally, the MOS Operational Amplifier and its applications are reviewed at the end of the course to enhance the students understanding concerning the analogue design.

**Course Outcomes:**

1. Ability to apply and analyse the fundamental concept of transistor behaviour using basic laws and circuit theorem.
2. Ability to design and evaluate the analogue sub-circuit using basic laws and circuit theorem
3. Ability to design and investigate the analogue system to meet the required specifications

**NMJ42203 SISTEM ATAS CIP [SYSTEM ON CHIP]****No of Credits: 3****Course Synopsis:**

To expose the student with system on chip design methodology, IP design and platform-based design. The student will be learned various important elements for successful system-on-chip design implementation such as design flow requirement, system performance evaluation and system integration issues.

**Course Outcomes:**

1. Ability to analyse System-On-Chip design methodology.
2. Ability to design the System-On-Chip architecture.
3. Ability to evaluate the System-On-Chip performance.

**NMJ10004 ANATOMI DAN FISILOGI [ANATOMY & PHYSIOLOGY]****No of Credits: 4****Course Synopsis:**

This course introduces basic human anatomy and physiology. The students will be exposed to the basic knowledge on cell and tissues, skin and appendages, circulatory and cardiovascular system, the respiratory system, nervous system, special senses, the musculoskeletal system, digestive system and metabolism, lymphatic and immune system, the endocrine system, urinary system, and also reproductive system. At the end of the course, the students are expected to have a good grip of basic anatomical and physiological aspects of the human body and be able to apply in biomedical engineering problem solving.

**Course Outcomes:**

1. Ability to understand basic anatomy and physiology of cells and tissue classification and their functions of various human body systems.
2. Ability to analyze human physiology of homeostasis and their properties.
3. Ability to analyze and evaluate human system-related to the disease, treatment procedure, and their properties

**NMJ11503 ELEKTRONIK ANALOG [ANALOG ELECTRONIC]****No of Credits: 3****Course Synopsis:**

This course provides fundamental knowledge of analog circuit. The topics covered include basic semiconductor materials, diode, bipolar junction transistors

(BJTs), field effect transistors (FETs) and thyristors. BJT and FET amplifiers are also covered in this course. The course is designed to provide basic electronic skills covering theories and practical.

**Course Outcomes:**

1. Ability to explain theory of semiconductor materials and analyse operation of the selected electronic devices.
2. Ability to apply and modify the circuit or biasing of selected electronic devices.

**NMJ10103 BLOKIMIA [BIOCHEMISTRY]****No of Credits: 3****Course Synopsis:**

The topics covered in this course include the origin of life and structure of prokaryotes and eukaryotes cells, properties and structure, classification and function of biomolecules such as protein (amino acid), sugar, lipids and carbohydrates. The role modern technique of proteins purification, molecular biology and genetics will be featured in the course. Electron transportation, citric acid cycle photosynthesis in biological processes will also be briefly highlighted. Modern biotechnologies of biochemistry also introduced as a solution for engineering problem related to the metabolism and measurement principle in human biochemistry process.

**Course Outcomes:**

1. Ability to explain the concepts, structure, classification and function of biomolecules
2. Ability to differentiate a technique of modern engineering tool.
3. Ability to propose the solution of engineering problem related to the metabolism and measurement principle in biological process.

**NMJ21103 MEKANIK KEJURUTERAAN [ENGINEERING MECHANICS]****No of Credits: 3****Course Synopsis:**

The course provides a foundation for the students to analyze and solve mechanical problems that related to biomedical areas. The syllabus is designed to enable non-mechanical engineering students to have strong fundamentals in mechanics. It is planned to give greater emphasis on statics without neglecting the dynamics aspects of mechanics.

**Course Outcomes:**

1. Ability to explain and analyze two-dimensional (2D) mechanics in a static condition.
2. Ability to explain and analyze three-dimensional (3D) mechanics in a static condition.
3. Ability to explain and analyze two-dimensional (2D) mechanics in a dynamic condition.

**NMJ21003 REKA BENTUK TERBANTU KOMPUTER [COMPUTER AIDED DESIGN]****No of Credits: 3****Course Synopsis:**

This course provides a comprehensive introduction to 2D and 3D drawing and design, Finite Element Analysis (FEA), and 3D printing. Students will learn fundamental Computer Design Aided (CAD) concepts, techniques for creating precise 2D drawings, and advanced 3D modeling methods. The course also covers FEA principles for structural analysis and optimization. Additionally, students will explore the workflow of 3D printing, including printer types, materials, and design considerations. Assessment components include lab assessments, lab tests, and a mini-project. At the end of the course, students are able to create and analyze digital designs using CAD software and apply them in biomedical engineering scenarios.

**Course Outcomes:**

1. Ability to utilise computer aided design tools in drawing 2D and 3D objects.
2. Ability to design 3D model and solve biomedical engineering problems.
3. Ability to demonstrate effective collaboration skills in a mini-project.

**NMJ20103 BIOBAHAN [BIOMATERIALS]****No of Credits: 3****Course Synopsis:**

This course is designed to provide a fundamental knowledge of materials that are commonly utilized in engineering and biomedical field specifically various types of materials currently being utilized for biomedical applications and their biocompatibility with references to the biological environments will be discussed.

**Course Outcomes:**

1. Ability to describe the concept of biocompatibility and analyze basic properties of materials in medical applications.
2. Ability to propose the suitable materials for specific biomedical applications and explain their effects with respect to biocompatibility.
3. Ability to discuss biomaterials-tissue interactions, illustrate the main components of biomedical implants and justify the important characteristics of the implanted materials.

**NMJ20203 BIOMEKANIK [BIOMECHANICS]****No of Credits: 3****Course Synopsis:**

This is an introductory course to biomechanics which covers the engineering mechanics, anatomy and basic applications on the analysis of the human body as mechanical systems. This course aiming to integrate the knowledge of fundamental anatomy and mechanics to develop a deeper understanding of the field of human movement science. The course also aims to introduce students to the fundamentals of biomechanics and to relate these to mechanical actions of, by and on the body.

**Course Outcomes:**

1. Ability to define, explain and analyse the biomechanics and anatomy terminologies and their relationships.
2. Ability to analyse the fundamental of mechanics to the structure and function of human body.
3. Ability to evaluate problem related to kinematics and kinetics of human movement.

**NMJ21304 MIKROPENGAWAL DAN PENGANTARAMUKA [MICROCONTROLLER AND INTERFACES]****No of Credits: 4****Course Synopsis:**

This course is designed to introduce the Microchip PIC 18 microcontroller architecture and help the students to explore the embedded system application. This includes the knowledge of PIC 18 hardware system, assembly language programming, I/O interfacing, arithmetic operations, data transfer, timers, serial port programming, interrupts, LCD and keyboard interfacing and data converters. The course also helps student to design and develop simple real-world applications based on PIC 18 microcontroller system.

**Course Outcomes:**

1. Ability to describe and explain the theory and basic of computer architecture, microprocessor and/or microcontroller.
2. Ability to analyze and apply the concept and requirements of microcontroller-based system.
3. Ability to develop a microcontroller based system based application on given specifications.

**NMJ31003 MEKANIK BAHAN [MECHANICS OF MATERIALS]****No of Credits: 3****Course Synopsis:**

This course introduces the basic theories of mechanics of materials. The theories in statics and biomaterials will be extended and emphasized in this course. The course covers the fundamental law of engineering mechanics, concept of stress and strain, axial load, torsion and bending. Furthermore, it also covers the stress and strain transformation.

**Course Outcomes:**

1. Ability to analyse the fundamental theory of mechanics of materials in engineering problems.
2. Ability to propose solutions based on problems related to various loadings.
3. Ability to analyse the combination cases by using the stress and strain transformation.

**NMJ32804 SISTEM KAWALAN LELURUS [LINEAR CONTROL SYSTEMS]****No of Credits: 3****Course Synopsis:**

This course will introduce students to linear control system techniques for analysis and design; includes mathematical modeling of electrical, mechanical and biomedical systems, stability analysis, time domain analysis and frequency domain analysis. PID and lead-lag controllers design using root locus will be discussed. The controller performance will be evaluated both in time and frequency domains. Modern engineering software will be used for the analysis and design. At the end of the course, the students should be able to analyze, evaluate, and design controlled systems.

**Course Outcomes:**

1. Ability to construct the mathematical model for electrical, mechanical, and biomedical systems.
2. systems.
3. Ability to examine system response and stability in time domain.
4. Ability to examine system response and stability in frequency domain.
5. Ability to design PID and lead-lag controllers.

**NMJ30703 KESELAMATAN, PIAWAIAN DAN ETIKA DALAM KEJURUTERAAN BIOPERUBATAN [SAFETY, STANDARDS AND ETHICS IN BIOMEDICAL ENGINEERING]****No of Credits: 3****Course Synopsis:**

The course provides an introduction to standards and regulations in biomedical engineering. This course focuses on the regulations and standards in the management of medical device and its life cycle. It also includes safety and ethical issues associated to active medical devices. This course also discusses the requirements and guidelines to practice Biomedical Engineering in Malaysia. At the end of this course, students will appreciate on how regulations and standards are established with the requirements in compliance with global needs. Safety aspects and measures will be emphasized so that students will be able to understand and established control and prevention when dealing with hazards, as well as monitoring good ethical responsibility when assessing medical technology.

**Course Outcomes:**

1. Ability to demonstrate safety awareness and analyse hazards when dealing with active medical device.
2. Ability to evaluate applications of regulatory standards in ensuring safety and reliability of medical technology.
3. Ability to apply regulatory standards and good ethical responsibility when formulate solution for problems related to healthcare technology.

**NMJ31303 PEMROSESAN ISYARAT DIGIT DALAM APLIKASI-APLIKASI BIOPERUBATAN  
[DIGITAL SIGNAL PROCESSING IN BIOMEDICAL APPLICATIONS]****No of Credits: 3****Course Synopsis:**

This course provides an introduction to different types of signals and systems and; explains the application of different types of transform domains for analyzing the different types of signals and systems. The course covers the application of Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT) for analyzing the signals. This course also covers the design of Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) filters. At the end of this course, the biomedical applications of digital signal processing and digital signal processors are discussed. Signal processing software is used in laboratory sessions. Data processing software is usually programmed in the same languages as other science and engineering tasks.

**Course Outcomes:**

1. Ability to analyse biomedical signals using different types of transform domains.
2. Ability to analyse and propose suitable types of transform domain algorithms for biomedical signal application.
3. Ability to select and design suitable digital filters for processing of biomedical signals.

**NMJ33003 TERMOBENDALIR [THERMOFLUIDS]****No of Credits: 3****Course Synopsis:**

The objective of the course is to expose the students to the fundamental principle of fluid mechanics (fluid statics, fluid dynamics and flow over bodies), thermodynamic (Zeroth law, first law, and 2nd law), heat transfer (conduction, convection, and radiation), and also applications of thermofluids in Biomedical Engineering.

**Course Outcomes:**

1. Ability to explain and analyze the fundamental principles of fluid mechanics.
2. Ability to explain and solve fundamental principles of thermodynamics related problems.
3. Ability to analyze the fundamental principles of heat transfer.

**NMJ30003 BIOINSTRUMENTASI I [BIOINSTRUMENTATION I]****No of Credits: 3****Course Synopsis:**

This course provides an intensive coverage to medical electronics and bioinstrumentation. It will cover sensors and instrumentation for medical applications, as well as measurement of biosignals, such as electrocardiogram (ECG), electroencephalography (EEG), blood pressure and respiratory system. At the end of the course, the students are expected to provide clear understanding in various medical instrumentation principles and demonstrate the ability to apply, evaluate and integrate basic sensors and design basic electronic circuits for medical applications.

**Course Outcomes:**

1. Ability to identify, apply and distinguish sensors and transducers for measurement of biological parameters in medical instrumentation system.
2. Ability to discuss, explain and analyse design requirements and constraints for specific medical devices.
3. Ability to design, assemble, analyse, and evaluate basic circuits in medical instrumentation.

**NMJ40003 BIOINSTRUMENTASI II [BIOINSTRUMENTATIONS II]****No of Credits: 3****Course Synopsis:**

This course provides in-depth look at various types of medical equipment, such as measuring, recording and monitoring instruments, together with therapeutic equipment. At the end of the course, the students are expected to provide clear understanding in various medical instrumentation principles and demonstrate the ability to design basic system for implementation in medical and healthcare based on engineering principles and computer applications.

**Course Outcomes:**

1. Ability to apply the principles of science and engineering for application in bioinstrumentation and analyze the bioinstrumentation system.
2. Ability to construct, propose and design bioinstrumentation system based on specific requirements.



**NMJ31103 MESIN ELEKTRIK DAN PEMACU [ELECTRICAL MACHINES AND DRIVES]****No of Credits: 3****Course Synopsis:**

This course provides students with knowledge on the characteristics of electrical machines and drives. Students then analyse and evaluate the design of electrical machines and drives which include different types of motors, generators, and transformers. At the end of this course, students are able to perform analysis, appraise and design suitable electrical machines for engineering applications.

**Course Outcomes:**

1. Ability to perform analysis on the characteristics of different types of electrical machines and drives
2. Ability to appraise the performance of the different types of electrical machines

**NMJ41503 PENGIMEJAN PERUBATAN [MEDICAL IMAGING]****No of Credits: 3****Course Synopsis:**

This course highlights the different principles of medical imaging modalities. This will provide them the understanding of various types of diagnostic radiology such as general XRay, Mammography, Ultrasound, Computed Tomography (CT) and Magnetic Resonance Imaging (MRI). Radiation therapy is introduced to provide a better understanding of how radiation is used not only for diagnosis but also for treatment such as cancer treatment. Upon completion, students will be able to apply the fundamental principles and evaluate the efficiency of the medical imaging modalities that have been used in healthcare industry.

**Course Outcomes:**

1. Ability to apply the concept of medical imaging modalities used in clinical application.
2. Ability to investigate and propose the most suitable imaging modalities for specific needs.
3. Ability to create and select appropriate radiation technique for therapy and diagnosis purposes.

**NMJ41303 PEMROSESAN IMEJ PERUBATAN [MEDICAL IMAGE PROCESSING]****No of Credits: 3****Course Synopsis:**

This course introduces a basic knowledge on medical image processing. It includes basic aspects related to image fundamental, image representation, image quality, spatial filtering, enhancement, segmentation, morphological operation, color image processing and image processing in biomedical applications. This subject will expose the student to process the medical images for different medical applications.

**Course Outcomes:**

1. Ability to explain and analyse the fundamental of image processing.
2. Ability to propose and evaluate image processing techniques for medical image applications.

**NMJ40103 BIOPENDERIA DAN BIOMEMS [BIOSENSORS AND BIOMEMS]****No of Credits: 3****Course Synopsis:**

This course introduced the concept of biosensors, the main structure of biosensors, various sensing mechanism, and types of transducer used in biosensor technology. Students will be also exposed to bioelectronic based analytical devices that are typically used in clinical environment. The operation of biosensors in vivo and in vitro and issues in biocompatibility and biomaterial used in biosensor are discussed in details. The fundamental concept of Biomicroelectromechanical Systems (BioMEMS) is introduced in this course including the main principles and its medical applications.

**Course Outcomes:**

1. Ability to analyze biosensors from the aspects of the fundamental principles and their construction.
2. Ability to investigate the application of the biological elements which are suitable to be used for a biosensor.
3. Ability to analyze MEMS fabrication and technology from the principles and the methodology involved.
4. Ability to propose suitable applications of biosensor and bioMEMS in biomedical engineering.

**NMJ41003 ORGAN BUATAN [ARTIFICIAL ORGANS]****No of Credits: 3****Course Synopsis:**

This course covers the artificial organ for the heart, kidney, lung, pancreas and ear. These topics focus on the implementation of artificial organs by understanding the anatomical, physiological and biological transport aspects as well as mathematical concepts of the respective organs. At the end of the course, students are expected to have the ability to apply the fundamental principles of the artificial organs, perform simple modeling and able to propose the suitable methods/devices for each problematic organ.

**Course Outcomes:**

1. Ability to analyze mathematical concepts of human physiology, biotransport and artificial organs.
2. Ability to illustrate modeling and simulation of human physiological system and artificial organs.
3. Ability to discuss concepts, fundamental principle and propose appropriate artificial organ devices for certain problems.

**NMJ40603 KEPINTARAN BUATAN [ARTIFICIAL INTELLIGENCE]****No of Credits: 3****Course Synopsis:**

In this course, the students will learn the fundamental concepts of Artificial Intelligence (AI), modern AI techniques and tools; and apply them to the design of intelligent systems that solve real-world AI problems. This course will cover machine learning, deep learning, and search and optimization algorithms in AI. The students will also learn the history, philosophy, ethics, and the future of AI.

**Course Outcomes:**

1. Ability to apply basic principles, models and algorithms in artificial intelligence to solve complex problems
2. Ability to analyze the available artificial intelligence concepts and techniques for complex problem-solving
3. Ability to design solutions for complex engineering problems by using artificial intelligence techniques

**NMJ41603 PERUBATAN ROBOTIK [MEDICAL ROBOTICS]****No of Credits: 3****Course Synopsis:**

The course is designed to introduce the basic principles of robotic technology which includes kinematics and kinetics of manipulator motion, safety and application of robotics in medical field. In addition, the course will provide some computational foundation of robotic technology. At the end of the course, students are expected to understand the main concept of robot manipulator and capable in analyzing and solving related problems.

**Course Outcomes:**

1. Ability to explain and analyze the fundamental principles of robotic technology.
2. Ability to analyze and provide solutions to problems related to kinematics and kinetics aspect of robotic manipulator.
3. Ability to assess the fundamental requirements of robotic technology for medical applications.

**NMJ11004 PENGATURCARAAN KOMPUTER [COMPUTER PROGRAMMING]****No of Credits: 4****Course Synopsis:**

One of the aspects of a good engineer is to have the capability of integrating the hardware and the software, thus an electronic engineer should be competence in programming. This course introduces basic programming using high level language (C language). The main objective of this course is to prepare the students with the ability of problem solving using programming, to be able to do analysis with the programming tools such as organization chart, IPO chart, flow chart and pseudo code and then to implement them by developing C program.

**Course Outcomes:**

1. Ability to apply knowledge of programming concepts and principles
2. Ability to apply appropriate tools for coding, compiling, executing and debugging computer program using GNU/Linux.
3. Ability to identify, formulate and analyze complex engineering problems
4. Ability to design solutions for complex engineering related problems and design systems using computer programming techniques

**NMJ10803 LITAR ELEKTRIK II [CIRCUIT THEORY II]****No of Credits: 3****Course Synopsis:**

In this course, students will be exposed to the circuit analysis using Laplace Transform, Fourier Series and Fourier Transform technique. Students also should be able to explain and analyze the concept of frequency response of AC circuit and two-port network.

**Course Outcomes:**

1. Ability to analyze special types of circuit such as Two-Port Networks
2. Ability to apply knowledge of Laplace Transform, Fourier Series and Fourier Transform in solving electric circuit problem
3. Ability to construct Bode Plot for various types of transfer function and analyze frequency response of AC circuits.

**NMJ10503 KEJURUTERAAN ELEKTRIK [ELECTRICAL ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course is designed to provide the students with the fundamentals knowledge and applications of electrical engineering technology. This course emphasizes the students to the single phase and three phase system, magnetism and electromagnetism. These theories and concept are then applied in the power transformer and electrical machines technology. General concepts and basic operation principle for power transformer, electrical transmission, AC and DC generator, and AC and DC motor, including their characteristics and performance analysis are also covered in this course.

**Course Outcomes:**

1. Ability to apply the basic concept of single-phase and three-phase system, magnetism and electromagnetism
2. Ability to identify and analyze the fundamental, operation and application of electrical transformer
3. Ability to identify and analyze the fundamental, operation and application of AC machines and DC machines with respect to their equivalent circuits and performances

**NMJ20404 ELEKTRONIK DIGIT II [DIGITAL ELECTRONICS II]****No of Credits: 4****Course Synopsis:**

This course exposes students to enhanced knowledge in digital design. It helps them to develop technical skills in design, simulate, analyse and verify complex digital circuits. Topics covered including Combinational and Sequential Logic Design, as well as Fundamentals of Computer Design.

**Course Outcomes:**

1. Ability to apply knowledge of a digital system in Register Transfer Language (RTL) form
2. Ability to analyse sequential systems on Finite State Machine (FSM) and Algorithmic State Machine
3. Ability to design a digital system with control unit
4. Ability to use modern engineering/CAD tool to construct digital system

**NMJ20003 ALGORITMA DAN STRUKTUR-STRUKTUR DATA [ALGORITHM AND DATA STRUCTURES]****No of Credits: 3****Course Synopsis:**

This course provides solid foundation in the basic concepts of data structures and algorithms. This course makes easy to select and design data structures and algorithms in problem solving manner and clear concept on the correctness of algorithms and their computational complexities. This course covers data types, linear and nonlinear data structures as well as various searching and sorting algorithms.

**Course Outcomes:**

1. Ability to analyze the performance of computer programs in terms of space and time complexity
2. Ability to appropriately apply various abstract data types in computer programs.
3. Ability to apply and evaluate algorithms to solve computational problems.

**NMJ21704 SISTEM MIKROEMPROSES [MICROPROCESSOR SYSTEMS]****No of Credits: 4****Course Synopsis:**

The aim of the course is to study the microprocessor architecture and knowledge that relate to the design of microprocessor-based systems. This includes the memory design, input, and output. The study of the microprocessor instruction set and various software development tools are also emphasized as knowledge is needed in the design process.

**Course Outcomes:**

1. Ability to apply knowledge of theory and basic architecture of microprocessor system.
2. Ability to analyse engineering problems and able to build microprocessor programs.
3. Ability to design and develop an application on a microprocessor-based system

**NMJ21403 PENGATURCARAAN BERASASKAN OBJEK [OBJECT ORIENTED PROGRAMMING]****No of Credits: 3****Course Synopsis:**

This course introduces the object-oriented design, analysis and programming by using Java Programming language. The main concepts of object oriented such as data abstraction, encapsulation, inheritance and polymorphism are covered in this course. Apart from that the basic UML diagrams are introduced in the object-oriented design. Students will be exposed to the real-world problems and solutions using object-oriented programming.

**Course Outcomes:**

1. Ability to apply the principles of object oriented programming in any computational problems
2. Ability to analyze computational problem and draw appropriate UML diagrams
3. Ability to design object oriented solution for any UML diagram or any computational problem description

**NMJ30504 INSTRUMENTASI ELEKTRONIK DAN PENGUKURAN [ELECTRONIC INSTRUMENTATION AND MEASUREMENT]****No of Credits: 4****Course Synopsis:**

In this course, students will be introduced to the basic understanding of various electronic measurement system. Following that, the students will be also introduced with transducers, signal conditioning & conversion, data acquisition system, virtual instrumentation and instrumentation design. The instrumentation design specifically related with computer-based implementation. The students are expected to understand, analyse and design electronic instrumentation system.

**Course Outcomes:**

1. Ability to apply knowledge of principle measurements for different types of physical system and instruments
2. Ability to analyze instrumentation method that inclusive or transducer, signal conditioning and DAS
3. Ability to use tools/simulator to conduct and construct virtual instrument experiments
4. Ability to design a complete instrumentation system based on the knowledge of transducers, signal conditioning and virtual instrumentation

**NMJ32203 RANGKAIAN KOMPUTER [COMPUTER NETWORKS]****No of Credits: 3****Course Synopsis:**

This course gives exposure on computer network. This course highlights fundamental knowledge of computer network and its applications. This course covers related knowledge such as Local Area Network (LAN) and Wide Area Network (WAN) and also data transmission techniques as well as latest applications used.

**Course Outcomes:**

1. Ability to explain, discuss and apply the concepts and principles of computer networking.
2. Ability to identify, analyze and solve network problems.
3. Ability to design and evaluate the performance of computer network.

**NMJ32404 REKABENTUK SISTEM TERBENAM [EMBEDDED SYSTEM DESIGN]****No of Credits: 4****Course Synopsis:**

Revisit of architecture foundation and system design of microprocessor-based system, microcontroller system, and other logic control system. It includes encountering the concept and requirement of the embedded system features. Also, a study of practical examples of embedded systems in terms of hardware and software for the system development. In addition, a study of programming languages such as assembly language and C language for the embedded system program. In practice, apply theories for embedded system design using microcontrollers.

**Course Outcomes:**

1. Ability to apply the knowledge and identify formulate solution in development embedded system based on a single chip microcontroller
2. Ability to apply appropriate techniques to develop embedded system platform
3. Ability to communicate effectively in written and oral forms to defend and justify the completed embedded system design and solution

**NMJ31804 PRINSIP SENIBINA KOMPUTER [PRINCIPLES OF COMPUTER ARCHITECTURE]****No of Credits: 4****Course Synopsis:**

This course focuses on the computer system which involves with the design of interface techniques, organization and architecture. The syllabus coverage will be on the theory of basic computer system, format of instruction set, memory organization and arithmetic logic unit (ALU) as well as certain designing issues such as bus structure, parallel processing, pipelining and memory management. The students are required to design a simple CPU during their experiments. The lab sessions will complement the theories given in a class.

**Course Outcomes:**

1. Ability to apply the knowledge of Computer architecture
2. Ability to analyze the performance of a computer system
3. Ability to design small scale computer system
4. Ability to apply appropriate CAD tool to design, verify, and test the computer system

**NMJ42303 SISTEM MASA NYATA [REAL TIME SYSTEM]****No of Credits: 3****Course Synopsis:**

The course shall discuss the important concepts in real-time system which are the real-time reference model, real-time scheduling theory, and real-time system programming techniques. Hence, terminologies which include hard/soft real-time, feasible interval, jitter, release time, absolute and relative deadline, clock-driven, static and dynamic scheduling are discussed. On the application side, concepts relevant to concurrent programming base on a particular Real-Time Operating System like PREEMPT-RT Linux or Free RTOS will be undertaken.

**Course Outcomes:**

1. Ability to apply knowledge of major concept relevant to real-time systems and RTOS.
2. Ability to evaluate and conclude real-time system problems utilizing algorithms/formula of various real-time system concepts.
3. Ability to design and develop software that adheres to principles of real-time software requirements
4. Ability to correctly construct Real-Time Software by utilizing industrial-compliant Real-Time API and software tools.

**NMJ42503 SISTEM PENGOPERASIAN MODEN [MODERN OPERATING SYSTEMS]****No of Credits: 3****Course Synopsis:**

This course introduces the fundamentals of operating systems. It covers theoretical and practical issues underlying operating system design and implementation. The topics include Evolution of operating system, process, thread, inter-process communication, concurrency, and mutual exclusion, scheduling, deadlock, memory management, virtual memory, and file management system.

**Course Outcomes:**

1. Ability apply knowledge of operating systems structures and basic principles used in the design of modern operating systems
2. Ability to evaluate, calculate and solve problems related to process, thread, resource access control mechanisms (concurrency etc.), physical and virtual memory, scheduling
3. Ability to design, develop and explain multiprocess / multithreaded synchronized programs using world Standard API

**NMJ40503 KEJURUTERAAN PERISIAN [SOFTWARE ENGINEERING]****No of Credits: 3****Course Synopsis:**

The course shall introduce principles and techniques in software engineering, management integration concept, methods or process and software metrics. In addition, this course exposes presentation and discussion on specific software engineering method, documentation and tools. This course explains about relevant method to verify and validate prototype developed.

**Course Outcomes:**

1. Ability to apply knowledge of software engineering
2. Ability to analyze engineering problems and design software by developing related software engineering documentations
3. Ability to work in a team and communicate effectively in written and oral forms to defend and justify the designed software

**NMJ40803 OBJEK RANGKAIAN INTERNET [INTERNET OF THINGS]****No of Credits: 3****Course Synopsis:**

In this course, students will be introduced to IoT hardware design, IoT systems integration, sensors and actuator controls, IoT device integration to network communications and cloud computing. The course would also cover security topics regarding IoT implementation and authentication protocols. Reliability perspective in IoT architecture will also be discussed together with privacy and ethics regarding IoT implementation in real life data gathering.

**Course Outcomes:**

1. Ability to apply sensors and actuators to IoT devices
2. Ability to evaluate input-output signals using external interface on IoT devices
3. Ability to design and integrate a complete Internet of Things solution

**NMJ41203 PEMROSESAN IMEJ [IMAGE PROCESSING]****No of Credits: 3****Course Synopsis:**

This subject is prepared for the growing needs of scientists and engineers in digital imaging and computer vision. The course will introduce a core knowledge of digital image processing in spatial and frequency domains by applying several mathematical tools. The syllabus covers the fundamental theory of image sampling, filtering, compression, and multiresolution image analysis. Topics covered include image enhancement in spatial and frequency domain, image restoration model, image segmentation, linear and nonlinear image classification, and statistical image analysis. The students will be exposed to various applications of image processing such as biometric recognition systems and machine vision inspection systems.

**Course Outcomes:**

1. Ability to evaluate and analyze the digital images in spatial and frequency domain
2. Ability to evaluate a filter in frequency and spatial domain for image enhancement
3. Ability to analyze the multiresolution image, image compression in grey and color, feature extraction and segmentation, and design image processing application

**NMJ42603 COMPUTER NETWORK SECURITY [KESELAMATAN RANGKAIAN KOMPUTER]****No of Credits: 3****Course Synopsis**

The course focuses on the design and implementing of secure computer network systems. The studies include threat models, attacks that compromise security, and techniques for achieving security, based on recent technology advancements. It is important to meet the basic needs of a variety of security applications. Topics include operating system (OS) security, cryptography, capabilities, information flow control, language security, network protocols, hardware security, and security in web applications. Additionally, the sub-topics covers on the Information security concept, information security standards and specifications, common attack methods, basic operating system security, firewall security policy, firewall NAT technology, firewall hot standby technology, intrusion prevention technology, cryptography foundation, PKI mechanism, IPSec/SSL VPN technology, data monitoring and analysis, electronic forensics technology, cyber security, and emergency response technology.



**Course Outcomes:**

1. Ability to analyze principles of computer network security, models, various protocols for network security.
2. Ability to design a complex application due to security threats and vulnerabilities issues as well as the subsequent implications for the computer network security.
3. Ability to design computer network systems to produce solutions that manage security issues.

**NMJ42703 CLOUD COMPUTING [PENGKOMPUTERAN AWAN]****No of Credits: 3****Course Synopsis**

This course covers the principles and applications of Cloud Computing. It will detail of the characteristics of Cloud Computing consists of Cloud Computing Virtualization, Network Architecture in Cloud Computing, Storage for Cloud Computing and Virtualization Cluster Features in Cloud Computing as defines by National Institute of Standards and Technology (NIST). Students will have the ability to characterize the structure of Cloud Computing . Student also will have ability to defining Cloud architecture and technologies involved in compute virtualization Computing (Major Elements in Cloud Computing). Also student able to design and proposed the Cloud Computing architecture based criterion for selecting appropriate structure of Cloud Computing such as Network setup and Storage distribution and replication. The teaching of the course will use an active learning strategy. It will discuss the of Cloud Computing architecture and structures . The students will learn and able to identify advanced possible contribution or enhancement to cloud computing. Through them, the students are expected to gain deep understanding of Cloud Computing.

**Course Outcomes:**

1. Ability to apply basic theories structure of a Cloud Computing technologies.
2. Ability to analyze structure of a Cloud Computing components or elements.
3. Ability to design a feasibility Cloud Computing by using a significant range of the practices required to design components in a Cloud Computing.

**NMJ41403 PENGATURCARAAN RANGKAIAN [NETWORK PROGRAMMING]****No of Credits: 3****Course Synopsis**

This course is to educate students to write programs that communicate with each other using an application program interface (API). The course covers the basic and advanced issues of TCP/IP networking programming such as multiple processes, I/O multiplexing, multi-threaded processes and secure network programming.

**Course Outcomes:**

1. Ability to identify and analyze the suitable protocol type (TCP and UDP) to make connection in network socket
2. Ability to design and setting up elementary network programming
3. Ability to design and implement the advanced socket into the network programming in a group project

**NMJ42803 PENGATURCARAAN FPGA [FPGA PROGRAMMING]****No of Credits: 3****Course Synopsis**

This course aims to develop the knowledge and skill necessary for students in modelling, design, analysis and implement complex digital systems using a state-of-the-art Field Programmable Gate Array (FPGA) programming. Students are introduced with hardware description language (HDL) in modelling, design, and analysis of complex digital systems. To facilitate learning process, Computer-Aided Design (CAD) software/tool and FPGA programming techniques are used throughout this course. Actual environment of problems and solutions are provided.

**Course Outcomes:**

1. Ability to apply hardware description language to model building block of digital system.
2. Ability to analyze complex digital system design problems.
3. Ability to create testbench of complex digital systems.

**UR6523007**  
**Bachelor of Electronic Engineering Technology**  
**(Electronic System) with Honours**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1**

Graduates who have demonstrated career advancement in the field of Electronic Engineering Technology or related engineering field.

**PEO 2**

Engineering technology graduates who are members and contribute to professional society.

**PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities

**PEO 4**

Engineering technology graduates who are technopreneurs.

## PROGRAMME OUTCOMES (PO)

### PO 1

**Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and engineering specialisation principles to define and apply engineering procedures, processes, systems or methodologies.

### PO 2

**Problem analysis:** Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialization.

### PO 3

**Design/development of solutions:** Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns.

### PO 4

**Investigation:** Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources.

### PO 5

**Modern Tool Usage:** Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations.

### PO 6

**The Engineer and Society:** Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities.

### PO 7

**Environment and Sustainability:** Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development.

### PO 8

**Ethics:** Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices.

### PO 9

**Individual and Teamwork:** Function effectively as individuals, and as members or leaders in diverse technical teams.

### PO 10

**Communications:** Communicate effectively with the engineering community and society at large.

### PO 11

**Project Management and Finance:** Demonstrate an awareness of management, business practices and entrepreneurship.

### PO 12

**Life-Long Learning:** Recognise the need for professional development and to engage in independent and lifelong learning.

| CURRICULUM STRUCTURE                                                                                      |                                                            |                                                              |                                                                 |                                                         |                                                        |                                                    |                                   |                                 |
|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------|-----------------------------------|---------------------------------|
| UR6523007 BACHELOR OF ELECTRONIC ENGINEERING TECHNOLOGY (ELECTRONIC SYSTEM) WITH HONOURS INTAKE 2024/2025 |                                                            |                                                              |                                                                 |                                                         |                                                        |                                                    |                                   |                                 |
| YEAR                                                                                                      | FIRST                                                      |                                                              | SECOND                                                          |                                                         | THIRD                                                  |                                                    | FOURTH                            |                                 |
| SEMESTER                                                                                                  | 1                                                          | 2                                                            | 3                                                               | 4                                                       | 5                                                      | 6                                                  | 7                                 | 8                               |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES<br/>(106 CREDITS)</b>                                   | NMK10103<br>Electric Circuits                              | NMK10503<br>Electrical Engineering<br>Technology             | NMK20103<br>Microprocessor                                      | NMK20603<br>Computer Architecture                       | NMK30103<br>Communication<br>Systems                   | NMK30004<br>Final Year Project I                   | NMK40006<br>Final Year Project II | NMK40412<br>Industrial Training |
|                                                                                                           | NMK10203<br>Engineering Science                            | NMK10603<br>C Programming                                    | NMK20203<br>Analog Electronic I                                 | NMK21103<br>Electromagnetic Theory                      | NMK32003<br>Power Electronics                          | NMK31003<br>Digital Signal Processing              | NMK42003<br>Instrumentation       |                                 |
|                                                                                                           | NMK10403<br>Digital Electronics                            | NMK10702<br>Writing in Engineering<br>Technology             | NMK20503<br>Signals & Systems                                   | NMK21303<br>Analog Electronic II                        | NMK32103<br>Digital Integrated<br>Circuit Design       | NMK31203<br>Modern Control System                  | Elective I                        |                                 |
|                                                                                                           | NMK11103<br>Electronic Engineering<br>Skill                | NMK10803<br>Digital Systems                                  | NMK20703<br>Object-Oriented<br>Programming                      | NMK22003<br>Integrated Circuit<br>Design                | NMK32203<br>Microcontroller                            | NMK31704<br>Design Project                         | Elective II                       |                                 |
|                                                                                                           | NMK12003<br>Engineering Materials                          |                                                              |                                                                 |                                                         |                                                        | NMK32303<br>Verification on Chip                   |                                   |                                 |
| <b>COMMON<br/>CORE COURSES<br/>(18 CREDITS)</b>                                                           | QMQ11103<br>Mathematics for<br>Engineering<br>Technology I | QMQ11203<br>Mathematics for<br>Engineering<br>Technology II  | QMQ21303<br>Mathematics for<br>Engineering Technology<br>III    | QMQ27303<br>Statistics for Engineering<br>Technology    | NMK34403<br>Management In<br>Engineering<br>Technology | NMK44403<br>Engineering<br>Technologist in Society |                                   |                                 |
| <b>UNIVERSITY<br/>REQUIREMENT COURSES<br/>(16 CREDITS)</b>                                                | SMZXXX01<br>Co-Curriculum I                                | SMB41002<br>University Malay<br>Language <sup>[2]</sup>      | SMB20102<br>English for General<br>Communication <sup>[4]</sup> | SMU13002<br>Philosophy and Current<br>Issues            | SMB31202<br>English for Technical<br>Communication     |                                                    |                                   |                                 |
|                                                                                                           |                                                            | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[3]</sup> | SMU22402<br>Engineering<br>Entrepreneurship                     | SMU13102<br>Appreciation of Ethics<br>and Civilizations |                                                        |                                                    |                                   |                                 |
|                                                                                                           |                                                            | SMZXXX01<br>Co-curriculum II                                 |                                                                 |                                                         |                                                        |                                                    |                                   |                                 |
| <b>TOTAL CREDITS<br/>(140 CREDITS)</b>                                                                    | <b>19</b>                                                  | <b>19</b>                                                    | <b>19</b>                                                       | <b>19</b>                                               | <b>17</b>                                              | <b>20</b>                                          | <b>15</b>                         | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                                                      |                                                            | SMB10102<br>Preparatory English <sup>[1]</sup>               |                                                                 |                                                         |                                                        |                                                    |                                   |                                 |

**ELECTIVE SUBJECT:**

NMK33003 Microelectronics Fabrication Technology, NMK33103 Nanoelectronics, NMK33203 Semiconductor Packaging, NMK33303 Reliability and Failure Analysis, NMK42103 Semiconductor Testing, NMK42203 Analog Integrated Circuit Design, NMK42403 IoT Technology, NMK43103 Optoelectronic System, NMK43003 Microelectromechanical System

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[3] International students should register SMU13202 Malaysian Studies.

[4] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

**UR6523008**  
**Bachelor of Electronic Engineering Technology**  
**(Electronic Telecommunication Design) with Honours**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1**

Graduates who have demonstrated career advancement in the field of Electronic Engineering Technology or related engineering field

**PEO 2**

Engineering technology graduates who are members and contribute to professional society

**PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities

**PEO 4**

Engineering technology graduates who are technopreneurs



## PROGRAMME OUTCOMES (PO)

### PO 1

**Engineering Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to defined and applied engineering procedures, processes, systems or methodologies;

### PO 2

**Problem Analysis:** Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialization;

### PO 3

**Design/Development of Solutions:** Design solutions for broadly-defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations;

### PO 4

**Investigation:** Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, data bases and literature, design and conduct experiments to provide valid conclusions;

### PO 5

**Modern Tool Usage:** Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to broadly-defined engineering problems, with an understanding of the limitations;

### PO 6

**The Engineer and Society:** Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and solutions to broadly-defined engineering problems;

### PO 7

**Environment and Sustainability:** Understand the impact of engineering technology solution of broadly-defined engineering problems in societal and environmental contexts and demonstrate knowledge of and need for sustainable development;

### PO 8

**Ethics:** Understand and commit to professional ethics and responsibilities and norms of engineering technology practice;

### PO 9

**Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse technical teams.

### PO 10

**Communication:** Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;

### PO 11

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a team and to manage projects in multidisciplinary environments;

### PO 12

**Life-Long Learning:** Recognise the need for, and have the ability to engage in independent and life-long learning in specialist technologies.



| CURRICULUM STRUCTURE                                                                                                         |                                                      |                                                          |                                                                 |                                                   |                                                  |                                                 |                                   |                                 |
|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------|-------------------------------------------------|-----------------------------------|---------------------------------|
| UR6523008 BACHELOR OF ELECTRONIC TECHNOLOGY ENGINEERING (ELECTRONIC TELECOMMUNICATIONS DESIGN) WITH HONOURS INTAKE 2024/2025 |                                                      |                                                          |                                                                 |                                                   |                                                  |                                                 |                                   |                                 |
| YEAR                                                                                                                         | FIRST                                                |                                                          | SECOND                                                          |                                                   | THIRD                                            |                                                 | FOURTH                            |                                 |
| SEMESTER                                                                                                                     | 1                                                    | 2                                                        | 3                                                               | 4                                                 | 5                                                | 6                                               | 7                                 | 8                               |
| <b>DISCIPLINE CORE &amp; ELECTIVE COURSES</b><br>(106 CREDITS)                                                               | NMK10103<br>Electric Circuit                         | NMK10503<br>Electrical Engineering Technology            | NMK20103<br>Microprocessor                                      | NMK20603<br>Computer Architecture                 | NMK31003<br>Digital Signal Processing            | NMK30004<br>Final Year Project I                | NMK40006<br>Final Year Project II | NMK40412<br>Industrial Training |
|                                                                                                                              | NMK10203<br>Engineering Science                      | NMK10603<br>C Programming                                | NMK20203<br>Analog Electronic I                                 | NMK21103<br>Electromagnetic Theory                | NMK31203<br>Modern Control Systems               | NMK31103<br>Antenna and Propagation             | NMK41003<br>Satellite Technology  |                                 |
|                                                                                                                              | NMK10403<br>Digital Electronics                      | NMK10702<br>Writing in Engineering Technology            | NMK20503<br>Signal & Systems                                    | NMK21303<br>Analog Electronics II                 | NMK31303<br>Digital Communication Technology     | NMK31403<br>Optical Technology                  | Elective 2/3                      |                                 |
|                                                                                                                              | NMK11103<br>Engineering Skills                       | NMK10803<br>Digital Systems                              | NMK22003<br>Integrated Circuit Design                           | NMK30103<br>Communication System                  | NMK31503<br>RF and Microwave Technology          | NMK31704<br>Design Project                      | Elective 3/3                      |                                 |
|                                                                                                                              | NMK11203<br>Measurement & Instrumentation            |                                                          |                                                                 |                                                   |                                                  | Elective ½                                      |                                   |                                 |
| <b>COMMON CORE COURSES</b><br>(18 CREDITS)                                                                                   | QMQ11103<br>Mathematics for Engineering Technology I | QMQ11203<br>Mathematics for Engineering Technology II    | QMQ21303<br>Mathematics for Engineering Technology III          | QMQ27303<br>Statistics for Engineering Technology | NMK34403<br>Engineering Technology in Management | NMK44403<br>Engineering Technologist in Society |                                   |                                 |
| <b>UNIVERSITY REQUIREMENT COURSES</b><br>(16 CREDITS)                                                                        | SMZ1XX01<br>Co-Curriculum I                          | SMZ2XX01<br>Co-Curriculum II                             | SMU22402<br>Engineering Entrepreneurship                        | SMU13102 Appreciation of Ethics & Civilization    | SMB31202<br>English for Technical Communication  |                                                 |                                   |                                 |
|                                                                                                                              |                                                      | SMU12102<br>Integrity and Anti-Corruption <sup>[3]</sup> | SMB20102<br>English for General Communication <sup>[2]</sup> OR | SMU13002<br>Philosophy and Current Issues         |                                                  |                                                 |                                   |                                 |
|                                                                                                                              |                                                      | SMB41002<br>University Malay Language <sup>[4]</sup>     | SMB1XX02<br>Option Subject (Foreign Language) <sup>[2]</sup>    |                                                   |                                                  |                                                 |                                   |                                 |
| <b>TOTAL CREDITS</b><br>(140 CREDITS)                                                                                        | 19                                                   | 19                                                       | 19                                                              | 19                                                | 17                                               | 20                                              | 15                                | 12                              |
| <b>AUDIT COURSES</b>                                                                                                         |                                                      | SMB10102<br>Preparatory English <sup>[1]</sup>           |                                                                 |                                                   |                                                  |                                                 |                                   |                                 |

Elective I : NMK31603 Mobile and Wireless Communications, NMK42403 IoT Technology.

Elective II : NMK41103 Electronic and RF Circuit Design, NMK41203 Wireless Internetworking Technology.

Elective III : NMK40403 Artificial Intelligence, NMK41303 Data Communication and Network.

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students should register SMU13202 Malaysian Studies.

[4] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

**UR6523009**  
**Bachelor of Electronic Engineering Technology**  
**(Electronic Network Design) with Honours**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1**

Engineering technology graduates engaged in the field of electronic engineering technology as demonstrated through career advancement

**PEO 2**

Engineering technology graduates who are members and contribute to professional society

**PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities

**PEO 4**

Engineering technology graduates who are technopreneurs

## PROGRAMME OUTCOMES (PO)

### PO 1

**Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to defined and applied engineering procedures, processes, systems or methodologies; (SK1 to SK4)

### PO 2

**Problem analysis:** Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialization; (SK1 to SK4)

### PO 3

**Design/development of solutions:** Design solutions for broadly-defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations; (SK5)

### PO 4

**Investigation:** Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, data bases and literature, design and conduct experiments to provide valid conclusions; (SK8)

### PO 5

**Modern Tool Usage:** Select and apply appropriate techniques, resources, and modern engineering and IT tools to broadly-defined engineering problems, with an understanding of the limitations; (SK6)

### PO 6

**The Engineer and Society:** Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent

responsibilities relevant to engineering technology practice and solutions to broadly-defined engineering problems; (SK7)

### PO 7

**Environment and Sustainability:** Understand the impact of engineering technology solution of broadly-defined engineering problems in societal and environmental contexts and demonstrate knowledge of and need for sustainable development; (SK7)

### PO 8

**Ethics:** Understand and commit to professional ethics and responsibilities and norms of engineering technology practice; (SK7)

### PO 9

**Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse technical teams.

### PO 10

**Communications:** Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions;

### PO 11

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a team and to manage projects in multidisciplinary environments;

### PO 12

**Life-Long Learning:** Recognise the need for, and have the ability to engage in independent and life-long learning in specialist technologies

| CURRICULUM STRUCTURE                                                                                              |                                                            |                                                              |                                                                    |                                                           |                                                       |                                                       |                                               |                                    |
|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------|------------------------------------|
| UR6523009 BACHELOR OF ELECTRONIC ENGINEERING TECHNOLOGY (ELECTRONIC NETWORK DESIGN) WITH HONOURS INTAKE 2024/2025 |                                                            |                                                              |                                                                    |                                                           |                                                       |                                                       |                                               |                                    |
| YEAR                                                                                                              | FIRST                                                      |                                                              | SECOND                                                             |                                                           | THIRD                                                 |                                                       | FOURTH                                        |                                    |
| SEMESTER                                                                                                          | 1                                                          | 2                                                            | 3                                                                  | 4                                                         | 5                                                     | 6                                                     | 7                                             | 8                                  |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES</b><br>(106 CREDITS)                                            | NMK10003<br>Networking<br>Technology                       | NMK10503<br>Electrical<br>Engineering<br>Technology          | NMK20703<br>Object Oriented<br>Programming                         | NMK20403<br>Internetworking<br>Technology I               | NMK30103<br>Communication<br>System                   | NMK30004<br>Final Year Project I                      | NMK40006<br>Final Year Project II             | NMK40412<br>Industrial<br>Training |
|                                                                                                                   | NMK10103<br>Electric Circuit<br>Principles                 | NMK10603<br>C Programming                                    | NMK20103<br>Microprocessor                                         | NMK20503<br>Signal & Systems                              | NMK30203<br>Embedded Software<br>Technology           | NMK30503<br>Network<br>Management                     | NMK40103<br>Network<br>Security<br>Technology |                                    |
|                                                                                                                   | NMK10203<br>Engineering<br>Science                         | NMK10702<br>Writing in<br>Engineering<br>Technology          | NMK20203<br>Analogue<br>Electronics I                              | NMK20603<br>Computer<br>Architecture                      | NMK30303<br>Operating<br>Systems                      | NMK31704<br>Design Project                            | Elective II                                   |                                    |
|                                                                                                                   | NMK10403<br>Digital<br>Electronics                         | NMK10803<br>Digital<br>Systems                               | NMK20303<br>Database<br>Management<br>Systems                      | NMK20803<br>Data<br>Structures                            | NMK30403<br>Internetworking<br>Technology II          | NMK30703<br>Programming for<br>Networking             | Elective III                                  |                                    |
|                                                                                                                   | NMK11103<br>Engineering<br>Skills                          |                                                              |                                                                    |                                                           |                                                       | Elective I                                            |                                               |                                    |
| <b>COMMON<br/>CORE COURSES</b><br>(18 CREDITS)                                                                    | QMQ11103<br>Mathematics for<br>Engineering<br>Technology I | QMQ11203<br>Mathematics for<br>Engineering<br>Technology II  | QMQ21303<br>Mathematics for<br>Engineering<br>Technology III       | QMQ27303<br>Statistics for<br>Engineering<br>Technology   | NMK34403<br>Engineering<br>Technology<br>Management   | NMK44403<br>Engineering<br>Technologist in<br>Society |                                               |                                    |
| <b>UNIVERSITY<br/>REQUIREMENT<br/>COURSES</b><br>(16 CREDITS)                                                     | SMZXXX/1<br>Co-Curriculum I                                | SMB41002<br>University Malay<br>Language <sup>[3]</sup>      | SMU22402<br>Engineering<br>Entrepreneurship                        | SMU13002<br>Philosophy and<br>Current Issues              |                                                       |                                                       |                                               |                                    |
|                                                                                                                   |                                                            | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup> | SMB20102<br>English for<br>General<br>Communication <sup>[2]</sup> | SMU13102<br>Appreciation of<br>Ethics and<br>Civilization | SMB31202<br>English for<br>Technical<br>Communication |                                                       |                                               |                                    |
|                                                                                                                   |                                                            | SMZXXX/1<br>Co-Curriculum II                                 |                                                                    |                                                           |                                                       |                                                       |                                               |                                    |
| <b>TOTAL CREDITS</b><br>(140 CREDITS)                                                                             | <b>19</b>                                                  | <b>19</b>                                                    | <b>19</b>                                                          | <b>19</b>                                                 | <b>17</b>                                             | <b>20</b>                                             | <b>15</b>                                     | <b>12</b>                          |
| <b>AUDIT COURSES</b>                                                                                              |                                                            | SMB10102<br>Preparatory<br>English <sup>[1]</sup>            |                                                                    |                                                           |                                                       |                                                       |                                               |                                    |

Elective I : NMK40203 Mobile Computing, NMK34003 Switching, Routing and Wireless Essentials.

Elective II : NMK40803 Enterprise Networking, Security and Automation, NMK40403 Artificial Intelligent.

Elective II : NMK30903 Cloud Infrastructure and Services, NMK42403 IOT Technology.

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

**LIST OF COURSES**

| COURSE CODE | COURSE NAME                                                                |
|-------------|----------------------------------------------------------------------------|
| NMK10103    | Litar Elektrik [Electric Circuits]                                         |
| NMK10203    | Sains Kejuruteraan [Engineering Science]                                   |
| NMK10403    | Elektronik Digit [Digital Electronics]                                     |
| NMK10503    | Kemahiran Kejuruteraan Elektrik [Electrical Engineering Technology]        |
| NMK10603    | Pengaturcaraan C [C Programming]                                           |
| NMK10703    | Penulisan dalam Teknologi Kejuruteraan [Writing in Engineering Technology] |
| NMK10803    | Sistem Digital [Digital Systems]                                           |
| NMK11103    | Kemahiran Kejuruteraan [Engineering Skill]                                 |
| NMK11203    | Pengukuran dan Instrumentasi [Measurement and Instrumentation]             |
| NMK20103    | Mikropemproses [Microprocessor]                                            |
| NMK20203    | Elektronik Analog I [Analog Electronic I]                                  |
| NMK20503    | Isyarat dan Sistem [Signals and Systems]                                   |
| NMK20603    | Senibina Komputer [Computer Architecture]                                  |
| NMK21103    | Teori Elektromagnetik [Electromagnetic Theory]                             |
| NMK21303    | Litar Elektronik Analog II [Analog Electronic Circuit II]                  |
| NMK22003    | Reka Bentuk Litar Bersepadu [Integrated Circuit Design]                    |
| NMK30004    | Projek Tahun Akhir I [Final Year Project I]                                |
| NMK30103    | Sistem Komunikasi [Communication Systems]                                  |
| NMK31003    | Pemprosesan Isyarat Digital [Digital Signal Processing]                    |

| COURSE CODE | COURSE NAME                                                                    |
|-------------|--------------------------------------------------------------------------------|
| NMK31103    | Antena Dan Perambatan [Antenna and Propagation]                                |
| NMK31203    | Sistem Kawalan Moden [Modern Control System]                                   |
| NMK31303    | Teknologi Komunikasi Digital [Digital Communication Technology]                |
| NMK31403    | Teknologi Optik [Optical Technology]                                           |
| NMK31503    | Teknologi RF Dan Gelombang Mikro [RF and Microwave Technology]                 |
| NMK31603    | Komunikasi Tanpa Wayar Dan Mudah Alih [Mobile and Wireless Communication]      |
| NMK31704    | Projek Rekabentuk [Design Project]                                             |
| NMK34403    | Pengurusan dalam Teknologi Kejuruteraan [Engineering Technology in Management] |
| NMK40006    | Projek Tahun Akhir II [Final Year Project II]                                  |
| NMK40403    | Kepintaran Buatan [Artificial Technology]                                      |
| NMK40412    | Latihan Industri [Industrial Training]                                         |
| NMK41003    | Teknologi Satelit [Satellite Technology]                                       |
| NMK41103    | Elektronik dan Rekabentuk Litar RF [Electronics and RF Circuit Design]         |
| NMK41203    | Teknologi Antara Rangkaian Tanpa Wayar [Wireless Internetworking Technology]   |
| NMK41303    | Komunikasi Data dan Rangkaian [Data Communication and Network]                 |
| NMK42403    | Teknologi IoT [IoT Technology]                                                 |
| NMK44403    | Jurutera Teknologis dalam Masyarakat [Engineering Technologist in Society]     |
| NMK12003    | Bahan Kejuruteraan [Engineering Materials]                                     |
| NMK20703    | Object Oriented Programming [Pengaturcaraan Berasaskan Objek]                  |



| COURSE CODE | COURSE NAME                                                                  |
|-------------|------------------------------------------------------------------------------|
| NMK32003    | Elektronik Kuasa [Power Electronics]                                         |
| NMK32103    | Rekabentuk Litar Bersepadu Digital [Digital Integrated Circuit Design]       |
| NMK32203    | Mikropengawal [Microcontroller]                                              |
| NMK32303    | Verifikasi Atas Cip [Verification on Chip]                                   |
| NMK33003    | Teknologi Fabrikasi Mikroelektronik [Microelectronic Fabrication Technology] |
| NMK33103    | Nanoelektronik [Nanoelectronics]                                             |
| NMK33203    | Pembungkusan Semikonduktor [Semiconductor Packaging]                         |
| NMK33303    | Kebolehpercayaan Dan Analisis Kegagalan [Reliability and Failure Analysis]   |
| NMK42003    | Instrumentasi [Instrumentation]                                              |
| NMK42103    | Pengujian Semikonduktor [Semiconductor Testing]                              |
| NMK42203    | Rekabentuk Litar Terkamir Analog [Analog Integrated Circuit Design]          |
| NMK43103    | Sistem Optoelektronik [Optoelectronic System]                                |
| NMK43003    | Sistem Mikroelektromekanikal [Microelectromechanical System]                 |
| NMK10003    | Asas Rangkaian [Networking Fundamentals]                                     |
| NMK10702    | Penulisan dalam Teknologi Kejuruteraan [Writing in Engineering Technology]   |
| NMK20303    | Sistem Pengurusan Pangkalan Data [Database Management System]                |
| NMK20403    | Teknologi Antara Rangkaian 1 [Internetworking Technology 1]                  |
| NMK20803    | Struktur Data [Data Structures]                                              |
| NMK30203    | Teknologi Perisian Terbenam [Embedded Software Technology]                   |

| COURSE CODE | COURSE NAME                                                                                     |
|-------------|-------------------------------------------------------------------------------------------------|
| NMK30303    | Sistem Pengoperasian [Operating System]                                                         |
| NMK30403    | Teknologi Antara Rangkaian 2 [Internetworking Technology 2]                                     |
| NMK30503    | Pengurusan Rangkaian [Network Management]                                                       |
| NMK30703    | Pengaturcaraan Rangkaian [Programming for Network]                                              |
| NMK30903    | Infrastruktur Dan Perkhidmatan Awan [Cloud Infrastructure And Services]                         |
| NMK34003    | Pensuisan, Penghalaan Dan Keperluan Tanpa Wayar [Routing And Wireless Essentials]               |
| NMK40103    | Teknologi Keselamatan Rangkaian [Network Security Technology]                                   |
| NMK40203    | Pengkomputeran Mudah Alih [Mobile Computing]                                                    |
| NMK40803    | Rangkaian Enterprise, Keselamatan dan Automasi [Enterprise Networking, Security And Automation] |

**NMK10103 LITAR ELEKTRIK [ELECTRIC CIRCUIT]****No of Credits: 3****Course Synopsis:**

This course introduces students to the mathematical foundation and measurement tools for electric circuit analysis. It covers the analysis of simple electrical circuits consisting of a few essential components using fundamental, well-known methods and techniques. Key concepts introduced in this course include basic electrical measurements, Ohm's and Kirchhoff's laws, as well as nodal and mesh analysis in series/parallel circuits. The circuit theorems and conversions, capacitors, inductors and RLC circuits also will be discussed.

**Course Outcomes:**

1. Ability to demonstrate basic concepts of electrical current, voltage, resistance, capacitance and inductance.
2. Ability to discuss the concept of Ohm's and Kirchhoff's laws, nodal and mesh analysis, circuit theorems and conversions, and RLC circuits.
3. Ability to perform the appropriate technique using measurement tools for electric circuit analysis.

**NMK10203 SAINS KEJURUTERAAN [ENGINEERING SCIENCE]****No of Credits: 3****Course Synopsis:**

This course covers introduction to physic and science which are force and motion, circular motion, work, power and energy, electrostatic, magnetism, electric current and resistance. Fundamental physics is combined with problem solving and engineering skills through suitable tutorials. This course will expose the students to the elements and principles of basic concepts of physics and its application.

**Course Outcomes:**

1. Ability to apply the concept of standard unit, force, motion, work, energy and power principles.
2. Ability to examine the circular motion principles in oscillation and wave related problems
3. Ability to analyse the basics of electrostatic, electromagnetism related problems.
4. Ability to examine the basics of electric current and resistivity related problems.

**NMK10403 ELEKTRONIK DIGIT [DIGITAL ELECTRONICS]****No of Credits: 3****Course Synopsis:**

Introduction and discussion of fundamentals of digital circuit design and analysis. The lecture and tutorial exercise/ practical lab modules cover the following topics: Boolean Algebra, Numbering System, Basic Logic Gates, Combinational Circuit Design, Timing Diagram, and Bi-Stable Memory Device - latch and flip-flops.

**Course Outcomes:**

1. Ability to describe numbering systems, Boolean algebra, and Boolean expression
2. Ability to analyse Boolean expression for combinational logic circuits
3. Ability to design and evaluate combinational logic circuits.

**NMK10503 TEKNOLOGI KEJURUTERAAN ELEKTRIK [ELECTRICAL ENGINEERING TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course emphasizes basic electrical engineering and power electronics which consists of three parts: the introduction of electrical systems, equipment, electrical machines, and drives. This course also provides knowledge in the field of power transmission, machinery, equipment, and power processing meter. Teaching and learning involve theoretical, simulation of computer aided design (CAD) software and also practical skills in the fields of electricity and electromagnetism, transformer, Alternating Current (AC) and Direct Current (DC) machines.

**Course Outcomes:**

1. Solve the problems on electricity, electromagnetism, single and three phase system with respect to their application, reliability, and safety.
2. Analyze the basic operations of DC/AC meters and transformer based on their construction, types and application.
3. Design a basic connection to support the comprehensive solution to DC/AC machines problem with respect to their efficiency, equivalent circuits and losses.

**NMK10603 PENGATURCARAAN C (C PROGRAMMING)****No of Credits: 3****Course Synopsis:**

The course introduces basic programming using high-level language (C language). The main objective of this course is to prepare the students with the ability of problem solving with programming, to be able to do analysis with programming tools such as flowcharts and pseudo code and then to implement them by developing C programme.

**Course Outcomes:**

1. Ability to define and describe programming concepts and principles.
2. Ability to apply tools for coding, compiling, executing and debugging computer programs.
3. Ability to develop software solutions to solve engineering related problems using computer programming techniques.

**NMK10702 PENULISAN DALAM TEKNOLOGI KEJURUTERAAN [WRITING IN ENGINEERING TECHNOLOGY]****No of Credits: 2****Course Synopsis:**

This course introduces technical writing and communication related to engineering technology field. Students will be exposed to the methodology in accessing engineering technology information and common requirements and expectations to the formats, techniques and ethics in writing various types of engineering technology documents.

**Course Outcomes:**

1. Ability to produce engineering technology documents in consideration of ethics, spelling, grammar, and avoidance of typing errors while at the same time considering the flow and continuity of ideas.
2. Ability to differentiate and analyze technical documents related on the sources of information in engineering technology field.
3. Ability to perform group work involving presentations, reports and communication task.

**NMK10803 SISTEM DIGITAL [DIGITAL SYSTEMS]****No of Credits: 3****Course Synopsis:**

This course is a continuation of the digital electronic course. This course exposes students to enhancement knowledge in digital systems. Students can develop technical skills in design, analyze and verify digital systems. The topic covers combinational and sequential logic system design.

**Course Outcomes:**

1. Ability to analyze combinational and sequential logic circuits for digital systems.
2. Ability to construct and analyze various types of sequential circuits and counter including interpret state table, state diagram (Finite State Machine – FSM) charts.
3. Ability to design a digital system.

**NMK11103 KEMAHIRAN KEJURUTERAAN ELEKTRONIK [ELECTRONIC ENGINEERING SKILLS]****No of Credits: 3****Course Synopsis:**

This course is 100% of practical works and carries 3 credit hours. It contains five essential modules to develop basic engineering skills for the electronic students. The modules include an introduction to electronic components and instrumentation, electronic circuit design and simulation, PCB design and fabrication, technical drawing and as well as product design and integration.

**Course Outcomes:**

1. Ability to measure the electronic components by using appropriate electronic instrumentations tools.
2. Ability to construct electronic schematic diagrams and perform circuit simulation using suitable software.
3. Ability to build and fabricate Printed Circuit Board (PCB)
4. Ability to construct a two-dimensional (2D) and a three-dimensional (3D) technical drawing.
5. Ability to build a three-dimensional (3D) model of electronic product.

**NMK12003 BAHAN KEJURUTERAAN [ENGINEERING MATERIALS]****No of Credits: 3****Course Synopsis:**

The course is tailored to give students a basic principles study that governs the materials properties, limitations and behaviour of materials. At the end of this course, the student will be familiar with the basic understanding of different material classes in order to relate the material with its characteristics.

**Course Outcomes:**

1. Ability to explain type of materials families (metal, polymer, ceramic, composite and semiconductor) based on structure, property and application.
2. Ability to analyze various material characteristics and properties such as mechanical, electrical, magnetic and optical properties.
3. Ability to analyze materials reliability in terms of materials life cycle, oxidation and corrosion mechanism and function effectively as individual and as a member or leader in diverse teams..

**NMK20103 MIKROPEMROSES [MICROPROCESSOR]****No of Credits: 3****Course Synopsis:**

The aim of this course is to study the Intel 8085 microprocessor architecture and relate that knowledge to the design of microprocessor based systems. This includes the design technique for designing memory, input and output for the systems. The study of 8085 instruction set and various software development tools are also emphasized as the knowledge are needed in the design of the microprocessor-based systems.

**Course Outcomes:**

1. Ability to describe the theory and basic architecture of microprocessor system.
2. Ability to write an assembly language programming.
3. Ability to design a simple application on a microprocessor-based system

**NMK20203 ELEKTRONIK ANALOG I [ANALOG ELECTRONIC I]****No of Credits: 3****Course Synopsis:**

This course exposes the student the basic knowledge in analog electronic. The exposure encompasses amplifier design based on bipolar and field effect transistors, for single and multi-stage, power amplifier, frequency response analysis of amplifiers. Emphasis is placed on basic design aspects and applications. The course has been designed to provide basic analog electronic skills covering theories and practices. At the end of the course, the students are expected to be able to solve engineering problems of diode application and circuits analysis related to analog electronic.

**Course Outcomes:**

1. Ability to apply the concept of diode application and basic configuration of BJT and FET amplifier.
2. Ability to analyze DC and AC, small-signal analysis and frequency performance of basic configuration of BJT and FET amplifier.
3. Ability to analyze simple design of Classes A, B, AB of FET and BJT power amplifier in-terms of their equivalent circuit and gain.
4. Ability uses modern tools to characterize the diode application, DC and AC analysis of the amplifier.

**NMK20503 ISYARAT DAN SISTEM [SIGNALS AND SYSTEMS]****No of Credits: 3****Course Synopsis:**

This course introduces students to the mathematical foundation and computational tools for processing continuous-time and discrete-time signals in both time and frequency domains. Key concepts introduced and discussed in this course include linear time-invariant systems (LTI), impulse response, frequency response, convolution, filtering, sampling, Fourier series and transform, Laplace transform and Z-transform.

**Course Outcomes:**

1. Ability to demonstrate types, characteristics and basic operation of signals and systems.
2. Ability to discuss the concept of signal representations and transformations of continuous-time and discrete-time signals.
3. Ability to perform the appropriate technique using computational software for continuous-time and discrete-time signal analysis.

**NMK20603 SENIBINA KOMPUTER [COMPUTER ARCHITECTURE]****No of Credits: 3****Course Synopsis:**

This course covers both the architectural and organizational aspects of computer systems. Architectural aspects of a system are defined as the features that are available to the operating system kernel such as the instruction set, data representations and peripheral interfaces. On the other hand, organizational aspects of a system are defined as the physical implementations that realize the features given for a system. These include the design of basic building blocks such as the ALU and the control unit, as well as the logic level interface of both internal and external units. This course expects the students to have a good fundamental on digital logic design (both combinatorial and sequential logic).

**Course Outcomes:**

1. Ability to interpret the theoretical aspects of computer organization and architecture.
2. Ability to analyze existing design issues involving performance using theoretical knowledge and/or simulation tools.
3. Ability to design and justify basic central processing unit (CPU) based on given specifications.

**NMK20703 PENGATURCARAAN BERASASKAN OBJEK [OBJECT ORIENTED PROGRAMMING]****No of Credits: 3****Course Synopsis:**

This course discusses the fundamental concepts of programming in the object-oriented paradigm, which includes classes and objects, inheritance, polymorphism, and exception handling. Students will be able to apply object-oriented problem solving with attention to general as well as programming language-specific issues such as application design and development, packages, applets, and graphical user interface (GUI).

**Course Outcomes:**

1. Ability to explain and apply the basic concepts of class, object, instance, attributes, methods, inheritance, and polymorphism.
2. Ability to evaluate technology problems and prepare the solution to the problem using an object oriented paradigm.
3. Ability to develop an application and improve its robustness based on the problem-solution design using java.

**NMK21103 TEORI ELEKTROMAGNETIK [ELECTROMAGNETIC THEORY]****No of Credits: 3****Course Synopsis:**

The course covers basic concepts and understanding of fundamental laws of electrostatic and magnetostatic. Applications of these laws for different field configurations are also introduced. The course also introduces transmission line theory and the use of transmission lines as circuit elements. Calculation of transmission line parameters like VSWR, reflection coefficient, and impedance matching using Smith's chart is also included in this course.

**Course Outcomes:**

1. Ability to apply knowledge on the concept of vector analysis coordinate systems in electromagnetic theory.
2. Ability to analyze the concepts of electrostatic.
3. Ability to analyze the concepts of magnetostatic.
4. Ability to evaluate the concept of electromagnetics in transmission line analysis.

**NMK21303 LITAR ELEKTRONIK ANALOG II [ANALOG ELECTRONIC CIRCUIT II]****No of Credits: 3****Course Synopsis:**

This course offers the students an exposure to the operational amplifier: operation, differential amplifier, common-mode, parameters, basic op-amp, practical op-amp circuits; Applications of op-amp: Summing amplifier, Voltage follower, Comparator, Integrator, Differentiator; oscillator: Basic operating principles of an oscillator, phase shift, Wien Bridge, Crystal oscillator, uni-junction. Active Analog Filters: Basic filter, filter response characteristics, low-pass filter, high-pass filter, band-pass filter, band-stop filter, frequency response measurement, design of filter, Butterworth, Chebyshev and Elliptic.

**Course Outcomes:**

1. Ability to explain the basic characteristics of the op-amp, oscillators, filters, and voltage regulators.
2. Ability to analyse the operations of analogue electronic circuits.
3. Ability to measure and conclude the output of analogue circuits.



**NMK22003 REKA BENTUK LITAR BERSEPADU [INTEGRATED CIRCUIT DESIGN]****No of Credits: 3****Course Synopsis:**

In this course, students learn about VLSI design, with emphasis on designing circuits to meet certain performance criteria. Important issues when designing a VLSI circuit are discussed. MOS transistors are reviewed, including their characteristics, structure, switch-level behavior, and current equation. SPICE model of a MOS transistor is also described. The inverter circuit is studied in detail. IC fabrication process is reviewed. Layout, design rules and stick diagram are explained. This course emphasizes circuit design for speed and power performances. Factors that affect speed are explained. Logical effort concept is introduced to explain how to design a fast circuit. Similarly, effect of input signal transitions on power dissipation is explained.

**Course Outcomes:**

1. Ability to analyze CMOS transistor characteristics.
2. Ability to design combinational logic circuits at transistor level and construct its layout.
3. Ability to design and recommended the logic circuits for speed optimization and understand the principles of fabrication related.
4. Ability to work in a team and communicate effectively to solve broadly defined engineering problems.

**NMK30004 PROJEK TAHUN AKHIR I [FINAL YEAR PROJECT I]****No of Credits: 4****Course Synopsis:**

This is a development project that involves solving practical engineering technology problem under the supervision of faculty member. The project undertaken might be one of the following areas: hardware and/or software development and device fabrication. Each student prepares comprehensive engineering reports, presents and demonstrates project work findings and results.

**Course Outcomes:**

1. Ability to synthesize information for literature review including standards, management, journals, policies, field data, etc, relevant to the specific project to be undertaken and relate with societal and global issues.
2. Ability to identify problem statements, objectives and appropriate research and design solution using suitable methodology to solve broad-defined engineering problems.

3. Ability to manage research activities systematically by planning and executing in a timely manner.
4. Ability to communicate effectively in oral forms to defend and justify the proposed solutions and progress.

**NMK30103 SISTEM KOMUNIKASI [COMMUNICATION SYSTEMS]****No of Credits: 3****Course Synopsis:**

This course includes basic principles and concepts of communication engineering system such as an introduction to the basic elements of communications, information theory and signal analysis. Knowledge in Amplitude Modulation (AM), Frequency Modulation (FM) and Pulse Modulation techniques are introduced. Some pulse modulation technique is also present such as Amplitude Shift Keying (FSK), Phase Shift Keying (PSK) Frequency Shift Keying (FSK) and Pulse Code Modulation (PCM).

**Course Outcomes:**

1. Ability to analyze the fundamentals of communication systems and information theory, and the essentials of signal analysis in communication system.
2. Ability to evaluate amplitude, frequency, and phase modulation signals in term of modulation index, power, noise, and the frequency spectrum.
3. Ability to investigate the fundamental of communication system, types of modulation techniques for digital modulation. As well as the practical system that has been applied in real world.

**NMK31003 PEMROSESAN ISYARAT DIGITAL [DIGITAL SIGNAL PROCESSING]****No of Credits: 3****Course Synopsis:**

Digital signal processing (DSP) manipulates an information signal by modifying or improving it via some mathematical approaches. DSP has been revolutionized and applied in various areas including electronic audio/video/image media, communications, radar, automotive, biomedical, and military. Since DSP is significant for developing numerous emerging digital products and applications in information age, it becomes as a core subject in most electronics/computer/communications engineering curricula. This course will focus the mathematical basis of discrete-time signal analysis, explain the theory and implementation of Fourier transform (FT) algorithms and z-domain transform, and discuss the design and implementation of digital filters. In practical, this course will make extensive use of a mathematical software and/or a DSP kit and board as an analysis, design, and visualization tool.

**Course Outcomes:**

1. Ability to apply knowledge systematically the Fourier transform and z-transform domain representation of discrete-time signals.
2. Ability to analyse the sampling and recovery processes for continuous-time signals and discrete-time signals conversion.
3. Ability to design digital filters implementing finite impulse response (FIR) and infinite impulse response (IIR) filters taking account on their structures and the effect of finite word length.
4. Ability to apply technique using software and/or hardware tool for various DSP problems.

**NMK31203 SISTEM KAWALAN MODEN [MODERN CONTROL SYSTEM]****No of Credits: 3****Course Synopsis:**

This course introduces modern control techniques and tools in performing control and realizing control system. The implementation of mathematics and control theory become the core of this subject.

**Course Outcomes:**

1. Ability to explain control systems and control systems design.
2. Ability to describe the mathematical models for such mechanical, electrical and electromechanical systems. (state variable systems, stability in feedback control systems, and frequency domain).
3. Ability to analyse and design linear feedback systems using root locus method, digital control systems.

**NMK31704 PROJEK REKABENTUK [DESIGN PROJECT]****No of Credits: 4****Course Synopsis:**

In this course, students are expected to propose a design solution of broadly defined engineering problem which consist of several integration parts development such as components, processes, modules, systems. Throughout the course implementation, participation among team members were evaluated. Upon completion, students will have the ability to design an ideal project solution with consideration of societal, health, safety, cultural and environmental issues. Related act and regulation compliance are emphasized towards sustainable design development.

**Course Outcomes:**

1. Ability to construct a problem solving design with consideration of societal, health, safety, cultural and environmental issues.
2. Ability to evaluate the responsibility of a technologist in terms of societal, health, safety, legal and cultural issues in problem solving design.
3. Ability to propose a sustainable plan to mitigate the negative impact of designed solution of engineering problem.
4. Ability to justify the designed solution of engineering problem in adherence to ethical conduct.
5. Ability to contribute in a collaborative task of multidisciplinary team.
6. Ability to perform effective communication in terms of technical report, presentation and task collaboration.

**NMK32003 ELEKTRONIK KUASA [POWER ELECTRONICS]****No of Credits: 3****Course Synopsis:**

This course introduces Power Electronics as a Multidisciplinary & Interdisciplinary Applications Orientated Technology emphasising the main criterion of energy efficiency. Topics for this course also cover Fundamental Concepts of Power Electronics, Power Semiconductor Devices, Power Electronic Circuits, AC-DC Conversion, AC-AC Conversion, DC-DC Conversion and DC-AC Conversion, including waveform analysis, is developed from the blended skills of theory – simulation - laboratory.

**Course Outcomes:**

1. Ability to identify power electronic systems operation, applications area and need for efficiency design.
2. Ability to design different types of power semiconductor device by APPLYING modelling tool; power diode, SCR, BJT, IGBT, GTO and MOSFET.
3. Ability to design AC-DC conversion, AC-AC conversion, DC-DC conversion and DC-AC conversion using modern tool.

**NMK32103 REKABENTUK LITAR BERSEPADU DIGITAL [DIGITAL INTEGRATED CIRCUIT DESIGN]****No of Credits: 3****Course Synopsis:**

This course introduces Power Electronics as a Multidisciplinary & Interdisciplinary Applications Orientated Technology emphasising the main criterion of energy efficiency. Topics for this course also cover Fundamental Concepts of Power Electronics, Power Semiconductor Devices, Power Electronic Circuits, AC-DC Conversion, AC-AC Conversion, DC-DC Conversion and DC-AC Conversion, including waveform analysis, is developed from the blended skills of theory – simulation - laboratory.

**Course Outcomes:**

1. Ability to analyze hardware architecture of a microcontroller system and sketch the fundamental diagram describing its behavior.
2. Ability to design and write a structured programmed of microcontroller programming for the system application.
3. Ability to design and evaluate embedded system based in a single chip microcontroller.

**NMK32203 MIKROPENGAWAL [MICROCONTROLLER]****No of Credits: 3****Course Synopsis:**

The aim of this course is to study the concept and requirement of embedded software development, single chip microcontroller and programming technique in assembly language and C, basic multitasking concept, developing and embedded system application.

**Course Outcomes:**

1. Ability to analyze basic digital systems using Hardware Description Language (HDL) for application-specific integrated circuit-based design.
2. Ability to construct and design a complete digital system consisting of control and data path unit by design and simulation using Verilog HDL.
3. Ability to construct and evaluate digital system using High-Level Synthesis.

**NMK33003 TEKNOLOGI FABRIKASI MIKROELEKTRONIK [MICROELECTRONIC FABRICATION TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course on microelectronic fabrication technology focuses on the concept and basics of semiconductor materials, process technology and fabrication processes of Integrated Circuits (ICs). The students will also be exposed to the fabrication process from oxidation, lithography, etching, diffusion, implantation, metallization and characterization.

**Course Outcomes:**

1. Ability to relate the essential aspects of semiconductor fabrication technology, which include materials, devices, processes, facilities and standard practices.
2. Ability to design and appraise important parameters of the wafer cleaning, thermal processes and photolithography process.
3. Ability to design and evaluate important parameters of etching, metallization process and CMOS fabrication process module.

**NMK33103 NANOELEKTRONIK [NANO ELECTRONIC]****No of Credits: 3****Course Synopsis:**

Fundamentals of nanotechnology and its application to engineering technology systems, emphasizing basic principles, materials, measurement methods, fabrication techniques and applications.

**Course Outcomes:**

1. Ability to analyze basic principles, methods of measuring properties and structures in nanoelectronic.
2. Ability to evaluate properties of particles and materials in nanoelectronic.
3. Ability to design nanomachines and nanodevices.

**NMK33303 KEBOLEHPERCAYAAN DAN ANALISIS KEGAGALAN [RELIABILITY AND FAILURE ANALYSIS]****No of Credits: 3****Course Synopsis:**

This course is basically divided into two areas: Reliability & Failure Analysis. In the first section of Reliability, students will learn the concept of Reliability, its terms & definitions, the different types of Reliability Distributions and also the different types of Reliability Prediction Techniques such as FMEA & FTA. In the second section of Failure Analysis, students will be exposed to the different types of FA techniques commonly conducted on a failed semiconductor device and the test instrumentation associated with each technique.

**Course Outcomes:**

1. Ability to analyze Reliability-based problems
2. Ability to create the failure analysis process flow and the related procedures
3. Ability to suggest different tools and techniques available in failure analysis, its importance and the details operation principle

**NMK34403 PENGURUSAN DALAM TEKNOLOGI KEJURUTERAAN [ENGINEERING TECHNOLOGY IN MANAGEMENT]****No of Credits: 3****Course Synopsis:**

This course aims to teach students on how to apply the project management skills and economic techniques in evaluating the design. The role of economics is to assess the appropriateness of a given project, estimate its value, and justify it from an engineering technology standpoint. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineering technologist relating to project management in the current economic scenarios.

**Course Outcomes:**

1. Ability to evaluate the process of project management, develop work plans, do cost estimation and perform project evaluation
2. Ability to evaluate economic scenarios and apply decision making process to engineering project and business venture
3. Ability to demonstrate the needs of skills in economic and engineering project management

**NMK40006 PROJEK TAHUN AKHIR II [FINAL YEAR PROJECT II]****No of Credits: 6****Course Synopsis:**

The course would expose students toward the second part of a development project that involves manage solving practical engineering technology problem under the supervision of a faculty member within the time given. The project undertaken may fall under one of the following areas: hardware and/or software development or device fabrication. Each student would prepares comprehensive engineering reports, communicate effectively by presenting and demonstrating the finding in order to defend the results of project work.

**Course Outcomes:**

1. Ability to manage research activities systematically by planning and executing in a timely manner and create a learning portfolio.
2. Ability to apply appropriate tools, techniques and resources to develop broadly-defined engineering product
3. Ability to communicate effectively in oral presentation to defend and justify the broadly-defined engineering solutions
4. Ability to conduct investigations, data interpretations/analysis, and judgement in research findings to solve broadly-defined problems

**NMK42003 INSTRUMENTASI [INSTRUMENTATION]****No of Credits: 3****Course Synopsis:**

This course covers the fundamental of electronic instrumentation. The core of electronic instrumentation is the embedded controller, which controls sensors and actuators. The importance of the working principle, transduction properties of transducers and sensors, and signal conditioning is highlighted. Element and principle of data conversion and acquisition, data transmission, and their applications are discussed. Local and network electronic instrumentation requirement and wireless sensor network are discussed. The technique to send acquired data from the embedded controller and smart sensors to cloud storage to be shared and used by actuators is covered.

**Course Outcomes:**

1. Ability to outline the fundamental concept of electronic instrumentation
2. Ability to analyse electronic instrumentation comprising of embedded controllers, sensors, actuators, data acquisition, storage
3. Ability to design local system, wired and wireless network system, internet and cloud-based data storage

**NMK40412 LATIHAN INDUSTRI [INDUSTRIAL TRAINING]****No of Credits: 12****Course Synopsis:**

This practical-based course exposes students to a company technical functions and organizational structure and operation such as departmental function, work procedure, safety procedure, communication, technical skills and project management. During this course, the students will apply knowledge learned in the university and increased the related skills required in their future profession.

**Course Outcomes:**

1. Ability to demonstrate technical knowledge and practical skills.
2. Ability to practice the health, safety, legal and cultural issues in working environment.
3. Ability to apply societal environmental and sustainable development in engineering problems.
4. Ability to demonstrate good work performance, work ethics during training period.
5. Ability to perform as individual, a member or leader in diverse technical teams.
6. Ability to communicate and operate assigned task given by host company.
7. Ability to engage in independent and life-long learning in specialist technologies.

**NMK42203 REKABENTUK LITAR ANALOG BERSEPADU [ANALOG INTEGRATED CIRCUIT DESIGN]****No of Credits: 3****Course Synopsis:**

The aim of this course is to expose the student to the basic knowledge in analog integrated circuit design. The course includes study and analysis of the MOS characteristics and its second-order effects, the basic cells, single stage amplifier and differential amplifier. Emphasis is put on design aspect of the circuits. The course has been designed to provide fundamental analog integrated circuit knowledge covering theories and practices.

**Course Outcomes:**

1. Ability to analyse the MOS transistor operation and basic building block for analog circuit
2. Ability to design single stage amplifier
3. Ability to design differential amplifier

**NMK42403 TEKNOLOGI IOT [IOT TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course which is practical in nature introduces current enabling technologies, architectures and applications of IOT using real/actual devices. These devices are integrated within local area network and the internet wirelessly. Implementation of these seamless interconnections and interactions are made between people and machines, and machines and machines. Examples of these interactions manifest in home, transport, health, office and factory automation and security. Emphasis is given in hands-on applications involving Bluetooth, RFID, WiFi, ZigBee and GSM technology. Data involve may be stored locally, in local network and in cloud storage.

**Course Outcomes:**

1. Ability to select appropriate IoT technology
2. Ability to evaluate sensors, actuators, and embedded systems.
3. Ability to design IoT based applications.

**NMK43003 SISTEM MIKROELEKTROMEKANIKAL [MICROELECTROMECHANICAL SYSTEM]****No of Credits: 3****Course Synopsis:**

This course will explore about Microelectromechanical System (MEMS) which focus on the introduction, micro fabrication process, sensors and actuating systems. Measurement techniques and MEMS related applications will be covered in this course.

**Course Outcomes:**

1. Ability to analyze basic fabrication process, electrical and mechanical properties for MEMS technologies.
2. Ability to explain and investigate the concepts of MEMS sensors and actuators systems for different applications.
3. Ability to design and evaluate MEMS application device.

**NMK43103 SISTEM OPTOELEKTRONIK [OPTOELECTRONIC SYSTEM]****No of Credits: 3****Course Synopsis:**

The students studying this course will develop a basic understanding of the principles and practices of modern optoelectronic device includes fiber optic, semiconductor laser, photodiode and LED. The important functions for applications for these optoelectronic devices will acquire in optoelectronic system such as optical communication and display technology. Practical skills by using software in optical fiber systems and measurement will also be acquired.

**Course Outcomes:**

1. Ability to demonstrate light properties, principle in optical fiber fundamental and optical component and passive device.
2. Ability to construct the concept, principles and operation of LEDs principles and operation of lasers concept.
3. Ability to design laser diode and photo detectors.
4. Ability to evaluate non-linear optics activity, acoustic optics and systems and applications for display.

**NMK44403 JURUTERA TEKNOLOGIS DALAM MASYARAKAT [ENGINEERING TECHNOLOGIST IN SOCIETY]****No of Credits: 3****Course Synopsis:**

This course aims to explain the main concepts in engineer and technology ethics, risk management and occupational safety and health as well as to expose the students to basic if law in the engineering and technology context. The course presents the introductory nature to enable technologists to appreciate factors that must be considered in decision-making. Examine and assess issues and challenges faced by technologist relating to engineering and technology ethics, risk management and to understand the legal requirements related engineering and technology field.

**Course Outcomes:**

1. Ability to examine the issues and challenges of Engineering and Technology ethics
2. Ability to assess Hazard, the function of risk management and occupational safety and health (OSHA)
3. Ability to evaluate aspect and procedures of legal on Engineering and Technologies Issues

**NMK11203 PENGUKURAN DAN INSTRUMENTASI [MEASUREMENT AND INSTRUMENTATION]****No of Credits: 3****Course Synopsis:**

This course discusses about theory and constructional of analog instruments, measurement standard and calibration, unit and dimension, measurement and error, use voltmeter and ammeter using PMMC (Permanent Magnet Moving Coil), AC (Alternating Current) voltmeter design, analog and digital meters, measurement using DC (Direct Current) or AC bridges. Introduction to sensors and transducers. Measurement using oscilloscope and waveform generator. Types of display device which are the output devices for presentation of information in text or image form. Also introduce topic on Data acquisition (DAQ), is the process of measuring an electrical or physical phenomenon such as voltage, current, temperature, pressure, or sound with a computer. A DAQ system consists of sensors, DAQ measurement hardware, and a computer with programmable software. At the end of the course, the students are expected to be able to determine the right measurement and instrumentation for different application.

**Course Outcomes:**

1. Ability to describe the standards of measurement and instrument application
2. Ability to analyze different types of DC/AC meter to measure current, voltage, resistance, inductance, and capacitance
3. Ability to analyze the knowledge of AC & DC bridge, transducer, and sensor.
4. Ability uses modern tools for data acquisition system in instrumentation and measurement.

**NMK31103 ANTENA DAN PERAMBATAN [ANTENNA AND PROPAGATION]****No of Credits: 3****Course Synopsis:**

This course introduces the fundamental principle of the function, types, design and characteristic of antenna. Student should be able to analyze the characteristic of wave and waveguide. Student should be able to ability to design various type of antenna and explain the characteristic of radio wave propagation.



**Course Outcomes:**

1. Ability to apply the antenna theory, antenna fundamentals and the wave propagation concept.
2. Ability to analyze the antenna characteristic and radio wave propagation concept.
3. Ability to design and demonstrate different types of antennas and explore its propagation characteristics.

**NMK31303 TEKNOLOGI KOMUNIKASI DIGITAL [DIGITAL COMMUNICATION TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course introduces the students with the basic digital communications systems including parameters, modulation technique, line and source coding, channel coding on modems and noise. The knowledge gained will contribute in understanding the operation of the related circuit. The exposures in amplitude modulations and frequency modulations will help in understanding the real applications. The introduction of digital communications will enhance the students understanding about the revolution of digital communications and the latest technology.

**Course Outcomes:**

1. Ability to apply the principles of basic digital communications including the source, channel coding and modulation technique.
2. Ability to analyse the performance of digital communication systems, multiplexing, multiple access, and spread spectrum techniques.
3. Ability to investigate digital communication modulation techniques and performance parameters using modern testing equipment.

**NMK31403 TEKNOLOGI OPTIK [OPTICAL TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

The students studying this module will develop a basic understanding of the principles and practices of optical communication components and applications to communication systems. The technology of optical communication systems which includes laser, fiber optics, and amplifier fundamentals, semiconductor sources, optical detector, optical amplifiers, optical devices, introduction to modern optics, are tailored to the needs of the optoelectronic, photonics and optical communications industry. Practical skills in optical fiber systems and measurement will also be acquired.

**Course Outcomes:**

1. Ability to apply the knowledge of light properties concept and principle in

optical technology communication system.

2. Ability to examine the parameters describing optical fiber properties and elements in the optical communications link.
3. Ability to analyze the system design of optical fiber application and aspects that influence the system performance.
4. Ability to assemble the related optical technology equipment in performing the measurement of appropriate signals parameter.

**NMK31503 TEKNOLOGI RF DAN GELOMBANG MIKRO [RF AND MICROWAVE TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

Radio frequency (RF) and microwave engineering relates with electrical components designed to operate specifically with alternating current (AC) or electromagnetic (EM) wave frequencies in range between 100 megahertz (MHz) and 1000 gigahertz (GHz). Through RF and microwave engineering, engineers/technologists can provide/control coverage via some kind of antenna/transmission system and also generate/receive signals to/from that transmission system to other communications electronics or controls. This course focuses on in-depth knowledge of mathematics, physics, general electronics theory as well as hands-on in RF and microwave areas including transmission lines, network analysis, filters design, dividers, couplers, amplifiers, oscillators, mixers, etc. Practically, this course utilizes test equipments, such as digital oscilloscope, spectrum analyzer and network analyzer for RF and microwave signal analysis and measurements.

**Course Outcomes:**

1. Ability to apply knowledge of the microwave basic concept, transmission line theory, and network analysis systematically.
2. Ability to analyze the microwave devices including filters, dividers, couplers amplifiers, oscillators, and mixer.
3. Ability to design microwave filters using electronic automation software.
4. Ability to investigate various RF and microwave problems using test equipments.

**NMK31603 KOMUNIKASI TANPA WAYAR DAN MUDAH ALIH [MOBILE AND WIRELESS COMMUNICATION]****No of Credits: 3****Course Synopsis:**

The course aims to expose students with the ability to recognize main components for mobile and wireless communication systems. By the end of the course, students will be able to explain basic concept in mobile and wireless systems. Additionally, the students are required to understand main issues in mobile and wireless communication and able to overcome the issues. The latest technique and standard in communication systems will also be discussed. Practical skills in mobile and wireless communication systems and measurement will also be acquired.

**Course Outcomes:**

1. Ability to interpret the essential cellular concept, propagation effect, and modulation technique.
2. Ability to elucidate the architecture, traffic engineering, and standard of mobile and wireless communication systems.
3. Ability to measure the mobile communications signal characteristic using modern tool.

**NMK40403 KEPINTARAN BUATAN [ARTIFICIAL INTELLIGENCE]****No of Credits: 3****Course Synopsis:**

This subject focuses on the concept of Artificial Intelligence (AI) field in terms of definition, history and characteristics including some examples of applications in this specific field. This subject conveys understanding and skill in several AI techniques. This subject is an interesting subject and an additional skill for students to design and develop coding using advanced techniques for sophisticated systems.

**Course Outcomes:**

1. Ability to compare concepts and characteristics of Artificial Intelligence systems
2. Ability to differentiate between Artificial Intelligence systems and conventional systems
3. Ability to design appropriate techniques to present knowledge and develop solution for the given problems using appropriate AI techniques

**NMK41003 TEKNOLOGI SATELIT [SATELLITE TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course introduces the fundamental principle of the function, types and characteristic of satellite technology. Student should be able to describe the satellite system, frequency bands, satellite orbits and basic satellite systems. Student should also have ability to explain the satellite access techniques, the propagation consideration and be able to analyze propagation models of satellite system.

**Course Outcomes:**

1. Ability to analyze the satellite systems, frequency allocation and frequency bands, satellite orbits and basic satellite systems.
2. Ability to evaluate the satellite access technique, propagation effects and their impact on satellite earth link.
3. Ability to investigate satellite system planning and propagation models of satellite system.

**NMK41103 ELEKTRONIK DAN REKABENTUK LITAR RF [ELECTRONICS AND RF CIRCUIT DESIGN]****No of Credits: 3****Course Synopsis:**

This course focuses on RF electronic components measurements and characterizations besides RF circuit design theoretically and practically. Students will use modern test equipment, such as PathWave Advanced Design System (ADS) software, signal generator (SG), vector network analyzer (VNA) and spectrum analyzer (SA) along with recent automation software for RF circuit analysis and design specifically for wireless technology.

**Course Outcomes:**

1. Ability to analyze active and passive devices of radio frequency (RF) circuit design for wireless communications such as filter, amplifier, mixer, local oscillator, and transceiver system.
2. Ability to evaluate RF and microwave electronic component measurements and characterizations using modern test equipment.
3. Ability to design RF circuit using modern automation software.

**NMK41203 TEKNOLOGI ANTARA RANGKAIAN TANPA WAYAR [WIRELESS INTERNETWORKING TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course will introduce students with the fundamental knowledge of wireless internetworking technology. Precisely, topics related to wireless standard, architecture, protocol, switching, security, distribution, mesh, bridging, and tunnel will be focused. Moreover, modern tools will be used to design, install and test wireless computer network.

**Course Outcomes:**

1. Ability to discuss wireless network protocol and layered architecture.
2. Ability to evaluate wireless network switching, security, distribution, mesh, bridging and tunnel.
3. Ability to measure wireless computer network design parameter using modern tool.

**NMK41303 KOMUNIKASI DATA DAN RANGKAIAN [DATA COMMUNICATION AND NETWORK]****No of Credits: 3****Course Synopsis:**

This course introduces the theory and basic of data communication and network that help students to identify the concept of multimedia networking, network security and network management. Students will be familiarized with the data communication equipment and tools to measure the computer network performance.

**Course Outcomes:**

1. Ability to explain the basic concept of data communication and layered protocol model.
2. Ability to interpret the multimedia networking, network security and network management.
3. Ability to evaluate the computer network performance using modern tool.

**NMK10003 ASAS RANGKAIAN [NETWORKING FUNDAMENTALS]****No of Credits: 3****Course Synopsis:**

This course introduces students to networking architectures, models, protocols, and components. These components facilitate the connection of users, devices, applications and data through the internet and across modern computer networks. By the end of the course, students can perform basic configurations for routers and switches to build simple local area networks (LANs) that integrate IP addressing schemes and foundational network security.

**Course Outcomes:**

1. Ability to EXPLAIN fundamental concept of networking based on reference model
2. Ability to apply and analyse the networking set-up of local area network and identify the network IP
3. Ability to DESIGN a small network including topology maps and network maps

**NMK10702 PENULISAN DALAM TEKNOLOGI KEJURUTERAAN [WRITING IN ENGINEERING TECHNOLOGY]****No of Credits: 2****Course Synopsis:**

This course introduces technical writing and communication related to engineering technology field. Students will be exposed to the methodology in accessing engineering technology information and common requirements and expectations to the formats, techniques and ethics in writing various types of engineering technology documents.

**Course Outcomes:**

1. Ability to produce engineering technology documents in consideration of ethics, spelling, grammar, and avoidance of typing errors while at the same time considering the flow and continuity of ideas.
2. Ability to differentiate and analyze technical documents related on the sources of information in engineering technology field.
3. Ability to perform group work involving presentations, reports and communication task.

**NMK20403 TEKNOLOGI ANTARA RANGKAIAN 1 [INTERNETWORKING TECHNOLOGY 1]****No of Credits: 3****Course Synopsis:**

This course will introduce students with the fundamental knowledge and tools for study internetworking. Principles of computer network cover so many aspects and it is expanding rigorously. Therefore this course focuses on the fundamental concept and theories, applications and advantages of internetworks. Related technologies such as Local Area Network, Wide Area Network and techniques use in data transmission as well as latest technologies. Practical exercises such as design, install and testing of a simple computer internetworking which improve understanding and develop skills on networking are integrated in laboratories exercises

**Course Outcomes:**

1. Ability to explain, discuss and apply the concepts and principles of computer networking technologies.
2. Ability to apply internetworking tools to understands the principles behind theoretical concepts of internetworking technology
3. Ability to design and evaluate the connectivity of computer networks

**NMK30203 TEKNOLOGI PERISISAN TERBENAM [EMBEDDED SOFTWARE TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course introduces contemporary software technology for embedded systems. Students will be exposed to the requirements of embedded systems that frequently impose time and/or memory constraints. Among the topics that will be discussed are embedded systems, platform hardware, cross-compilations, barebone systems, peripheral interfacing and embedded operating system. Knowledge in this subject is important for electronics engineers who are interested in system development and integration.

**Course Outcomes:**

1. Ability to DESCRIBE the concept of embedded software.
2. Ability to EVALUATE embedded software implementations.
3. Ability to DEVELOP embedded software for specific applications

**NMK30303 SISTEM PENGOPERASIAN [OPERATING SYSTEM]****No of Credits: 3****Course Synopsis:**

This course presents the fundamental concepts and design of operating systems. Students will be guided to explore basic operating system concepts like processes, memory management, scheduling, file systems and IO management. Basic design and implementation of some of these concepts will be covered during laboratory sessions.

**Course Outcomes:**

1. Able to discuss basic operating systems concepts.
2. Able to implement basic operating systems concepts.
3. Able to evaluate implementations of basic operating systems concepts.

**NMK30403 TEKNOLOGI ANTARA RANGKAIAN 2 [INTERNETWORKING TECHNOLOGY 2]****No of Credits: 3****Course Synopsis:**

Comprehensive overview of communications software and hardware involved in wide area networks and their relationship to local area networks are introduced. The course is designed for computer networking majors. The students are able to identify the major components of the WAN and the flow of data between the bridges and routers.

**Course Outcomes:**

1. Ability to Differentiate between the principles of the OSI and TCP/IP Models, their layers and the open communication principles for LAN and WAN interconnections.
2. Ability to Design advanced networking protocols, mechanisms and technique such as IP addressing, subnetting, connection orientation and network security.
3. Ability to Construct the network and its behaviour via network simulation tools in solving network problems.

**NMK30503 PENGURUSAN RANGKAIAN [NETWORK MANAGEMENT]****No of Credits: 3****Course Synopsis:**

This course aims to give knowledge of operation, and maintenance of modern computer and global networks. Network Management basics, and standards is described with focus on Internet Management with the aid of Simple Network Management Protocol (SNMP), as well as the application of the same. It discusses the components of network management framework, i.e. fault management, performance management, configuration management, security management and accounting management. This course also gives practical knowledge and skill in system and network administration as well as network supervision.

**Course Outcomes:**

1. Ability to DIFFERENTIATE functional areas of fault, configuration, accounting, performance, and security management (FCAPS).
2. Ability to explain and RECOMMEND network management applications and standards to manage practical networks.
3. Ability to manipulate and DEVISE solutions to network management issues and challenges pertaining to management of emerging network technologies.

**NMK30703 PENGATUCARAAN RANGKAIAN [PROGRAMMING FOR NETWORKING]****No of Credits: 3****Course Synopsis:**

The aims of this course are to introduce the students of the programming in computer network and students get familiar with the mechanism of protocols that consists in the network. This course provides the skills to programme the network protocols to works properly to transfer data from the sender to the receiver are exposed. The students are able to analyze, test, develop and design the protocols that are setting up a network.

**Course Outcomes:**

1. Ability to EXPLAIN and APPLY the concepts of network programming and the related network protocols involved..
2. Ability to APPLY network programming in computer networking environments.
3. Ability to DESIGN the architecture of network applications/web.
4. Ability to DEVELOP and IMPROVE Java language as an application by using network programming techniques learned.

**NMK30903 INFRASTRUKTUR DAN PERKHIDMATAN AWAN [CLOUD INFRASTRUCTURE AND SERVICES]****No of Credits: 3****Course Synopsis:**

This course educates students on the knowledge and skills needed to deploy and automate a secure cloud environment that supports the high availability of business systems and data. Migration to the cloud provides opportunities to deploy, optimize, and protect mission -critical applications and data storage. Students will learn about cloud infrastructure, services, networking, security, deployment, cloud management and troubleshooting according to best practices.

**Course Outcomes:**

1. Ability to apply knowledge of cloud fundamental, infrastructure, services, networking, security and deployment to the cloud solution problem.
2. Ability to design solution for cloud infrastructure, services, networking, security and deployment problem according to best practices.
3. Ability to investigate and analyze the characteristics of cloud infrastructure, services, networking, security and cloud deployment strategy according to guided instructions, best practices and ethic issues.

**NMK34003 PENSUISAN, PENGHALAAN DAN KEPERLUAN TANPA WAYAR [SWITCHING, ROUTING AND WIRELESS ESSENTIALS]****No of Credits: 3****Course Synopsis:**

This course educates students on the knowledge and skills needed to deploy and automate a secure cloud environment that supports the high availability of business systems and data. Migration to the cloud provides opportunities to deploy, optimize, and protect mission -critical applications and data storage. Students will learn about cloud infrastructure, services, networking, security, deployment, cloud management and troubleshooting according to best practices.

**Course Outcomes:**

1. Ability to explain the switching, routing and wireless essentials.
2. Ability to configure the switching, routing and wireless essentials.
3. Ability to troubleshoot inter-VLAN routing, Ether Channel on switched networks

**NMK40103 TEKNOLOGI KESELAMATAN RANGKAIAN [RANGKAIAN SECURITY TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course introduces the fundamental principle of the function, types and characteristic of satellite technology. Student should be able to describe the satellite system, frequency bands, satellite orbits and basic satellite systems. Student should also have ability to explain the satellite access techniques, the propagation consideration and be able to analyze propagation models of satellite system.

**Course Outcomes:**

1. Ability to ANALYZE the satellite systems, frequency allocation and frequency bands, satellite orbits and basic satellite systems.
2. Ability to EVALUATE the satellite access technique, propagation effects and their impact on satellite earth link.
3. Ability to INVESTIGATE satellite system planning and propagation models of satellite system.

**NMK40203 PENGKOMPUTERAN MUDAH ALIH [MOBILE COMPUTING]****No of Credits: 3****Course Synopsis:**

This course will introduce students to the fundamentals of mobile computing and mobile application development that consists of three perspectives which are mobile technology, application development, and user interaction. The course will first give an overview of various mobile computing applications, technologies and wireless communication technologies. Next, students will learn about common paradigms in mobile computing such as low power computing, computing in an environment with limited resources, fault tolerance, security, and persistence. Students will be introduced to mobile application frameworks and development environments and be able to use them. User interface, user experience, and application development guidelines will be discussed and analyzed. Lastly, the course will look at some of the current research and problems in mobile computing. Students will be expected to learn at least one mobile application development framework and use it to implement their assignments and course project.

**Course Outcomes:**

1. Ability to CATEGORIZE and EXPLAIN the functionalities, components and features of mobile computing technologies and applications.

2. Ability to RELATE the important issues of developing mobile computing systems and applications.
3. Ability to APPLY various techniques for realizing the mobile computing functionalities.
4. Ability to DEVELOP mobile computing applications by analyzing their characteristic and requirements.

**NMK40803 RANGKAIAN ENTERPRISE, KESELAMATAN DAN AUTOMASI [ENTERPRISE NETWORKING, SECURITY, AND AUTOMATION]****No of Credits: 3****Course Synopsis:**

The Enterprise Networking, Security, and Automation (ENSA) course is the third course in the CCNav7 curriculum. This course describes the architectures and considerations related to designing, securing, operating, and troubleshooting enterprise networks. This course covers wide area network (WAN) technologies and quality of service (QoS) mechanisms used for secure remote access. It also introduces software-defined networking, virtualization, and automation concepts that support the digitalization of networks. Students gain skills to configure and troubleshoot enterprise networks and learn to identify and protect against cybersecurity threats. They are introduced to network management tools and learn key concepts of software-defined networking, including controller-based architectures and how application programming interfaces (APIs) enable network automation.

**Course Outcomes:**

1. Ability to EXPLAIN Single-Area OSPFv2, network security, software-defined networking, virtualization, and automation concepts.
2. Ability to CONFIGURE Single-Area OSPFv2, ACLs and NAT services on the edge router.
3. Ability to troubleshoot enterprise networks and learn to identify and protect against cybersecurity threats.



**UR6523011**  
**Bachelor of Technology in Industrial Electronic Automation with Honours**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1**

To produce industrial electronic automation technologist who can perform automation tasks and solve problems in automation work.

**PEO 2**

To produce technopreneurs in electronic related technology. .

**PEO 3**

To produce relevant, respected and referred professionals in industrial electronic automation technology

## PROGRAMME OUTCOMES (PO)

### P01

Apply knowledge of technology fundamentals to broadly-defined procedures processes, systems and methodologies in industrial electronic automation.

### P02

Able to suggest and apply latest tools and techniques to solve broadly-defined problems.

### P03

Demonstrate strong analytical and critical thinking skills to solve broadly-defined problems in industrial electronic automation.

### P04

Able to communicate and articulate effectively in both verbal and written among technologist communities and society at large.

### P05

Demonstrate understanding of the societal related issues and the consequent responsibilities relevant to broadly-defined technology practices.

### P06

Recognize the needs for professional development and to engage independent lifelong learning in specialist technologists

### P07

Demonstrate an awareness of management and technopreneurship practices in real perspective.

### P08

Demonstrate professionalism and social and ethical consideration.

### P09

Demonstrate leadership quality, mentoring and work effectively in diverse teams.

| CURRICULUM STRUCTURE                                                                                |                                                                               |                                                                                 |                                                              |                                                               |                                                        |                                                 |           |                                 |
|-----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------|-----------|---------------------------------|
| UR65230111 BACHELOR OF TECHNOLOGY IN INDUSTRIAL ELECTRONIC AUTOMATION WITH HONOURS INTAKE 2024/2025 |                                                                               |                                                                                 |                                                              |                                                               |                                                        |                                                 |           |                                 |
| YEAR                                                                                                | FIRST                                                                         |                                                                                 | SECOND                                                       |                                                               | THIRD                                                  |                                                 |           | FOURTH                          |
| SEMESTER                                                                                            | 1                                                                             | 2                                                                               | 3                                                            | 4                                                             | 5                                                      | 6                                               | BREAK     | 7                               |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES</b><br>(108 CREDITS)                              | NMT11602<br>Technology and<br>Development Skill in<br>Electronic Automation I | NMT12604<br>Technology and<br>Development Skills in<br>Electronic Automation II | NMT21602<br>Data Acquisition<br>Technology and<br>Analysis I | NMT22104<br>Data Acquisition<br>Technology and<br>Analysis II | NMT31104<br>System Optimization<br>Technology II       | NMT32310<br>Final Year Project                  |           | NMT41112<br>Industrial Training |
|                                                                                                     | NMT11205<br>Product Development<br>Technology                                 | NMT12202<br>Network, Switching and<br>Routing                                   | NMT21503<br>Professional Practices                           | NMT22202<br>System Optimization<br>Technology I               | NMT31204<br>Application System<br>Development II       | NMT32205<br>Elective                            |           |                                 |
|                                                                                                     | NMT11505<br>Industrial Automation I                                           | NMT12704<br>System Programming<br>Technology II                                 | NMT21305<br>Embedded System<br>Programming Tool              | NMT22302<br>Application System<br>Development I               | NMT32105<br>System Integration<br>Design               | NMT31304<br>Quality<br>Management<br>Technology |           |                                 |
|                                                                                                     | NMT11702<br>System Programming<br>Technology I                                | NMT12505<br>Industrial Automation II                                            | NMT21403<br>Network Security<br>Implementation               | NMT22404<br>Operation<br>Management<br>Technology             | NMT31404<br>Technopreneur<br>Project II                |                                                 |           |                                 |
|                                                                                                     |                                                                               |                                                                                 |                                                              | NMT22504<br>Technopreneur<br>Project I                        |                                                        |                                                 |           |                                 |
| <b>UNIVERSITY<br/>REQUIREMENT COURSES</b><br>(16 CREDITS)                                           | SMZ1XX01<br>Co-Curriculum I                                                   | SMZ2XX01<br>Co-Curriculum II                                                    | SMB31202<br>English for Technical<br>Communication           | SMU22402<br>Engineering<br>Entrepreneurship                   | SMU13102<br>Appreciation of<br>Ethics and Civilization |                                                 |           |                                 |
|                                                                                                     | SMB41002<br>University Malay<br>Language <sup>[3]</sup>                       | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup>                    | SMB1XX02<br>Third Language <sup>[5]</sup>                    |                                                               |                                                        |                                                 |           |                                 |
|                                                                                                     | SMU13002<br>Philosophy and Current<br>Issues                                  | SMB20102<br>English for General<br>Communication <sup>[2]</sup>                 |                                                              |                                                               |                                                        |                                                 |           |                                 |
| <b>TOTAL CREDITS</b><br>(124 CREDITS)                                                               | <b>19</b>                                                                     | <b>20</b>                                                                       | <b>17</b>                                                    | <b>18</b>                                                     | <b>19</b>                                              | <b>9</b>                                        | <b>10</b> | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                                                | SMB10102<br>Preparatory English <sup>[1]</sup>                                |                                                                                 |                                                              |                                                               |                                                        |                                                 |           |                                 |

Elective : NMT32205: Maintenance Management

- [1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.  
 [2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.  
 [3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.  
 [4] International students should register SMU13202 Malaysian Studies.  
 [5] SMB1XX02: Germany, Mandarin or Japanese

**LIST OF COURSES:**

| COURSE CODE | COURSE NAME                                                                                                                      |
|-------------|----------------------------------------------------------------------------------------------------------------------------------|
| NMT11602    | Kemahiran Teknologi dan Pembangunan dalam Automasi Elektronik I [Technology and Development Skills in Electronic Automation I]   |
| NMT11205    | Teknologi Pembangunan Produk [Product Development Technology]                                                                    |
| NMT11505    | Automasi Industri I [Industrial Automation I]                                                                                    |
| NMT11702    | Teknologi Pengaturcaraan Sistem I [System Programming Technology I]                                                              |
| NMT12604    | Kemahiran Teknologi dan Pembangunan dalam Automasi Elektronik II [Technology and Development Skills in Electronic Automation II] |
| NMT12202    | Rangkaian, Penukaran dan Penghalaan [Network, Switching and Routing]                                                             |
| NMT12704    | Teknologi Pengaturcaraan Sistem II [System Programming Technology II]                                                            |
| NMT12505    | Automasi Industri II [Industrial Automation II]                                                                                  |
| NMT21602    | Teknologi Perolehan Data dan Analisis I [Data Acquisition Technology and Analysis I]                                             |
| NMT21503    | Amalan Profesional [Professional Practices]                                                                                      |
| NMT21305    | Perkakasan Pengaturcaraan Sistem Terbenam [Embedded System Programming Tool]                                                     |
| NMT21403    | Pelaksanaan Rangkaian Keselamatan [Network Security Implementation]                                                              |
| NMT22104    | Teknologi Perolehan Data dan Analisis II [Data Acquisition Technology and Analysis II]                                           |
| NMT22202    | Teknologi Sistem Pengoptimum I[System Optimization Technology I]                                                                 |
| NMT22302    | Pembangunan Sistem Aplikasi I [Application System Development I]                                                                 |
| NMT22404    | Teknologi Pengurusan Operasi [Operation Management Technology]                                                                   |
| NMT22504    | Projek Keusahawanan Teknologi I [Technopreneur Project I]                                                                        |
| NMT31104    | Teknologi Sistem Pengoptimum II [System Optimization Technology II]                                                              |

| COURSE CODE | COURSE NAME                                                        |
|-------------|--------------------------------------------------------------------|
| NMT31204    | Pembangunan Sistem Aplikasi II [Application System Development II] |
| NMT32105    | Rekabentuk Sistem Integrasi [System Integration Design]            |
| NMT31404    | Projek Keusahawanan Teknologi II [ Technopreneur Project II]       |
| NMT31304    | Teknologi Pengurusan Kualiti [Quality Management Technology]       |
| NMT32205    | Sistem Pengurusan Penyelenggaraan [Maintenance Management System]  |
| NMT32310    | Projek Tahun Akhir [Final Year Project]                            |
| NMT41112    | Latihan Industri [Industrial Training]                             |

**NMT11602 KEMAHIRAN TEKNOLOGI DAN PEMBANGUNAN DALAM AUTOMASI ELEKTRONIK I [TECHNOLOGY AND DEVELOPMENT SKILLS IN ELECTRONIC AUTOMATION I]****No of Credits: 2****Course Synopsis:**

This course aims to provide students with knowledge of the basic technical skills in electronic automation based on the use of electronic technology in the field of production and measurement. This includes basic knowledge of technical drawings, design drawings for 2D and 3D technique, electronic formulations, visualization techniques, circuit simulation techniques and print circuit design board (PCB).

**Course Outcomes:**

1. Ability to interpret the basic knowledge and standard practices of electronic circuit design layout using software.
2. Ability to perform a standard practiced of manual technical drawing and able to construct a product using Computer-aided Design (CAD) tool.
3. Ability to demonstrate technical analysis ideas presented in electronic design.

**NMT11205 TEKNOLOGI PEMBANGUNAN PRODUK [PRODUCT DEVELOPMENT TECHNOLOGY]****No of Credits: 5****Course Synopsis:**

This course focuses on the fundamental concepts of circuit analysis and electronic devices. It covers the operational behaviour and application circuit of passive and active components, which includes resistor, capacitor, inductor, diode, and transistor. Important parts of electronic systems such as operational amplifier, filter, power supply and other electronic circuits related to industrial electronic automation are also discussed and emphasized.

**Course Outcomes:**

1. Ability to apply the knowledge of passive and active electronic components.
2. Ability to construct electronic circuits and performs their operation.
3. Ability to act as a team member in completing tasks.

**NMT11505 AUTOMASI INDUSTRI I [INDUSTRIAL AUTOMATION I]****No of Credits: 5****Course Synopsis:**

The course is meant to be an introductory course on industrial automation. In this context, the course covers the basic electrical control circuit, electro mechanical, electro pneumatic system and integration of Programmable Logic Controller (PLC) to automate industrial processes. The program covers the following areas: basic control circuit and PLC hardware and software platform. Students will learn about the basic structure of automation, control circuit knowledge. They also will be taught to configure the PLC's hardware, as well as the logic control system, timer, counter, human machine integration (HMI) as well as common programming languages such as Ladder Diagram (LD) and Function Block Diagram (FBD). Finally, students will have to troubleshoot and clear any existing faults thus implement the standard maintenance procedure for PLC system. The course has a strong practical component whereby the students have the opportunity of getting a hands-on experience on the subjects taught on the theoretical lectures.

**Course Outcomes:**

1. Ability to apply the basic knowledge in industrial automation and control, programmable logic control (PLC) components and system.
2. Ability to manipulate circuit layout, construct for operation, troubleshoot and maintain the PLC system in a correct order.
3. Ability to demonstrate and show relevant justification for performing programming into the PLC to match the required outcome.

**NMT11702 TEKNOLOGI PENGATURCARAAN SISTEM I [SYSTEM PROGRAMMING TECHNOLOGY I]****No of Credits: 2****Course Synopsis:**

This course delivers the competency to student in applying the fundamental programming concepts and ability to analyse problem and produce the solution using algorithm development tools. The course will be delivered using the basic programming language (C programming).

**Course Outcomes:**

1. Ability to apply the fundamental programming concepts and its principles.
2. Ability to construct a program using computer programming techniques based on a given problem.
3. Ability to demonstrate a problem-solving approach in algorithm development.



**NMT12604 KEMAHIRAN TEKNOLOGI DAN PEMBANGUNAN DALAM AUTOMASI ELEKTRONIK II [TECHNOLOGY AND DEVELOPMENT SKILLS IN ELECTRONIC AUTOMATION II]****No of Credits: 4****Course Synopsis:**

This course aims to demystify the digital electronics through hands-on work in the lab creating simple machines with embodied behaviors. This course brings students over the beginner's threshold to a basic understanding of the use, terminology and potential of digital electronic. The skills and concepts taught in this course are presented from an interdisciplinary approach which merges practices in sciences and technology.

**Course Outcomes:**

1. Ability to describe Boolean functions and logic circuit in digital applications.
2. Ability to construct simple logical operations using combinational and sequential logic circuits.
3. Ability to build the digital logic systems.

**NMT12202 RANGKAIAN, PENUKARAN DAN PENGHALAAN [NETWORK, SWITCHING AND ROUTING]****No of Credits: 2****Course Synopsis:**

This course focuses on networking structure and functions. The course introduces the principles and structure of IP addressing and the fundamentals of networks, switching and routing. It covers topics such as the introduction of networking, type of network, network layer, type of network topologies, network media, network design and basic network performance.

**Course Outcomes:**

1. Ability to describe the fundamental concept of networking.
2. Ability to setup the local area network and identify the network IP.
3. Ability to build a small network.

**NMT12704 TEKNOLOGI PENGATURCARAAN SISTEM II [SYSTEM PROGRAMMING TECHNOLOGY II]****No of Credits: 4****Course Synopsis:**

This course teaches students how to write programmes that can solve problems using high level programming. The course will be taught in the current market's most popular programming language. The student can create a programme that uses basic input and output to solve problems.

**Course Outcomes:**

1. Ability to analyse problems using programming language.
2. Ability to implement a programming language solution appropriately based on a programming concept.
3. Ability to demonstrate a solution in developing a program to solve a problem.

**NMT12505 AUTOMASI INDUSTRI II [INDUSTRIAL AUTOMATION II]****No of Credits: 5****Course Synopsis:**

This course is practical in nature. It introduces current industrial automation technology, from device level until system architecture through PLC programming. This course also introduces the Modular Production System (MPS), ranging from the concept and its core elements, navigate to Smart Manufacturing for the development of Industry 4.0 Modular Production System.

**Course Outcomes:**

1. Ability to construct Automation System using Advanced PLC Programming.
2. Ability to construct Modular Production System using Advanced PLC Programming.
3. Ability to justify the implementation of Product Identification System.

**NMT21602 TEKNOLOGI PEROLEHAN DATA DAN ANALISIS I [DATA ACQUISITION TECHNOLOGY AND ANALYSIS I]****No of Credits: 2****Course Synopsis:**

This course covers the basics of operation and analysis of electronic instruments, including the working principles and nature of transducers and sensors, signal conditioning and data acquisition system. Software tool interface with a microprocessor also introduced. The importance of application and signal conduction techniques is emphasized. Elements and principles of data exchange, acquisition and application are discussed.

**Course Outcomes:**

1. Ability to apply knowledge of transducer and sensor, signal conditioning and data acquisition system.
2. Ability to employ electronic apparatus interfacing to device consists of sensors and others.
3. Ability to justifies the working principles of measurement and instrumentation in data acquisition system.

**NMT21503 AMALAN PROFESIONAL [PROFESSIONAL PRACTICES]****No of Credits: 3****Course Synopsis:**

Professional practices course aims to explain the main concepts in engineering and technology ethics, risk management and occupational safety and health as well as to expose the students to basic law in the engineering and technology context.

**Course Outcomes:**

1. Ability to interpret hazards, the function at risk management and occupational safety and health (OSHA).
2. Ability to explains the issues and challenges of professionalism, social and ethical consideration.
3. Ability to demonstrate understanding of the societal related in technology issues.

**NMT21305 PERKAKASAN PENGATURCARAAN SISTEM TERBENAM [EMBEDDED SYSTEM PROGRAMMING TOOL]****No of Credits: 5****Course Synopsis:**

This course emphasizes the role of microcontroller in an automation system. It covers input and output topics as well as memory usage. In addition, this course will also focus on how to program using language C. Meanwhile, the Resberry Pi or latest controller board will be used as a controller.

**Course Outcomes:**

1. Ability to determine the theory and basic architecture of microcontroller system.
2. Ability to construct program into microcontroller.
3. Ability to design simple system of microcontroller interface with input and output device.

**NMT21403 PELAKSANAAN RANGKAIAN KESELAMATAN [NETWORK SECURITY IMPLEMENTATION]****No of Credits: 3****Course Synopsis:**

This course focuses on the foundational understanding of cybersecurity and how it relates to information and network security. It provides core security skills needed for monitoring, detecting, investigating, analyzing and responding to security events, thus protecting systems and organizations from cybersecurity risks, threats and vulnerabilities. It covers topics such as introduction to cybersecurity and cybersecurity operations.

**Course Outcomes:**

1. Ability to apply network security principles as well as the tools and configurations available.
2. Ability to manipulate to security incidents.
3. Ability to identify data confidentiality, integrity, availability and security controls on networks, servers and applications.

**NMT22104 TEKNOLOGI PEROLEHAN DATA DAN ANALISIS II [DATA ACQUISITION TECHNOLOGY AND ANALYSIS II]****No of Credits: 4****Course Synopsis:**

This course covers data transfer, monitoring and control. This includes data transfer techniques using wired and wireless communication technology. Also introduced is development of mobile applications which allow data monitoring and data storage using mobile devices. In addition, elements of modern control systems are introduced. Control techniques of motors are included.

**Course Outcomes:**

1. Ability to analyze data transfer techniques.
2. Ability to perform wired and wireless communication techniques.
3. Ability to demonstrate the technical approach in developing mobile applications for monitoring and control.

**NMT22202 TEKNOLOGI SISTEM PENGOPTIMUM I [SYSTEM OPTIMIZATION TECHNOLOGY I]****No of Credits: 2****Course Synopsis:**

This course covers the fundamental of data communication network, measurement and instrumentation. This includes the working with current data network, measurement technique and network technology. System application, configuration and troubleshooting data communication network and electronic measurement is emphasized.

**Course Outcomes:**

1. Able to explain the theory and basic principle of data communication, network and electronic measurement.
2. Able to apply data communication tools and working principles of measurement to further understand the theoretical concepts.
3. Able to justify a small network technology including topology maps or network maps.

**NMT22302 PEMBANGUNAN SISTEM APLIKASI I [APPLICATION SYSTEM DEVELOPMENT I]****No of Credits: 2****Course Synopsis:**

This course provides a foundation in data management concepts and database systems. It includes representing information with the relational database model, manipulating data with an interactive query language (SQL), database development using standard Database Management System, and integration of database to application development.

**Course Outcomes:**

1. Ability to apply logical database design concept to represent a functioning database.
2. Ability to build a working database using relevant technology according to database standards and procedures.
3. Ability to independently seek solution to technical issues arose during database development.

**NMT22404 TEKNOLOGI PENGURUSAN OPERASI [OPERATION MANAGEMENT TECHNOLOGY]****No of Credits: 4****Course Synopsis:**

Technology Operation Management gives knowledge of concepts and principles for production and operations management in Industrial Electronic Automation. This course emphasizes production functions, forecasting techniques, efficiency theory, layout techniques, economics order quantity level, control of source acquisition and project scheduling, and production standard must be comply. This course also provides knowledge and skills in planning, decision and control of production in the Electronic Industry Automation.

**Course Outcomes:**

1. Ability to apply theories and concepts of operational management in Industrial Electronic Automation.
2. Ability to perform project scheduling and source allocation in project management using Project Evaluation and Review Techniques (PERT), Critical Path Method (CPM) and Linear Programming.
3. Ability to demonstrate ethical values in operational management for the benefit of society.

**NMT22504 PROJEK KEUSAHAWANAN TEKNOLOGI I [TECHNOPRENEUR PROJECT I]****No of Credits: 4****Course Synopsis:**

Entrepreneurs need money to start and to grow their business. It is important to understand how revenue is generated, how to source for funds, how to control cash flow, how to assess the success of the company in monetary terms, and how to value a company for various purposes. The course exposes students to the various financial aspects relating to new ventures. These include approaches to secure start-up capital and venture financing. Students learn about the basic accounting, essential financial indicators, the types of funds available, the different categories of investors, the importance of intellectual property in securing finance, the financial details to be included in a business plan required for investment purpose, valuation of company and the art of negotiation with investors.

**Course Outcomes:**

1. Ability to apply various financial indicators & tools to prepare for financial information for a new business venture.
2. Ability to integrate effective project management and technopreneur skills in solving given problems.
3. Ability to perform effectively teamwork and leadership skills in completing the technopreneur project.

**NMT31104 TEKNOLOGI SISTEM PENGOPTIMUM II [SYSTEM OPTIMIZATION TECHNOLOGY II]****No of Credits: 4****Course Synopsis:**

This course integrates with concepts and mathematical models. It teaches students how to apply basic principles of analyzing signals and relate with real engineering and technology application. This course divided into three sections. The first section will be signal acquisition and processing, where various types of signals are measured and analyzed to facilitate the control and automation. Second section will be focused on the embedded system and integration, and third section will be on system development and mobile applications.

**Course Outcomes:**

1. Ability to integrate basic principles of analyzing signals with real technology application.
2. Ability to construct system design and application using embedded system module.

3. Ability to explain mobile application, embedded system integration and optimization.

**NMT31204 PEMBANGUNAN SISTEM APLIKASI II [APPLICATION SYSTEM DEVELOPMENT II]****No of Credits: 4****Course Synopsis:**

This course focuses on the analysis and development of systems to meet the increasing need for information management within organizations. It covers topics such as systems development life cycle, analysis and design techniques, software project planning, process modeling, data modeling, data management, system design and implementation, and testing.

**Course Outcomes:**

1. Ability to integrate different components of a system to develop a working software application.
2. Ability to build an efficient database based on a well-designed data model using cloud data storage technology.
3. Ability to organize a plan to solve technical issues faced during application system development.

**NMT32105 REKABENTUK SISTEM INTEGRASI [SYSTEM INTEGRATION DESIGN]****No of Credits: 5****Course Synopsis:**

The aim of this course is to provide students with the technical knowledge and practical experience on Supervisory Control and Data Acquisition(SCADA) in automation technology. SCADA is a system of software and hardware elements that allows industrial organizations to control industrial processes locally or at remote locations as well as monitoring, gather, and process real-time data.

**Course Outcomes:**

1. Ability to configure machine and plan-specific HMI tasks using the SCADA software based on the Totally Integrated Automation Portal (TIA Portal).
2. Ability to apply and manage the TIA portal and structure of automation system, configuration and parameterization of hardware and PLC programming and SCL Programming.
3. Ability to apply virtual machine and plants concept, IOT, virtual commissioning and integrated energy management.

**NMT31404 PROJEK KEUSAHAWANAN TEKNOLOGI II [TECHNOPRENEUR PROJECT II]****No of Credits: 4****Course Synopsis:**

The start-up and growth of an enterprise invariably involves both human and financial capital. To manage the increasing pool of human resources and to convince venture capitalists to invest become two main issues especially for growing venture. This course consists of two parts: in the first part, organization and human resource management are introduced; in the second part, the focus is on writing a convincing business plan to attract venture capital investment. When enterprise starts to take shape and grow, more people will be hired, proper organization, team building and human resource management will become important issues. In this course, students will be exposed to the various organizational aspects relevant to new ventures and established companies. These include the pros and cons of the different organization structures, conflicts that may arise among employees, and approaches to building strong teams. Human resource management techniques will also be introduced and discussed. In the second part of the course, the business model canvas will be described listing the connections among the different components of a business. The value of a business plan and the techniques of writing a business plan will be introduced.

**Course Outcomes:**

1. Ability to design vital organizational behaviours necessary to grow a new venture.
2. Ability to arrange the business model canvas incorporating human and financial elements.
3. Ability to influence and motivate all stakeholders to build a cohesive venture team.

**NMT31304 TEKNOLOGI PENGURUSAN KUALITI [QUALITY MANAGEMENT TECHNOLOGY]****No of Credits: 4****Course Synopsis:**

This course provides the understanding and knowledge of total quality principles and the use of quality tools to enable students to apply the principles of management, design and production in Industrial Electronic Automation. This course covers the introduction to quality and the principles of total quality, its relationship to global competitiveness, ethics and culture in quality management, the 7 quality tools, quality function deployment, continuous improvements benchmarking and the implementation aspects of total quality. Finally, the

students will be able to relate several quality management tools and decide the most suitable amongst them for certain issues/ problems.

**Course Outcomes:**

1. Ability to analyse quality problems effectively using the principles and tools of quality management in Industrial Electronic Automation.
2. Ability to manipulate quality control in measures for improving products and business performance.
3. Ability to relate values in several quality management tools to solve problems in quality management.

**NMT32205 SISTEM PENGURUSAN PENYELENGGARAAN [MAINTAINANCE MANAGEMENT SYSTEM]****Type of courses : Elective****No of Credits: 5****Course Synopsis:**

This course will introduce student to principle of maintenance management system. The topics to be covered including Introduction to Maintenance Management, Reliability performance of production plants, Total Productive Maintenance (TPM), Maintenance methods and techniques and Maintenance Software Application. Apart of the course implementation, there will be an industrial visit to related industries in order to expose student to the actual practices of maintenance management system.

**Course Outcomes:**

1. Ability to apply of contemporary maintenance management practices.
2. Ability to display competency in managing and developing industrial environment maintenance activities.
3. Ability to justify maintenance activities in a cost effective manner.

**NMT32310 PROJEK TAHUN AKHIR [FINAL YEAR PROJECT]****No of Credits: 10****Course Synopsis:**

This course is to fulfil students with knowledge in conducting research methods, particularly in the field of technical and vocational education in Malaysia. The main idea is to take the knowledge and background that students have learnt throughout the semester and use it to propose new and creative project. It is important in providing human capital development equivalent with global developments.

**Course Outcomes:**

1. Ability to organize solution based on identified issues in industrial technology.
2. Ability to perform related tasks for the implementation of Final Year Project I.
3. Ability to communicate effectively related to the proposed solutions and progress.

**NMT41112 LATIHAN INDUSTRI [INDUSTRIAL TRAINING]****No of Credits: 12****Course Synopsis:**

The course will expose students to technical and practical application and other aspects such as the company operation, work culture, safety procedure, project management, communication, technical skills, and presentation to achieve appreciation and/or capability of carrying out technologist activities.

**Course Outcomes:**

1. Ability to correlate theory and practical with the knowledge gained from industrial training.
2. Ability to display/demonstrate related skills in industrial environment.
3. Ability to practice self-discipline and responsibility attitude working in a team.



# FACULTY OF MECHANICAL ENGINEERING & TECHNOLOGY (FKTM)

## Programmes Offered:

1. Bachelor of Mechanical Engineering with Honours
2. Bachelor of Manufacturing Engineering with Honours
3. Bachelor of Agricultural Engineering with Honours
4. Bachelor of Mechanical Engineering Technology (Machining) with Honours
5. Bachelor of Mechanical Engineering Technology (Agricultural Systems) with Honours
6. Bachelor of Mechanical Engineering Technology (Product Design) with Honours
7. Bachelor of Mechanical Engineering Technology (Materials Processing) with Honours
8. Bachelor of Technology in Industrial Machining with Honours
9. Bachelor of Technology in Automotive with Honours
10. Bachelor of Technology in Welding with Honours
11. Diploma in Manufacturing Engineering

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## UR6521001 Bachelor of Mechanical Engineering with Honours

### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

#### PEO 1

Graduates who have demonstrated career advancement in the field of Mechanical Engineering or related engineering field

#### PEO 2

Graduates who are involved in a professional body or society

#### PEO 3

Graduates who pursue lifelong learning

## PROGRAMME OUTCOMES (PO)

### P01

**Engineering Knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to the solution of complex engineering problems

### P02

**Problem Analysis:** Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK1 to WK4)

### P03

**Design/ development of solutions:** Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (WK5)

### P04

**Investigation:** Conduct investigations of complex problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### P05

**Modern Tool Usage:** Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations. (WK6)

### P06

**The Engineer and Society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (WK7)

### P07

**Environment and Sustainability:** Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (WK7)

### P08

**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)

### P09

**Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

### P010

**Communications:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

### P012

**Life-Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

| CURRICULUM STRUCTURE<br>UR6521001 BACHELOR OF MECHANICAL ENGINEERING WITH HONOURS INTAKE 2024/2025 |                                                   |                                                              |                                           |                                                 |                                                      |                                                          |                                 |                                          |                                      |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------------|-------------------------------------------|-------------------------------------------------|------------------------------------------------------|----------------------------------------------------------|---------------------------------|------------------------------------------|--------------------------------------|
| YEAR                                                                                               | FIRST                                             |                                                              | SECOND                                    |                                                 | THIRD                                                |                                                          |                                 | FOURTH                                   |                                      |
| SEMESTER                                                                                           | 1                                                 | 2                                                            | 3                                         | 4                                               | 5                                                    | 6                                                        | BREAK                           | 7                                        | 8                                    |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES</b><br>(107 CREDITS)                             | MMJ10103<br>Engineering Statics                   | MMJ10203<br>Engineering Dynamics                             | MMJ10303<br>Solid Mechanics I             | MMJ22103<br>Solid Mechanics II                  | MMJ32103<br>Mechanisms & Machines                    | MMJ32903<br>Control Engineering                          | MMJ39905<br>Industrial Training | MMJ40202<br>Final Year Project I         | MMJ40304<br>Final Year Project II    |
|                                                                                                    | MMJ12202<br>Engineering Materials                 | MMJ12403<br>Manufacturing Processes                          | MMJ22203<br>Materials in Design           | MMJ22303<br>Component Design                    | MMJ32503<br>Engineering Design Process               | MMJ32402<br>Integrated Design Project I                  |                                 | MMJ42503<br>Integrated Design Project II | MMJ42602<br>Production & Operations  |
|                                                                                                    | MMJ12302<br>Mechanical Workshop                   |                                                              | MMJ20103<br>Fluid Mechanics I             | MMJ22503<br>Fluid Mechanics II                  | MMJ32203<br>Finite Element Analysis                  | MMJ32603<br>Heat Transfer                                |                                 | MMJ42103<br>Vibration Mechanics          | MMJ4XX03<br>Elective II              |
|                                                                                                    | MMJ12102<br>Computer Aided Drafting               | MMJ10403<br>Thermodynamics I                                 | MMJ22403<br>Thermodynamics II             |                                                 | MMJ32703<br>Fluid Machinery                          | MMJ32303<br>Parametric Modelling & Analysis              |                                 | MMJ4XX03<br>Elective I                   | MMJ4XX03<br>Elective III             |
|                                                                                                    | MMJ12503<br>Computer Programming                  | MMJ12603<br>Electrical Circuit & Machines                    |                                           | MMJ22603<br>Instrumentations & Measurements     |                                                      | MMJ32803<br>Electronics & Microprocessors                |                                 | MMJ40102<br>Professional Engineers       | MMJ30103<br>Management for Engineers |
| <b>COMMON<br/>CORE COURSES</b><br>(12 CREDITS)                                                     | QMQ10103<br>Engineering Mathematics I             | QMQ10203<br>Engineering Mathematics II                       | QMQ20303<br>Engineering Mathematics III   | QMQ27103<br>Engineering Statistics              |                                                      |                                                          |                                 |                                          |                                      |
| <b>UNIVERSITY<br/>REQUIREMENT<br/>COURSES</b><br>(16 CREDITS)                                      | SMU13102<br>Appreciation of Ethics & Civilization | SMB20102<br>English for General Communication <sup>[2]</sup> | SMU13002<br>Philosophy and Current Issues | SMB31202<br>English for Technical Communication | SMB41002<br>University Malay Language <sup>[3]</sup> | SMU12102<br>Integrity and Anti-Corruption <sup>[4]</sup> |                                 |                                          |                                      |
|                                                                                                    | SMZ1XX01<br>Co-Curriculum I                       | SMZ2XX01<br>Co-Curriculum II                                 |                                           |                                                 | SMU22402<br>Engineering Entrepreneurship             |                                                          |                                 |                                          |                                      |
| <b>TOTAL CREDITS</b><br>(135 CREDITS)                                                              | <b>18</b>                                         | <b>18</b>                                                    | <b>17</b>                                 | <b>17</b>                                       | <b>16</b>                                            | <b>16</b>                                                | <b>5</b>                        | <b>13</b>                                | <b>15</b>                            |
| <b>AUDIT COURSES</b>                                                                               | SMB10102<br>Preparatory English <sup>[1]</sup>    |                                                              |                                           |                                                 |                                                      |                                                          |                                 |                                          |                                      |

Elective : MMJ42203 Fracture Mechanics / MMJ42303 Mechanics of Composite Materials / MMJ42403 Acoustic & Noise Control / MMJ42803 Additive Manufacturing / MMJ42703 Design Optimization / MMJ42903 Refrigeration & Air Conditioning / MMJ43103 Renewable Energy / MMJ43303 Computational Fluid Dynamics / MMJ43203 Internal Combustion Engine

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

## UR6540001

### Bachelor Of Manufacturing Engineering With Honours

#### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

##### PEO 1

Graduates who have demonstrated career advancement in the field of Manufacturing Engineering or related engineering fields.

##### PEO 2

Graduates who are involved in a professional body or society.

##### PEO 3

Graduates who pursue lifelong learning



## PROGRAMME OUTCOMES (PO)

### P01

Engineering Knowledge: Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in **WK1 to WK4** respectively to the solution of complex engineering problems.

### P02

Problem Analysis: Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences (**WK1 to WK4**).

### P03

Design/ Development of Solutions: Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (**WK5**).

### P04

Investigation: Conduct investigations of complex problems using research-based knowledge (**WK8**) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### P05

Modern Tool Usage: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations (**WK6**).

### P06

The Engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems (**WK7**).

### P07

Environment and Sustainability: Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts (**WK7**).

### P08

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice (**WK7**).

### P09

Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

### P010

Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

Project Management and Finance: Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

### P012

Lifelong Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

| CURRICULUM STRUCTURE                                                          |                                          |                                           |                                                              |                                             |                                                                 |                                                    |                                    |                                                           |                                                         |
|-------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------|--------------------------------------------------------------|---------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------|------------------------------------|-----------------------------------------------------------|---------------------------------------------------------|
| UR6520001 BACHELOR OF MANUFACTURING ENGINEERING WITH HONOURS INTAKE 2024/2025 |                                          |                                           |                                                              |                                             |                                                                 |                                                    |                                    |                                                           |                                                         |
| YEAR                                                                          | FIRST                                    |                                           | SECOND                                                       |                                             | THIRD                                                           |                                                    |                                    | FOURTH                                                    |                                                         |
| SEMESTER                                                                      | 1                                        | 2                                         | 3                                                            | 4                                           | 5                                                               | 6                                                  | BREAK                              | 7                                                         | 8                                                       |
| DISCIPLINE<br>CORE & ELECTIVE<br>COURSES<br>(107 CREDITS)                     | MMJ16103<br>Materials                    | MMJ10303<br>Solid Mechanics I             | MMJ10203<br>Engineering<br>Dynamics                          | MMJ20103<br>Fluid Mechanics I               | MMJ36102<br>Heat Transfer                                       | MMJ36203<br>Computer-Aided<br>Engineering          | MMJ39905<br>Industrial<br>Training | MMJ40202<br>Final Year Project I                          | MMJ40304<br>Final Year Project<br>II                    |
|                                                                               | MMJ10103<br>Engineering<br>Statics       | MMJ15203<br>Electronics                   | MMJ10403<br>Thermodynamics<br>I                              | MMJ25203<br>Control Systems                 | MMJ36303<br>Mechanics of<br>Machines<br>And Vibration           | MMJ37203<br>Industrial<br>Ergonomics               |                                    | MMJ47003<br>Manufacturing<br>Integrated<br>Design Project | MMJ4XXX2<br>Elective III*                               |
|                                                                               | MMJ15103<br>Electrical<br>Technology     | MMJ15402<br>Computer<br>Programming       | MMJ25102<br>Instrumentation                                  | MMJ26203<br>Machine<br>Components<br>Design | MMJ37103<br>Production<br>Planning<br>and Control               | MMJ37403<br>Lean<br>Manufacturing                  |                                    | MMJ4XXX2<br>Elective I*                                   | MMJ40102<br>Professional<br>Engineer                    |
|                                                                               | MMJ17102<br>Manufacturing<br>Process I   | MMJ17203<br>Manufacturing<br>Process II   | MMJ27102<br>Computer-Aided<br>Manufacturing                  | MMJ27203<br>Quality<br>Engineering          | MMJ37303<br>Advanced<br>Manufacturing<br>Technology             | MMJ37603<br>Industrial<br>Automation               |                                    | MMJ4XXX2<br>Elective II*                                  |                                                         |
|                                                                               | MMJ17302<br>Engineering<br>Workshop      | MMJ16202<br>Engineering Design            | MMJ26103<br>Design for<br>Manufacture                        | MMJ27403<br>Industrial<br>Engineering       | MMJ37503<br>Pneumatic and<br>Hydraulic System                   | MMJ30103<br>Management for<br>Engineers            |                                    |                                                           |                                                         |
|                                                                               | MMJ17502<br>Engineering<br>Drawing       |                                           |                                                              |                                             |                                                                 |                                                    |                                    |                                                           |                                                         |
| COMMON<br>CORE COURSES<br>(12 CREDITS)                                        | QMQ10103<br>Engineering<br>Mathematics I | QMQ10203<br>Engineering<br>Mathematics II | QMQ20303<br>Engineering<br>Mathematics III                   | QMQ27103<br>Engineering<br>Statistics       |                                                                 |                                                    |                                    |                                                           |                                                         |
| UNIVERSITY<br>REQUIREMENT<br>COURSES<br>(16 CREDITS)                          | SMZ1XX01<br>Co-Curriculum I              | SMZ2XX01<br>Co-Curriculum II              | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup> |                                             | SMB20102<br>English for General<br>Communication <sup>[2]</sup> | SMB31202<br>English for Technical<br>Communication |                                    | SMU13002<br>Philosophy and Current<br>Issues              | SMU22402<br>Engineering<br>Entrepreneurship             |
|                                                                               |                                          |                                           |                                                              |                                             |                                                                 |                                                    |                                    | SMU13102<br>Appreciation of Ethics<br>& Civilization      | SMB41002<br>University Malay<br>Language <sup>[3]</sup> |
| TOTAL CREDITS<br>(135 CREDITS)                                                | 19                                       | 17                                        | 18                                                           | 18                                          | 16                                                              | 17                                                 | 5                                  | 13                                                        | 12                                                      |
| AUDIT COURSES                                                                 |                                          |                                           | SMB10102<br>Preparatory<br>English <sup>[1]</sup>            |                                             |                                                                 |                                                    |                                    |                                                           |                                                         |

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

## UR6524003

### Bachelor of Agricultural Engineering with Honours

#### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

##### PEO 1

Graduates who have demonstrated career advancement in the field of Agricultural Engineering or related engineering fields

##### PEO 2

Graduates who are involved in a professional body or society

##### PEO 3

Graduates who pursue lifelong learning

## PROGRAMME OUTCOMES (PO)

### P01

**Engineering Knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to the solution of complex engineering problems.

### P02

**Problem Analysis:** Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK1 to WK4)

### P03

**Design/ development of solutions:** Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (WK5)

### P04

**Investigation:** Conduct investigations of complex problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### P05

**Modern Tool Usage:** Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations. (WK6)

### P06

**The Engineer and Society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (WK7)

### P07

**Environment and Sustainability:** Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (WK7)

### P08

**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)

### P09

**Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

### P010

**Communications:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

### P012

**Life-Long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

| CURRICULUM STRUCTURE<br>UR6524003 BACHELOR OF AGRICULTURAL ENGINEERING WITH HONOURS INTAKE 2024/2025 |                                                      |                                                                 |                                                             |                                                                  |                                                              |                                                            |                                    |                                                             |                                                      |
|------------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------------|------------------------------------|-------------------------------------------------------------|------------------------------------------------------|
| YEAR                                                                                                 | FIRST                                                |                                                                 | SECOND                                                      |                                                                  | THIRD                                                        |                                                            |                                    | FOURTH                                                      |                                                      |
| SEMESTER                                                                                             | 1                                                    | 2                                                               | 3                                                           | 4                                                                | 5                                                            | 6                                                          | BREAK                              | 7                                                           | 8                                                    |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES<br/>(102 CREDITS)</b>                              | MMJ14003<br>Plant and Animal<br>Sciences             | MMJ10203<br>Engineering<br>Dynamics                             | MMJ20103<br>Fluid Mechanics I                               | MMJ24303<br>Heat and Mass<br>Transfer                            | MMJ34003<br>Soil Engineering                                 | MMJ34503<br>Farm Machinery                                 | MMJ39905<br>Industrial<br>Training | MMJ40202<br>Final Year Project I                            | MMJ40304<br>Final Year Project<br>II                 |
|                                                                                                      | MMJ14102<br>Physical Science                         | MMJ10303<br>Solid Mechanics I                                   | MMJ24003<br>Thermodynamics                                  | MMJ24403<br>Irrigation and<br>Drainage<br>Engineering            | MMJ34103<br>Farm Structural<br>Design                        | MMJ34602<br>Agricultural<br>Integrated Design<br>Project I |                                    | MMJ44003<br>Agricultural<br>Integrated Design<br>Project II | MMJ44503<br>Controlled<br>Environment<br>Agriculture |
|                                                                                                      | MMJ12102<br>Computer Aided<br>Drafting               | MMJ14203<br>Geomatics<br>Engineering                            | MMJ24103<br>Electrical and<br>Electronic<br>Technology      | MMJ24503<br>Engineering<br>Properties of<br>Biological Materials | MMJ34203<br>Instrumentation,<br>Measurement and<br>Control   | MMJ34703<br>Unit Operation                                 |                                    | MMJ44103<br>Precision Agriculture                           | MMJ4XX03<br>Elective II                              |
|                                                                                                      | MMJ10103<br>Engineering Statics                      | MMJ14303<br>Agricultural<br>Production Systems                  | MMJ24203<br>Hydrology and<br>Water Resources<br>Engineering | MMJ12503<br>Computer<br>Programming                              | MMJ34303<br>Energy and Power                                 | MMJ34803<br>Design of<br>Automation Systems                |                                    | MMJ4XX03<br>Elective I                                      |                                                      |
|                                                                                                      | MMJ12302<br>Mechanical<br>Workshop                   |                                                                 |                                                             |                                                                  | MMJ34403<br>Machine Design                                   | MMJ34902<br>Modelling and<br>Simulation                    |                                    |                                                             |                                                      |
| <b>COMMON<br/>CORE COURSES<br/>(17 CREDITS)</b>                                                      | QMQ10103<br>Engineering<br>Mathematics I             | QMQ10203<br>Engineering<br>Mathematics II                       | QMQ20303<br>Engineering<br>Mathematics III                  | QMQ27103<br>Engineering<br>Statistics                            |                                                              | MMJ30103<br>Management for<br>Engineers                    |                                    |                                                             | MMJ40102<br>Professional<br>Engineers                |
| <b>UNIVERSITY<br/>REQUIREMENT<br/>COURSES<br/>(16 CREDITS)</b>                                       | SMZ1XX01<br>Co-Curriculum I                          | SMZ2XX01<br>Co-Curriculum II                                    | SMU13002<br>Philosophy and<br>Current Issues                | SMB31202<br>English for Technical<br>Communication               | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup> |                                                            |                                    | SMU22402<br>Engineering<br>Entrepreneurship                 |                                                      |
|                                                                                                      | SMU13102<br>Appreciation of<br>Ethics & Civilization | SMB20102<br>English for General<br>Communication <sup>[2]</sup> | SMB41002<br>University Malay<br>Language <sup>[3]</sup>     |                                                                  |                                                              |                                                            |                                    |                                                             |                                                      |
| <b>TOTAL CREDITS<br/>(135 CREDITS)</b>                                                               | <b>18</b>                                            | <b>18</b>                                                       | <b>19</b>                                                   | <b>17</b>                                                        | <b>17</b>                                                    | <b>16</b>                                                  | <b>5</b>                           | <b>13</b>                                                   | <b>12</b>                                            |
| <b>AUDIT COURSES</b>                                                                                 | SMB10102<br>Preparatory<br>English <sup>[1]</sup>    |                                                                 |                                                             |                                                                  |                                                              |                                                            |                                    |                                                             |                                                      |

Elective I : MMJ44203 Remote Sensing, MMJ44303 Biowaste Management and Technology, MMJ44403 Bioproduct Manufacturing

Elective II : MMJ44603 Artificial Intelligence for Agriculture, MMJ43103 Renewable Energy, MMJ44703 Postharvest Engineering

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.



**LIST OF COURSES**

| COURSE CODE | COURSE NAME                                                  |
|-------------|--------------------------------------------------------------|
| MMJ10103    | Statik Kejuruteraan [Engineering Statics]                    |
| MMJ10203    | Dinamik Kejuruteraan [Engineering Dynamics]                  |
| MMJ10303    | Mekanik Pepejal I [Solid Mechanics I]                        |
| MMJ10403    | Termodinamik I [Thermodynamics I]                            |
| MMJ12102    | Lukisan Terbantu Komputer [Computer Aided Drafting]          |
| MMJ12202    | Bahan Kejuruteraan [Engineering Materials]                   |
| MMJ12302    | Bengkel Mekanikal [Mechanical Workshop]                      |
| MMJ12403    | Proses-proses Pembuatan [Manufacturing Processes]            |
| MMJ12503    | Pengaturcaraan Komputer [Computer Programming]               |
| MMJ12603    | Litar dan Mesin Elektrik [Electrical Circuit & Machine]      |
| MMJ20103    | Mekanik Bendalir I [Fluid Mechanics I]                       |
| MMJ22103    | Mekanik Pepejal II [Solid Mechanics II]                      |
| MMJ22203    | Bahan dalam Reka Bentuk [Materials in Design]                |
| MMJ22303    | Reka Bentuk Komponen [Component Design]                      |
| MMJ22403    | Termodinamik II [Thermodynamics II]                          |
| MMJ22503    | Mekanik Bendalir II [Fluid Mechanics II]                     |
| MMJ22603    | Instrumentasi dan Pengukuran [Instrumentation & Measurement] |
| MMJ30103    | Pengurusan Untuk Jurutera [Management for Engineers]         |
| MMJ32103    | Mekanisma dan Mesin[Mechanism & Machine]                     |



| COURSE CODE | COURSE NAME                                                        |
|-------------|--------------------------------------------------------------------|
| MMJ32203    | Analisis Unsur Terhingga [Finite Element Analysis]                 |
| MMJ32303    | Pemodelan dan Analisa Parametrik [Parametric Modelling & Analysis] |
| MMJ32402    | Projek Reka Bentuk Bersepadu I [Integrated Design Project I]       |
| MMJ32503    | Proses Reka Bentuk Kejuruteraan [Engineering Design Process]       |
| MMJ32603    | Pemindahan Haba [Heat Transfer]                                    |
| MMJ32703    | Jentera Bendalir [Fluid Machinery]                                 |
| MMJ32803    | Elektronik & Mikropemproses [Electronics & Microprocessors]        |
| MMJ32903    | Kejuruteraan Kawalan [Control Engineering]                         |
| MMJ39905    | Latihan Industri [Industrial Training]                             |
| MMJ40102    | Jurutera Professional [Professional Engineer]                      |
| MMJ40202    | Projek Tahun Akhir I [Final Year Project I]                        |
| MMJ40304    | Projek Tahun Akhir II [Final Year Project II]                      |
| MMJ42103    | Mekanik Getaran [Vibration Mechanics]                              |
| MMJ42203    | Mekanik Patah [Fracture Mechanics]                                 |
| MMJ42303    | Mekanik Bahan Komposit [Mechanics of Composite Materials]          |
| MMJ42403    | Akustik & Kawalan Hingar [Acoustic & Noise Control]                |
| MMJ42503    | Projek Reka Bentuk Bersepadu II [Integrated Design Project II]     |
| MMJ42602    | Pengeluaran & Operasi [Production & Operations]                    |
| MMJ42703    | Pengoptimuman Reka Bentuk [Design Optimization]                    |

| COURSE CODE | COURSE NAME                                                        |
|-------------|--------------------------------------------------------------------|
| MMJ42803    | Pembuatan Penambahan [Additive Manufacturing]                      |
| MMJ42903    | Penyejukan dan Penyamanan Udara [Refrigeration & Air Conditioning] |
| MMJ43103    | Tenaga Diperbaharui [Renewable Energy]                             |
| MMJ43203    | Enjin Pembakaran Dalam [Internal Combustion Engine]                |
| MMJ43303    | Perkomputeran Dinamik Bendalir [Computational Fluid Dynamics]      |
| MMJ16103    | Bahan [Materials]                                                  |
| MMJ15103    | Teknologi Elektrik [Electrical Technology]                         |
| MMJ17102    | Proses-Proses Pembuatan I [Manufacturing Process I]                |
| MMJ17302    | Bengkel Kejuruteraan [Engineering Workshop]                        |
| MMJ17502    | Lukisan Kejuruteraan [Engineering Drawing]                         |
| MMJ15203    | Elektronik [Electronics]                                           |
| MMJ15402    | Pengaturcaraan Komputer [Computer Programming]                     |
| MMJ17203    | Proses-Proses Pembuatan II [Manufacturing Process II]              |
| MMJ16202    | Reka Bentuk Kejuruteraan [Engineering Design]                      |
| MMJ25102    | Pengukuran [Instrumentation]                                       |
| MMJ27102    | Pembuatan Berbantu-Komputer [Computer Aided-Manufacturing]         |
| MMJ26103    | Reka Bentuk Untuk Pembuatan [Design for Manufacturing]             |
| MMJ25203    | Sistem Kawalan [Control Systems]                                   |
| MMJ26203    | Reka Bentuk Komponen Mesin [Machine Components Design]             |

| COURSE CODE | COURSE NAME                                                                          |
|-------------|--------------------------------------------------------------------------------------|
| MMJ27203    | Kejuruteraan Kualiti [Quality Engineering]                                           |
| MMJ27403    | Kejuruteraan Industri [Industrial Engineering]                                       |
| MMJ36102    | Pemindahan Haba [Heat Transfer]                                                      |
| MMJ36303    | Mekanik Mesin Dan Getaran [Mechanics of Machines and Vibration]                      |
| MMJ37103    | Perancangan Pengeluaran dan Kawalan [Production Planning and Control]                |
| MMJ37303    | Teknologi Pembuatan Termaju [Advanced Manufacturing Technology]                      |
| MMJ37503    | Sistem Pneumatik dan Hidraulik [Pneumatic and Hydraulic System]                      |
| MMJ36203    | Kejuruteraan Berbantu-Komputer [Computer-Aided Engineering]                          |
| MMJ37203    | Ergonomik Industri [Industrial Ergonomics]                                           |
| MMJ37403    | Pembuatan Lean [Lean Manufacturing]                                                  |
| MMJ37603    | Automasi Industri [Industrial Automation]                                            |
| MMJ47003    | Projek Reka Bentuk Bersepadu Pembuatan [Manufacturing Integrated Design Project]     |
| MMJ47202    | Penyelidikan Operasi [Operational Research]                                          |
| MMJ47402    | Kejuruteraan Dan Pengurusan Penyelenggaraan [Maintenance Engineering And Management] |
| MMJ46102    | Reka Bentuk Untuk Kelestarian [Design For Sustainability]                            |
| MMJ46202    | Reka Bentuk Acuan Suntikan [Injection Mold Design]                                   |
| MMJ46302    | Reka Bentuk Acuan Dan Perkakasan [Tool And Die Design]                               |
| MMJ47502    | Pengurusan Rantaian Bekalan [Supply Chain Management]                                |
| MMJ14003    | Sains Tumbuhan dan Haiwan [Plant and Animal Sciences]                                |

| COURSE CODE | COURSE NAME                                                                       |
|-------------|-----------------------------------------------------------------------------------|
| MMJ14102    | Sains Fizikal [Physical Science]                                                  |
| MMJ14203    | Kejuruteraan Geomatik [Geomatics Engineering]                                     |
| MMJ14303    | Sistem Pengeluaran Pertanian [Agricultural Production Systems]                    |
| MMJ24003    | Termodinamik [Thermodynamics]                                                     |
| MMJ24103    | Teknologi Elektrik dan Elektronik [Electrical and Electronic Technology]          |
| MMJ24203    | Kejuruteraan Hidrologi dan Sumber Air [Hydrology and Water Resources Engineering] |
| MMJ24303    | Pemindahan Haba dan Jisim [Heat and Mass Transfer]                                |
| MMJ24403    | Kejuruteraan Pengairan dan Saliran [Irrigation and Drainage Engineering]          |
| MMJ24503    | Sifat Kejuruteraan Bahan Biologi [Engineering Properties of Biological Materials] |
| MMJ34003    | Kejuruteraan Tanah [Soil Engineering]                                             |
| MMJ34103    | Reka Bentuk Struktur Ladang [Farm Structural Design]                              |
| MMJ34203    | Peralatan, Pengukuran dan Kawalan [Instrumentation, Measurement and Control]      |
| MMJ34303    | Tenaga dan Kuasa [Energy and Power]                                               |
| MMJ34403    | Reka Bentuk Mesin [Machine Design]                                                |
| MMJ34503    | Jentera Ladang [Farm Machinery]                                                   |
| MMJ34602    | Reka Bentuk Bersepadu Pertanian I [Agricultural Integrated Design Project I]      |
| MMJ34703    | Operasi Unit [Unit Operation]                                                     |
| MMJ34803    | Reka Bentuk Sistem Automasi [Design of Automation Systems]                        |
| MMJ34902    | Pemodelan dan Simulasi [Modelling and Simulation]                                 |

| COURSE CODE | COURSE NAME                                                                    |
|-------------|--------------------------------------------------------------------------------|
| MMJ44003    | Reka Bentuk Bersepadu Pertanian II [Agricultural Integrated Design Project II] |
| MMJ44103    | Pertanian Presis [Precision Agriculture]                                       |
| MMJ44503    | Kejuruteraan Persekitaran Terkawal [Controlled Environment Agriculture]        |
| MMJ44203    | Penderiaan Jauh [Remote Sensing]                                               |
| MMJ44303    | Teknologi dan Pengurusan Sisa Bio [Biowaste Management and Technology]         |
| MMJ44403    | Pembuatan Bioproduk [Bioproduct Manufacturing]                                 |
| MMJ44603    | Kecerdasan Buatan Untuk Pertanian [Artificial Intelligence for Agriculture]    |
| MMJ44703    | Kejuruteraan Lepas Tuai [Postharvest Engineering]                              |

**MMJ10103 STATIK KEJURUTERAAN [ENGINEERING STATICS]****No of Credits: 3****Course Synopsis:**

The objective of the course is to look into problems related to mechanics concepts in static conditions. This course deals with balanced force systems applied to rigid bodies that are at rest. Methods to determine support reactions and relationships between internal and external forces, as well as internal force distribution will be introduced in this course. This course is important as it serves as pre-requisite and fundamental in later engineering courses.

**Course Outcomes:**

1. Ability to analyse engineering problems by applying the fundamental concept and principle of statics.
2. Ability to evaluate static problems using the principles of equilibrium.

**MMJ10203 DINAMIK KEJURUTERAAN [ENGINEERING DYNAMICS]****No of Credits: 3****Course Synopsis:**

This course introduces the basic laws of motion involving kinematics and kinetics of a particle and rigid body. The concepts of force, energy, momentum, and impulse are reviewed for both particle and rigid body where several techniques are introduced to assist in the analysis of a mechanical system. At the end of the course, the students are expected to be able to solve engineering problems related to mechanisms and motions.

**Course Outcomes:**

1. Ability to analyze problems related to kinematics of a particle and planar kinematics of a rigid body.
2. Ability to evaluate problems related to kinetics of particle.
3. Ability to evaluate problems related to planar kinetics of a rigid body.

**MMJ10303 MEKANIK PEPEJAL I [SOLID MECHANICS I]****No of Credits: 3****Course Synopsis:**

This course introduces concept of stress and strain as well as mechanical properties of materials. It is also covering various type of loadings which occur in beam, shaft and member related to axial load, torsion, bending and transverse shear. The stress strain transformation analysis will also be discussed. At the end of this course, students will be able to solve related engineering problems applied

by various loadings.

**Course Outcomes:**

1. Ability to analyze engineering problems using fundamental theory of solid mechanics and produce stress strain transformation analysis
2. Ability to analyze engineering problems using fundamental theory of solid mechanics and produce stress strain transformation analysis

**MMJ10403 TERMODINAMIK I [THERMODYNAMICS I]****No of Credits: 3****Course Synopsis:**

Thermodynamics is one of the main foundations in mechanics which is the backbone of the Mechanical Engineering. This field is a combination of the concepts of thermal energy and energy movement in engineering. The extension of knowledge of the field of thermodynamics leads to the application of heat transfer, thermal-fluid and subsequently to dynamics gas.

**Course Outcomes:**

1. Ability to analyse the properties of pure substance.
2. Ability to formulate energy balance accordingly to the first law of thermodynamics for a system.
3. Ability to evaluate the second law of thermodynamics with entropy changes of substances in a system.

**MMJ12102 LUKISAN TERBANTU KOMPUTER [COMPUTER AIDED DRAFTING]****No of Credits: 2****Course Synopsis:**

This course provides the foundation for mechanical engineering students to acquire and apply the language of engineering graphics to visibly communicate engineering intent that follow good engineering conventions and practices. In this course, CAD software will be introduced to create 2-D and 3-D engineering drawings which including sketching techniques, multiview projections, isometric view, sectional and auxiliary view representation and dimensioning techniques. The use of solid modeling software to capture design object and generate engineering drawings gives the opportunity to apply this knowledge for engineering design projects.

**Course Outcomes:**

1. Ability to interpret technical drawings as a communication tool and understanding concepts of drafting in mechanical engineering discipline.
2. Ability to produce engineering drawings using computer aided software.



**MMJ12202 BAHAN KEJURUTERAAN [ENGINEERING MATERIALS]****No of Credits: 2****Course Synopsis:**

This course provides concept that relates basic understanding of engineering materials, their structure and the influence of structure on material behaviour. The course topics involve investigating the relationships that exist between the structures and properties of materials. Upon completion of this course, student will be able to analyse characteristic properties of engineering materials and relate the properties for various engineering applications.

**Course Outcomes:**

1. Ability to analyse engineering materials including materials behavior and atomic structure
2. Ability to evaluate mechanical properties of metals and processing of metals.

**MMJ12302 BENGKEL MEKANIKAL [MECHANICAL WORKSHOP]****No of Credits: 2****Course Synopsis:**

The objective of this course is to introduce and provide the students with theoretical and practical skills required in normal engineering workshop practices involving the selection and operation of some commonly used workshop tools and machines. At the end of this course the students will be able to appreciate various skills and technology to fabricate some simple engineering workpieces/parts, by operating ordinary workshop machine tools and practices such as manufacturing metrology, lathe, milling and drilling machine, welding, and CNC machining.

**Course Outcomes:**

1. Ability to identify and choose the proper measurement tools
2. Ability to safely operate equipment and tools in metal working and distinguish between their applications.

**MMJ12403 PROSES-PROSES PEMBUATAN [MANUFACTURING PROCESSES]****No of Credits: 3****Course Synopsis:**

This course provides a basic knowledge of the manufacturing processes as to serve diverse demands and to get a feel for cutting-edge technologies and manufacturing. It starts with a general view of the importance of manufacturing to humankind, followed by the interaction of design and manufacturing up to process choice. It is expected that student will be able to decide suitable manufacturing processes in fabrication of products.

**Course Outcomes:**

1. Ability to analyze information of the right raw materials for a manufacturing process
2. Ability to analyze an appropriate process or process sequence to the products to be produced.
3. Ability to optimize the design through the use of a desirable manufacturing process.

**MMJ12503 PENGATURCARAAN KOMPUTER [COMPUTER PROGRAMMING]****No of Credits: 3****Course Synopsis:**

This course introduces to Computers and Computing Fundamentals, Program Structure, Printing, Comments, Variables, Arithmetic Operations, Math Functions, Input/ Output, Control Structure, Looping, Functions, Numeric Arrays and their application on solving engineering problems. C programming language is utilized in this course.

**Course Outcomes:**

1. Ability to construct C programs with the desired input/ output.
2. Ability to construct C programs with control structure and looping.
3. Ability to construct C programs with functions and numeric arrays.

**MMJ12603 LITAR DAN MESIN ELEKTRIK [ELECTRICAL CIRCUIT & MACHINE]****No of Credits: 3****Course Synopsis:**

This course covers the fundamental concepts of electrical circuits including DC, AC, and electromagnetics. The students will also be exposed to the basics of the three-phase systems and their applications as well as the electrical machines. At the end of this course, the students should be able to evaluate an electrical circuit in order to solve engineering problems. In addition, the students should be able to select and characterize the electrical machines for specific applications.

**Course Outcomes:**

1. Ability to analyse the electrical circuit to solve engineering problems.
2. Ability to evaluate the electrical circuit and electrical machine in engineering applications.

**MMJ20103 MEKANIK BENDALIR I [FLUID MECHANICS I]****No of Credits: 3****Course Synopsis:**

This course aims to develop the basic knowledge on the principles of fluid mechanics and the application of these principles to practical applied problems. Emphasis is on fluid properties, fluid statics, fluid kinematics, conservation of mass, and Bernoulli's equation. Momentum analysis, modelling, and concepts of internal flow. At the end of this course, students will be able to solve, analyse and evaluate the problems dealing with fluid mechanics.

**Course Outcomes:**

1. Ability to apply the various properties of fluids in evaluating problems related to fluids statics.
2. Ability to evaluate fluid dynamics and kinematics problems.
3. Ability to analyse and evaluate problems related to flow in pipe.
4. Ability to perform experiments related to fluid mechanics and measure concern parameters/ variables during the experiment.

**MMJ22103 MEKANIK PEPEJAL II [SOLID MECHANICS II]****No of Credits: 3****Course Synopsis:**

The topics is extended and emphasized on combined loadings related to axial

load, torsion, bending and shear occur in beam, shaft and member. It is also covered an introduction on deflection, buckling, and energy method theory. At the end of this course, students will be able to solve related engineering problems applied by various loadings.

**Course Outcomes:**

1. Ability to analyze the stress in a member subjected to several loadings
2. Ability to design a prismatic beam for engineering application
3. Ability to evaluate engineering problems involving deflection and buckling behaviour

**MMJ22203 BAHAN DALAM REKA BENTUK [MATERIALS IN DESIGN]****No of Credits: 3****Course Synopsis:**

This course provides a comprehensive treatment of the selection of materials in mechanical design. Selection of materials will be performed on the basis of their properties (i.e. performance requirements), constraints imposed by the design and how the part will be manufactured for a particular end-use/application. At the end of this course, students should be able to demonstrate a sound knowledge of materials selection method, and how these must be taken into account during the design process.

**Course Outcomes:**

1. Ability to analyse the requirement on material selection process in solving mechanical design problems.
2. Ability to evaluate critically the mechanical design using engineering criteria, design tools and computer-based techniques.
3. Ability to propose suitable materials in mechanical design.

**MMJ22303 REKA BENTUK KOMPONEN [COMPONENT DESIGN]****No of Credits: 3****Course Synopsis:**

This course introduces the concepts and principles of design consideration for mechanical components. Design and analysis of mechanical components that consists of screws and fasteners, springs, bearings, gears, clutches, brakes, belts and chains in mechanical systems will be studied. Theories and criteria of material failures under static and variable loadings will also be discussed. Design parameters that could contribute to the failure of those components will be considered. At the end of the course, the students are expected to be able to perform the stress analysis on mechanical components for design judgement.

**Course Outcomes:**

1. Ability to analyze the design parameters of components in mechanical systems.
2. Ability to analyze failure prediction under static and variable loadings for mechanical components.
3. Ability to propose solution for components design in mechanical system problems.

**MMJ22403 TERMODINAMIK II [THERMODYNAMICS II]****No of Credits: 3****Course Synopsis:**

This course provides the advanced analysis of the thermodynamics cycles for engineering applications. Emphasis will be given to the gas power cycles, vapour power cycles, refrigeration cycles, gas vapour mixtures, airconditioning, chemical reactions and phase equilibrium. These cycles are classified as power and refrigeration cycles. Complex engineering problem solving will be focused for industry and everyday life applications.

**Course Outcomes:**

1. Ability to create solution for the problems in gas, vapor and combined power cycles, each in their applications.
2. Ability to create solution for the problems in refrigeration and air conditioning cycles.
3. Ability to analyze the problem in chemical reactions, adiabatic flame temperature and phase equilibrium.

**MMJ22503 MEKANIK BENDALIR II [FLUID MECHANICS II]****No of Credits: 3****Course Synopsis:**

This course is offered to enhance the basic knowledge that has been developed in Fluid Mechanics I. It introduces the analysis of real/ideal fluid with and without compressibility effect in a flow system. It also emphasizes on the differential analysis of fluid flow, boundary layer, potential flow theory, compressible flow, shock waves and expansion waves in practical engineering applications. At the end of the course, students should be able to demonstrate and apply the theory to solve problems related to fluid flow.

**Course Outcomes:**

1. Ability to analyze the differential analysis of fluid flow and boundary layer problems on flows past a flat plate.
2. Ability to analyze the differential analysis of fluid flow and boundary layer problems on flows past a flat plate
3. Ability to evaluate the consequences of compressibility in gas flow with and without the effects of friction and heat transfer.

**MMJ22603 INSTRUMENTASI DAN PENGUKURAN [INSTRUMENTATION & MEASUREMENT]****No of Credits: 3****Course Synopsis:**

This course provides the knowledge of measurement and instrumentation with various transducers and techniques involving physical phenomena. This includes on overview of general measurement system, errors and signal characteristics, followed by diverse type of sensors and their application in measuring electronics signal, temperatures, humidity, displacement as well as velocity and acceleration, force, torques strain and stress and also the flow rate measurement. The use of software for simulating or solving instrumentation and measurement applications is also covered in this course.

**Course Outcomes:**

1. Ability to explain and analyze basic concepts of transducers, sensors and measurement techniques and errors in measurement.
2. Ability to apply and analyze interfacing concept between transducers, computer and signals obtained from measurement techniques.
3. Ability to design and evaluate measurement system using suitable sensors and transducers.
4. Ability to use software to solve instrumentation and measurement problems.

**MMJ30103 PENGURUSAN UNTUK JURUTERA [MANAGEMENT FOR ENGINEERS]****No of Credits: 3****Course Synopsis:**

This course aims to teach students how to apply project management skills when undertaking projects. This course is also designed to provide basic tools of the engineering economy to enable the students to carry out professional-quality economic evaluations. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineers relating to project management in the current economic scenarios

**Course Outcomes:**

1. Ability to develop and evaluate project requirements and integrate the processes of project management like work plans, scheduling, cost estimation and perform project evaluation.
2. Ability to integrate and evaluate economic scenarios and integrate decision making process to engineering project and business ventures

**MMJ32103 MEKANISMA DAN MESIN[MECHANISM & MACHINE]****No of Credits: 3****Course Synopsis:**

This course is intended as an advanced knowledge of mechanism and machine to design and evaluate machine elements and machinery in mechanical engineering for undergraduate level. The course will emphasize on analytical and graphical techniques to evaluate the machine elements and machinery in mechanical engineering applications to achieve effective design.

**Course Outcomes:**

1. Ability to determine the kinematic characteristics of mechanisms in a mechanical system.
2. Ability to derive the kinematic characteristics of displacement, velocity and acceleration in a mechanical system.
3. Ability to revise the machinery dynamics of a mechanical system.

**MMJ32203 ANALISIS UNSUR TERHINGGA [FINITE ELEMENT ANALYSIS]****No of Credits: 3****Course Synopsis:**

The objective of this course is to introduce the students with theoretical

knowledge that are required in solving engineering problems using finite element methods (FEM). The students will also be exposed to the commercial software for Finite Element Analysis (FEA) in solving engineering problems. At the end of this course, the students will be able to apply various approaches in solving engineering problems especially for structural problems and utilize the FEA software for solving complex engineering problems.

**Course Outcomes:**

1. Ability to determine the stiffness matrices and identify boundary conditions for various engineering problems.
2. Ability to evaluate engineering problems using various approaches in finite element methods.
3. Ability to solve engineering problems using computational tools.

**MMJ32303 PEMODELAN DAN ANALISA PARAMETRIK [PARAMETRIC MODELLING & ANALYSIS]****No of Credits: 3****Course Synopsis:**

This course will develop skills and knowledge in using CAED tools for mechanical engineering design. The outcome of the course will impart knowledge related to principles, methods and techniques to create and manipulate parametric models, engineering communication, analysis and optimization using CAED software. Students will undertake practical works for design, analysis, simulation, evaluation and optimization of mass properties, static-stresses, thermal deformations by applying CAD and CAE software tools to design of simple parts, assemblies, mechanisms and structures.

**Course Outcomes:**

1. Ability to apply solid parametric modelling and use 3D CAD software tools in the correct manner for making geometric part models, assemblies and automated drawings of mechanical components and assemblies.
2. Ability to use CAD software tools for assembly of mechanism from schematic or component drawing and conduct position/ path/ kinematic / dynamic analysis of a mechanism in motion.
3. Ability to analyse part design and to evaluate and optimize parts using commercial CAD, CAE software for mechanical application that required mass properties/ stress, deflection / temperature distribution under realistic loading and constraining conditions.

**MMJ32402 PROJEK REKA BENTUK BERSEPADU I [INTEGRATED DESIGN PROJECT I]****No of Credits: 3****Course Synopsis:**

Integrated design project integrates mathematics, engineering, basic sciences and complementary studies in developing elements, systems, and processes to meet specific needs. This course aims to develop an understanding to strategically and systematically observe, develop, analyze, and compare existing products during the design process. Student will use appropriate engineering approaches and methods to formulate and compare alternative solutions systematically at different stages of the design process to refine and evaluate alternative solutions. This course covers a set of product development methods that brings together the marketing, design, and manufacturing functions. It is a creative, iterative, and often open-ended process subjected to constraints which may be governed by standards, or legislation to varying degrees within mechanical engineering discipline. This course will require students to work in a group environment and collaborate with other members of group to arrive at good design decisions and then to provide proper reports on these decisions upon completion.

**Course Outcomes:**

1. Ability to develop design requirements in defining and solving complex mechanical engineering problems.
2. Ability to propose design concepts that meets customer and functional requirements based on constraints and concerns using engineering design methods.
3. Ability to assist in a team for the successful delivery of design project.

**MMJ32503 PROSES REKA BENTUK KEJURUTERAAN [ENGINEERING DESIGN PROCESS]****No of Credits: 3****Course Synopsis:**

This course will provide the foundation in formulating and devising appropriate solutions and plans to open engineering design problems using systematic design methods that promote innovation. This course aims to develop an understanding to strategically and systematically observe, develops, analyze, and compare existing products during the design process. Student will use appropriate engineering approaches and methods to formulate and compare alternative solutions systematically at different stages of the design process to refine and evaluate alternative solutions. This course covers a set of product development methods that bringing together the marketing, design, and manufacturing functions. This course introduce analysis of user needs and customer's needs and product marketability through the chapter of "Customers/User Centered Design".

**Course Outcomes:**

1. Ability to determine design requirements and produce clear design information and ideas.
2. Ability to integrate fundamentals engineering design theory in the selection creation of components and mechanism for solving structured and unstructured design problems.
3. Ability to develop critically the design of mechanical system using engineering criteria and design tools.

**MMJ32603 PEMINDAHAN HABA [HEAT TRANSFER]****No of Credits: 3****Course Synopsis:**

The objective of this course is to introduce fundamental concepts and applications of heat transfer to the students of mechanical engineering. Emphasis will be given in solving and evaluating engineering problems through comprehensive analysis of conduction, convection, and radiation heat transfer, as well as on the evaluation of common type of heat exchangers and other heat transfer equipment.

**Course Outcomes:**

1. Ability to apply principles of heat transfer mechanisms in solving engineering problems.
2. Ability to evaluate engineering problems involving heat exchangers and other heat transfer equipment

**MMJ32703 JENTERA BENDALIR [FLUID MACHINERY]****No of Credits: 3****Course Synopsis:**

This course introduces the operating principles of different types of fluid machines; pumps, compressors, hydraulic turbines, steam turbines and gas turbines. It covered the fundamentals of fluid mechanics, analytical and empirical relationships, and work principle used in fluid machine. It also includes the analysis of flow, selection of fluid machine, and preliminary estimation of performance characteristics. Upon completion of this course, students will be able to select the fluid machines for specific applications and solve related fluid machinery problems.

**Course Outcomes:**

1. Ability to analyze the performance of different pumps, fans, and compressors and select them properly for specific applications.

2. Ability to evaluate the performance of different hydraulic turbines and select them properly for specific applications.
3. Ability to explain the operating principles of thermal turbines (steam/gas turbines) and formulate their performance.

### MMJ32803 ELEKTRONIK & MIKROPEMROSES [ELECTRONICS & MICROPROCESSORS]

**No of Credits: 3**

#### Course Synopsis:

This course introduces the basic concepts of electronics and microprocessors for application in Mechanical Engineering. The first part of the course focuses on analog and digital electronics, which covers the fundamentals of semiconductors, electronic components, electronic circuits, digital electronics and signal conversion. The second part of the course introduces students to the architecture, hardware and software of microprocessor. Upon completion of the course, the students will be able to develop application through the combination of electronic circuit and microprocessor.

#### Course Outcomes:

1. Ability to analyze and apply electronic components and circuit.
2. Ability to analyze and apply microprocessor functions.
3. Ability to develop simple microprocessor-based application with electronic circuit.

### MMJ32903 KEJURUTERAAN KAWALAN [CONTROL ENGINEERING]

**No of Credits: 3**

#### Course Synopsis:

This is an introductory control engineering course. Students will learn how to apply transfer functions to mathematically represent the mechanical, electrical, and electro-mechanical systems, as well as how to evaluate system performance in the time and frequency domain to establish system stability. The curriculum will also incorporate the Internet of Things (IoT) and the open-source programming tool for deeper control system design and system's response analysis.

#### Course Outcomes:

1. The ability to analyze the mathematical model for systems
2. The ability to analyze and evaluate the time- and frequency-domain of the system with response to test inputs. The analysis includes the determination of the system stability.
3. The ability to design and evaluate P, PI, PD, PID, lead, lag controllers based on the response of the system in time- and frequency-domain and integrating the use of the Internet of Things (IoT) in the system.

### MMJ39905 LATIHAN INDUSTRI [INDUSTRIAL TRAINING]

**No of Credits: 5**

#### Course Synopsis:

The course will expose students to technical and practical application as well as other aspects such as the company's operation, work culture, safety procedure, project management, communication, technical skills, and presentation in achieve appreciation and/or capability of carrying out complex engineering activities. Students are required to submit their logbook and written report at the end of the industrial training.

#### Course Outcomes:

1. Ability to demonstrate technical knowledge and practical skills.
2. Ability to adapt to health, safety, legal and cultural requirements in working environment.
3. Ability to perform tasks with professional ethics and responsibilities.
4. Ability to work independently, interact with co-workers and work in a team.
5. Ability to report and communicate verbally and in written form.

### MMJ40102 JURUTERA PROFESIONAL [PROFESSIONAL ENGINEER]

**No of Credits: 2**

#### Course Synopsis:

This course exposes students to the concepts of engineering ethics, sustainability, risk management, occupational safety and health, and basic of law in the engineering context. The materials will enable students to understand their future role as professional engineers to the society. Students will be confronted by issues and dilemma faced by engineers with constraints related to engineering ethics, environmental & sustainability, safety and regulatory acts. At the end of the course, students will be able to propose solutions with respect to engineering ethics, environmental & sustainability, safety and health as well as can interpret legal related to engineers.

#### Course Outcomes:

1. Ability to propose solutions in resolving moral responsibilities related to conditions of dilemma in engineering ethics.
2. Ability to suggest course of action to meet desired needs within realistic constraints of environmental and sustainability.
3. Ability to engender issues regarding hazards, risk management, occupational safety & health (OSHA) and procedures of legal on engineering issues.



**MMJ40202 PROJEK TAHUN AKHIR I [FINAL YEAR PROJECT I]****No of Credits: 2****Course Synopsis:**

This course is designed to expose students with an investigative research-based project to solve engineering issue(s)/problem(s). Students are required to identify problems, develop techniques for information gathering, conduct literature review and select appropriate methodology. Students are assessed by a written and oral presentation at the end of the semester.

**Course Outcomes:**

1. Ability to INTEGRATE comprehensively the needs and the insights of research works conducted.
2. Ability to INVESTIGATE and conduct research literature of complex engineering problems with selected knowledge in the research literature of the discipline.
3. Ability to PROPOSE and DEVELOP design solutions or methodology for complex engineering problems that meet specified needs with appropriate consideration including design of experiments, modeling or simulation.
4. Ability to PERFORM effective presentation on complex engineering activities undertaken.
5. Ability to demonstrate and apply engineering management principles by managing research project.

**MMJ40304 PROJEK TAHUN AKHIR II [FINAL YEAR PROJECT II]****No of Credits: 4****Course Synopsis:**

This course is designed to expose students with an investigative research-based project to solve engineering issue(s)/problem(s). Students are required to identify problems, develop techniques for information gathering, conduct literature review and select appropriate methodology. In addition, students are required to deliver individual analysis and judgement, utilize appropriate modern technology/tools in conducting the research and assessed independently. At the end of the semester, students will prepare a final report and deliver both written and oral.

**Course Outcomes:**

1. Ability to integrate comprehensively the needs and the insights of research works conducted.
2. Ability to investigate and conduct research literature of complex engineering problems with selected knowledge in the research literature of the discipline.

3. Ability to propose and develop design solutions or methodology for complex engineering problems that meet specified needs with appropriate consideration including design of experiments, modeling or simulation.
4. Ability to synthesize complex engineering problems using first principles of mathematics, natural sciences or engineering sciences in order to evaluate and interpret data to provide results and conclusions with recommendations.
5. Ability to perform effective presentation on complex engineering activities undertaken.
6. Ability to demonstrate and apply engineering management principles by managing research project.

**MMJ42103 MEKANIK GETARAN [VIBRATION MECHANICS]****No of Credits: 3****Course Synopsis:**

This course provides the skills and knowledge in vibrations disciplines. The syllabus cover the fundamental of vibration and oscillation motion, free vibration, force vibration, transient vibration, two degree of freedom systems and multiple degree of freedom systems. The students will be exposed towards industrial application elements such as vibration control, vibration measurement and signal analysis methods.

**Course Outcomes:**

1. Ability to evaluate and analyse the various response to various inputs of vibratory motion.
2. Ability to construct a control system for a vibration motion.
3. Ability to measure and analyse vibration signals.

**MMJ42203 MEKANIK PATAH [FRACTURE MECHANICS]****No of Credits: 3****Course Synopsis:**

This course contains the theory of principles and application of fracture mechanics. The fundamental of fracture mechanics covers the linear elastic fracture mechanics and elastic plastic fracture mechanics principles. It presents the problem solving of fracture parameter solution for wide range of failure cases from engineering design applications, including the analysis of fracture mechanism and experimental testing for metallic and non-metallic material. Computational fracture mechanics approach is employed for selected fracture mechanism cases in engineering design and structures.

**Course Outcomes:**

1. Ability to analyse the concepts of fracture mechanics in engineering materials and structures
2. Ability to formulate and propose the fracture mechanics solution for engineering design failures.
3. Ability to construct and manipulate the computational fracture mechanics program for a specific fracture mechanic problem solving

**MMJ42303 MEKANIK BAHAN KOMPOSIT [MECHANICS OF COMPOSITE MATERIALS]****No of Credits: 3****Course Synopsis:**

The basic concepts of composite materials are introduced. The elastic behaviour of unidirectional lamina and multidirectional laminates are presented. Students are to develop strong understanding of the role of constituent materials in overall response of composite lamina and how would the orientations and stacking sequence would affect the overall performance. Several failure criteria of laminates are introduced. Experimental methods used to characterise composite materials are presented.

**Course Outcomes:**

1. Ability to point out the role of constituents in overall response of composite lamina (micromechanics) and its effect on the laminate properties (macromechanics)
2. Ability to formulate elastic and strength properties, and elastic response, of orthotropic and anisotropic materials having both continuous and discontinuous reinforcements
3. Ability to analyse and discuss the basic experimental methods to characterise composite materials

**MMJ42403 AKUSTIK & KAWALAN HINGAR [ACOUSTIC & NOISE CONTROL]****No of Credits: 3****Course Synopsis:**

The aim of this course is to enable students to understand fundamental principles of engineering acoustics. Several acoustics criterias, measurements and noise control guidances that are required for design and construction of those features related to noise, are also to be introduced in the course. After completing this course, students should be able to use the basic concepts of acoustic measurements and application of acoustic signal analysis for particular applications in noise control.

**Course Outcomes:**

1. Ability to analyse the conceptual and fundamental of engineering acoustics.
2. Ability to explain and analyse the principles and techniques of noise and their applications in controlling noise.
3. Ability to propose and evaluate the various methods for controlling exposure to noise.

**MMJ42503 PROJEK REKA BENTUK BERSEPADU II [INTEGRATED DESIGN PROJECT II]****No of Credits: 3****Course Synopsis:**

This course is intended as an advanced knowledge in mechanical system design for undergraduate level. Bringing together the fundamentals theories and techniques from previous courses to accomplish the design of a complete machine or mechanical system. The course covers the principle of engineering design process continuing from conceptual design process in the prerequisite course. This course focuses from embodiment design to developing functional prototype. Students are expected to work in a group and collaborate with other members to arrive at good design decisions on selected theme. Students are required to design a project with current issues related to safety, cultural, societal, environmental as well as the economic considerations. It is a creative, iterative, and often open-ended process subject to constraints which may be governed by standards, or legislation to varying degrees within mechanical engineering discipline. This course will utilize Computer Aided Engineering (CAE) software as tool in analysing and solving mechanical system design problems as part of a capstone project.

**Course Outcomes:**

1. Ability to propose design solutions to solve complex mechanical engineering problem to meet customer and functional needs with consideration for safety, cultural, societal, environmental and sustainability concerns.
2. Ability to fabricate design solutions by selecting and applying the appropriate modern engineering tools.
3. Ability to develop and communicate the design solutions effectively with regards to project management and finance principles.
4. Ability to function in a team for the successful delivery of design project.

**MMJ42602 PENGELUARAN & OPERASI [PRODUCTION & OPERATIONS]****No of Credits: 2****Course Synopsis:**

This course offers comprehensive contents about production and operation in goods producing and services providing industries. It is a process of managing people and resources in order to create product or service. This course introduces students to linear programming, inventory management, aggregate planning, transportation models, material requirements planning (MRP) as well as short-term scheduling

**Course Outcomes:**

1. Ability to develop solutions for a production operation.
2. Ability to detect optimum solution to production operations based on operation research.

**MMJ42703 PENGOPTIMUMAN REKA BENTUK [DESIGN OPTIMIZATION]****No of Credits: 3****Course Synopsis:**

This course introduces the theory and use of numerical design optimization methods. Problem formulation, practical application, and result analysis. Design optimization concepts, necessary and sufficient optimality conditions and solution techniques. Unconstrained nonlinear problems, constrained linear and nonlinear problems, and multiobjective optimization. Use of basic knowledge of numerical optimization algorithms to apply them appropriately in engineering design.

**Course Outcomes:**

1. Ability to formulate optimum solution in practical engineering design problems.
2. Ability to analyze optimum solution based on mathematical constructs and

theoretical tools of linear and non-linear design problems.

3. Ability to analyze optimum solution based on mathematical constructs and theoretical tools of linear and non-linear design problems.

**MMJ42803 PEMBUATAN PENAMBAHAN [ADDITIVE MANUFACTURING]****No of Credits: 3****Course Synopsis:**

This course covers the principles and applications of reverse engineering and additive manufacturing as related to design and manufacturing. It will detail the synchronized approach consideration of functional design, analysis and manufacturing that support the integration of reverse engineering and additive manufacturing. The course will discuss the importance of additive manufacturing in manufacturing and other industries. The course will address additive manufacturing principles, variety and their concept; and scope of additive manufacturing with application areas. Upon completion, students will have the ability to select the proper additive manufacturing techniques for product design and manufacturing. The course will address the defining and applying criterion for selecting appropriate additive manufacturing process and, investigate application domain of additive manufacturing and learning the important process parameters.

**Course Outcomes:**

1. Ability to describe and analyze possibilities and needs of application of direct digital manufacturing in modern development, design and production.
2. Ability to describe and evaluate reverse engineering and additive manufacturing processes in the design and manufacturing of finished product.
3. Ability to evaluate and design product based on suitable additive manufacturing techniques in terms of hardware and software technologies.

**MMJ42903 PENYEJUKAN DAN PENYAMANAN UDARA [REFRIGERATION & AIR CONDITIONING]****No of Credits: 3****Course Synopsis:**

In this course, students will acquire advanced knowledge of refrigeration and air conditioning system. The course content includes recapitulation of thermodynamics, advancement of refrigeration, vapour compression cycle, P-h Diagram, actual vapour compression cycle, refrigerants, indoor and outdoor design conditions, and refrigeration system components. Advancement of Air-conditioning, properties of moist air, psychrometric chart, psychrometric processes, cooling load, air distribution system, thermal comfort, and indoor environmental health.

**Course Outcomes:**

1. Ability to analyse the total energy required for one confined space to achieve comfort zone.
2. Ability to demonstrate and propose methods to control temperature, humidity, air circulation and air purity in one confined space.
3. Ability to design and improve the COP of an air conditioning system while maintaining comfort.

**MMJ43103 TENAGA DIPERBAHARUI [RENEWABLE ENERGY]****No of Credits: 3****Course Synopsis:**

The goal of the course is to explore concepts and applications of Renewable Energy while approaching the practical limitations of some of the most additive energy sources. This course will encourage students to examine the facts about our energy needs, wants, and supplies, as well as the environmental and human impacts of energy production and use.

**Course Outcomes:**

1. Ability to examine the concepts and principles of renewable energy technologies and energy resources available today for sustainable development.
2. Ability to justify the conversion of alternative energies into thermal/mechanical/electrical energy
3. Ability to construct the interrelationships of renewable energy in the field, and its environmental impact

**MMJ43203 ENJIN PEMBAKARAN DALAM [INTERNAL COMBUSTION ENGINE]****No of Credits: 3****Course Synopsis:**

The objective of the course is to provide a basic understanding of the operation of internal combustion engines in terms of their performance, operation, fuel requirements, and environmental impact. Topics include flow, thermodynamics, combustion, heat transfer, and fuel properties, with reference to engine performance, efficiency, as well as emissions.

**Course Outcomes:**

1. Ability to analyse the operating characteristics of modern internal combustion engines.
2. Ability to evaluate the interrelationships of the internal combustion process as it relates to thermodynamics, combustion, and other factors affecting engine performance, efficiency, and emissions.
3. Ability to construct analytical techniques to the engineering problems and performance analysis of internal combustion engines.

**MMJ43303 PERKOMPUTERAN DINAMIK BENDALIR [COMPUTATIONAL FLUID DYNAMICS]****No of Credits: 3****Course Synopsis:**

This course offers an in-depth introductory foundational and technical knowledge in solving thermo-fluids problem via computational method. In particular, students will have hands-on experience in using computational fluid dynamics to solve engineering problems. Governing equations, discretisation schemes, numerical methods, turbulence modelling, mesh quality and independence test, numerical errors, and boundary conditions will be introduced in the course.

**Course Outcomes:**

1. Ability to analyze and apply basic fluid dynamics related partial differential equations.
2. Ability to analyze and apply basic discretization schemes for fluid dynamics related partial differential equations.
3. Ability to assess and solve fluid dynamics related problems by using appropriate numerical procedures.
4. Ability to solve fluid dynamics related problems by using computational tools.

**MMJ16103 BAHAN [MATERIALS]****No of Credits: 3****Course Synopsis:**

This course introduces students to the engineering materials fundamentals including the engineering materials application, atomic bonding, crystal structure, mechanical and physical properties, corrosion mechanism, microstructural analysis, phase diagram, ferrous and non-ferrous alloys, polymer and advanced materials.

**Course Outcomes:**

1. Ability to ANALYSE transformation, microstructure and behaviors of engineering materials - ferrous, non-ferrous and polymer.
2. Ability to EVALUATE mechanical and corrosion properties of engineering materials.
3. Ability to JUSTIFY advanced materials and sustainable materials.

**MMJ15103 TEKNOLOGI ELEKTRIK [ELECTRICAL TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course is intended to provide students with clear understanding the concepts and principles of the Direct Current (DC) and Alternating Current (AC) circuits, basic principles of three phase AC circuits, and electromagnetism. The students will also gain an understanding of the basic operating principles of a transformer; calculate induced e.m.f, equivalent resistance, reactance and impedance, losses and transformer efficiency. At the end of the subject, the students will understand the principles of DC and AC Electrical Machines.

**Course Outcomes:**

1. Ability to apply the electrical laws and theorems to solve direct current (dc) circuits to determine the voltage, current, resistance and power.
2. Ability to analyse and solve single phase and three phase alternating current (ac) circuits for its impedance, voltage, current, power and power factors.
3. Ability to analyse the concept of magnetic fields and the principle operation of a transformer.
4. Ability to apply the concept and principles used in electrical machines and their applications.

**MMJ17102 PROSES PEMBUATAN I [MANUFACTURING PROCESS I]****No of Credits: 2****Course Synopsis:**

This course provides students to explore the manufacturing processes used in industries in converting raw material into finished products. This course is divided into five main processes which are solidification processes, particulate processing, deformation processes, material removal processes and joining processes. The students are expected to be able to analyze the manufacturing processes in producing good quality finished products.

**Course Outcomes:**

1. Ability to analyze solidification processes, particulate processing, material removal processes, deformation processes and joining processes.
2. Ability to assess the suitable manufacturing processes on a product using research based knowledge (research literature).

**MMJ17302 BENGKEL KEJURUTERAAN [ENGINEERING WORKSHOP]****No of Credits: 2****Course Synopsis:**

This course explores the manufacturing processes with practical methods that used in industry to convert raw material into finished product. This course will be divided into five workshops; first workshop: solidification process will be introduced including sand casting and plastic injection molding process. Second workshop: conventional machining processes including turning, milling and drilling. Third workshop: particulate processing of metal, forming and sheet metalworking. Fourth workshop: various joining and assembly processes such as welding and mechanical fastening processes, and the last workshop: students need to do fabrication and presentation of mini projects that are given by lecturers.

**Course Outcomes:**

1. Ability to describe, report and communicate on metal processing and polymer processing.
2. Ability to demonstrate application of safety in the activities relevant to engineering practice.
3. Ability to operate equipment/machine used for metal processing and polymer processing.

**MMJ17502 LUKISAN KEJURUTERAAN [ENGINEERING DRAWING]****No of Credits: 2****Course Synopsis:**

The objective of this course is to provide exposure and skills to students in basic engineering drawing, Computer-Aided D (CAD) and its engineering application. This course covers manual drafting using drawing equipment and using software (Catia). Also, this course covers Geometric Dimensioning and Tolerance (GDT), which enhance students' ability to interpret and analyse engineering data from drawing.

**Course Synopsis:**

1. Ability to produce technical drawing and drafting using manual technique.
2. Ability to produce technical drawing using Catia software.
3. Ability to practice Geometric Dimensioning and Tolerance (GDT) on technical drawing.

**MMJ15203 ELEKTRONIK [ELECTRONICS]****No of Credits: 3****Course Synopsis:**

This course's main purpose is to give introduction and exposure to students about electronic devices which includes analog and digital devices. The analog devices topic includes the introduction to Semiconductor, PN junction, Diodes, Zener diodes, Bipolar Junction Transistor (BJT), Operational Amplifier and active filters. The digital device topic includes the introduction to binary number systems, Boolean Algebra, logic gates, logic circuits, Boolean function, and combinational logic circuits. Students will be exposed to the electronic basic, operation concept, analysis method including the usage of electronic devices used in industry and introduction to microprocessors. Laboratory experiments will also be done to clarify the topics learned in the class.

**Course Outcomes:**

1. Ability to analyse the rectifier and voltage regulator circuits.
2. Ability to analyse the applications of transistors for signal amplification and switching circuits.
3. Ability to analyse the operation and applications of operational amplifiers and active filters.
4. Ability to analyse the operation of digital circuits using the digital theorem.

**MMJ15402 PENGATURCARAAN KOMPUTER [COMPUTER PROGRAMMING]****No of Credits: 2****Course Synopsis:**

This course introduces to Computers and Computing Fundamentals, Program Structure, Printing, Comments, Variables, Arithmetic Operations, Math Functions, Input/ Output, Control Structure, Looping, Functions, Numeric Arrays and their application on solving engineering problems. An open source software of the C programming language is utilized in this course. Students will gain understanding and ability to identify problems and come up with the most efficient ways to solve them via programming. Students are expected to complete several programming assignments and programming tests.

**Course Outcomes:**

1. Ability to construct C programs with the most suitable variables: perform correct arithmetic operations, math functions and desired input/ output.
2. Ability to construct C programs with control structure and looping.
3. Ability to construct C programs with functions and numeric arrays.

**MMJ17203 PROSES PEMBUATAN II [MANUFACTURING PROCESS II]****No of Credits: 3****Course Synopsis:**

This course covers a wide range of fundamental machining operations, including machining techniques, machine tools, cutting instruments, cutting fluid, and surface treatment technology. Machine parameters, computation speed and feed rate, handling machines, CNC programming, abrasive machining and surface technology are covered. Students will be able to undertake machining processes based on traditional machining knowledge and build rudimentary CNC programming to carry out machining processes to produce items at the conclusion of the course. In addition, they will also be furnished with knowledge on the surface technology and abrasive machining.

**Course Outcomes:**

1. Ability to analyze the mechanics of the cutting process and CNC process.
2. Ability to design machining programs for CNC turning, milling and drilling procedures using complex cutting paths and tool setting.
3. Ability to analyse processes for abrasive machining and surface treatment methods.



**MMJ16202 REKA BENTUK KEJURUTERAAN [ENGINEERING DESIGN]****No of Credits: 2****Course Synopsis:**

The course introduces the concepts and principles of engineering design approach to solve engineering problems. Engineering design is the systematic integration of scientific principles, technical information and aesthetics in the definition of a product, process or system to perform pre-specified functions with maximum economy and efficiency. Therefore, the course introduces the phases of the engineering design process.

**Course Outcomes:**

1. Ability to generate product design specifications from customer needs and market analysis, and design requirements and constraints.
2. Ability to generate design concepts based on specifications and apply design screening techniques to select the best concept.
3. Ability to communicate effectively design ideas and information.
4. Ability to evaluate designs based on engineering criteria.

**MMJ25102 INSTRUMENTASI [INSTRUMENTATION]****No of Credits: 2****Course Synopsis:**

Instrumentation is a collective term for measuring instruments that are used for indicating, measuring and recording physical quantities. Today, this system has been used in a wide range of manufacturing and industrial processes to measure variables such as pressure, flow, temperature, displacement, and etc. These variables are consistently measured and monitored to ensure the output of a specific process are within a desired acceptable range and at the same time protect the safety of equipment in the system. Essential knowledge on the principle and operation of measuring instruments will help the engineer to understand the automated system used in manufacturing technology.

**Course Outcomes:**

1. Ability to understand the terminology used in instrumentation systems and signal conditioning methods for measurement systems.
2. Ability to analyze the characteristic performances for displacement, motion and strain measurements.
3. Ability to analyze the characteristic performances for pressure, flow and temperature measurements.

**MMJ27102 PEMBUATAN BERBANTU KOMPUTER [COMPUTER-AIDED MANUFACTURING]****No of Credits: 2****Course Synopsis:**

This course introduces the principles and applications of the CAM system, which is used in the field of manufacturing engineering. It enables students to comprehend theories, concepts, and applications of CAM as they apply to manufacturing processes in the industry. Students will illustrate and design components/parts in a three-dimensional (3D) model using CAD/CAM software. The students will then be exposed to how to use CAM software to simulate the 3-dimensional (3D) machining process in order to generate numerical control (NC) codes that will be transferred and operated on a computer numerical control (CNC) machine.

**Course Outcomes:**

1. Ability to construct 3D solid modelling for CAM simulation using CAD/CAM software.
2. Ability to simulate 3D solid parts and generate Computer Numerical Control (CNC) programs for basic and advanced milling and turning processes in CAM software.

**MMJ26103 REKA BENTUK UNTUK PEMBUATAN [DESIGN FOR MANUFACTURE]****No of Credits: 3****Course Synopsis:**

This course introduces students on the design approach that focuses on ease of manufacture and efficiency of assembly. Students will learn the guidelines and rules in designing each part/component of the product as well as the assembly analysis to determine Assembly Efficiency (AE). In terms of Design for Manufacture (DFM), students will learn on how to select the appropriate material and manufacturing process of each part/component of the product. At the end, students will be able to analyze an existing product design and subsequently propose a better design with appropriate manufacturing process and material selection for ease of manufacture and assembly.

**Course Outcomes:**

1. Ability to apply knowledge in the selection of appropriate material and process selection.
2. Ability to improve design efficiency of products using Design for Assembly (DFA) Methodology.
3. Ability to develop parts design, with consideration of manufacturability.
4. Ability to contribute effectively as a team member in project execution.

**MMJ25203 SISTEM KAWALAN [CONTROL SYSTEMS]****No of Credits: 3****Course Synopsis:**

The course shall cover the essential and basic theory of control systems. The students will be exposed to mathematical modeling for electrical and mechanical systems using block diagrams and transfer functions. In addition, they will be able to determine and analyze the characteristic, stability and performance of the feedback control system in time and frequency domain. The students will also learn how to design a feedback control system.

**1. Course Outcomes:**

2. The ability to perform a system's time-domain analysis with response to test inputs. Analysis includes the determination of the system stability and steady-state errors.
3. Ability to design and analyze the controller's performance using root locus technique.
4. The ability to perform system's frequency-domain analysis with response to test inputs. Analysis includes the determination of the system stability.

**MMJ26203 REKA BENTUK KOMPONEN MESIN [MACHINE COMPONENTS DESIGN]****No of Credits: 3****Course Synopsis:**

This course presents the concepts and methods essential to mechanical engineering design, analysis, and application. In-depth coverage of major topics, including free body diagrams, force and strength analysis to design the element of machine components. This course also focused on how to identify the critical design parameters that transform, transmit or use energy, load or motion for a specific purpose. Critical thinking and problem-solving skills are strengthened through an appropriate procedure and framework, enabling the effective identification of problems and clear presentation of solutions.

**Course Outcomes:**

1. Ability to analyze and synthesize engineering data to design the element of machine components such as Gears, Shafts, Bearings, Screw and Fasteners, Belt, Chain Drives, Keys, Coupling, seals and Springs.
2. Ability to comprehend and write effective report writings or design documentations.

**MMJ27203 KEJURUTERAAN KUALITI [QUALITY ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course gives an understanding about the concepts and techniques in total quality management and the relationship between these fields of knowledge. Students will be exposed to the technique of reliability system, accepted sampling and process capability to enhance the quality in engineering application. In addition, students learn about quality control tools, FMEA and management quality tools of engineering systems. Practical work will help student's gain effective understanding in quality and product liability.

**Course Outcomes:**

1. Ability to EVALUATE the quality problems using seven quality control (QC) tools, FMEA, management and planning tools in engineering application.
2. Ability to DEVELOP the reliability system, accepted sampling and process capability to enhance the quality in engineering application
3. Ability to ANALYZE the quality cost, product liability and problems in troubleshooting issues related to quality.

**MMJ27403 KEJURUTERAAN INDUSTRI [INDUSTRIAL ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course introduces the fundamentals of Industrial Engineering. It covers elements of industrial engineering, the installation of people, materials, equipment, information and economics for improvement and increased productivity. The main objectives of this course is to develop students into competent analysts who are capable of designing facilities and layouts that optimize material flow and productivity, minimize waste and perform necessary evaluation in work study for manufacturing operations.

**Course Outcomes:**

1. Ability to explain and analyze the fundamental concepts of industrial engineering and manufacturing productivity.
2. Ability to analyze work study in manufacturing operations.
3. Ability to analyze the facilities planning through its location and design components.
4. Ability to propose block layout from layout procedures and algorithms.

**MMJ36102 PEMINDAHAN HABA [HEAT TRANSFER]****No of Credits: 2****Course Synopsis:**

The main objective of this course is to enable students to understand the concepts of conduction, convection and radiation which form the basics of heat transfer. In order to ensure students achieve the outcomes of this course, they will perform theoretical calculations such as thermal conductivity, heat loss, and other important theories.

**Course Outcomes:**

1. Ability to distinguish fundamental knowledge of heat transfer mechanisms.
2. Ability to evaluate thermal engineering problems in conduction, convection and radiation.
3. Ability to evaluate thermal engineering problems in heat exchanger systems.

**MMJ36303 GETARAN DAN MEKANIK MESIN [VIBRATION AND MECHANICS OF MACHINES]****No of Credits: 3****Course Synopsis:**

The course aims at strengthening the knowledge of the machines and mechanisms with particular attention to the power transmission, balancing, flywheel, gyroscope and vibration. A method of analysis and synthesis of mechanics of machine will complement the basic concepts developed at the bachelor level. This subject also will introduce fundamentals of vibration, free and forced, undamped and damped vibration, vibration of single Degree of Freedom (DoF) system, 2-DoF and multi-DoF systems. At the end of the course students have a deep understanding of all the elements of mechanics that are fundamental for industrial automation, mastering design and construction principles that play a role in modern automatic machines.

**Course Outcomes:**

1. Ability to apply knowledge of mathematics, statics and dynamics to support analysis of mechanical power transmission mechanisms.
2. Ability to apply knowledge of mathematics, statics and dynamics to support analysis of the velocity control mechanism in a cycle and the balancing mechanism on a machine.
3. Ability to synthesise knowledge of mathematics, statics and dynamics into a new whole or propose alternative solutions for gyroscopic motions and their effects on a rotational body.
4. Ability to apply knowledge of mathematics, statics, solid mechanics and

dynamics to support analysis of vibrations and in solving problems and calculate the system vibrating due to some external force and its application in solving problems.

**MMJ37103 PERANCANGAN DAN KAWALAN PENGELUARAN [PRODUCTION PLANNING AND CONTROL]****No of Credits: 3****Course Synopsis:**

This course will provide the students with knowledge of production planning and control. It is designed to highlight the practical and applied techniques, which can improve the organization's quality and productivity. The designing, planning, organizing, and controlling of operating systems is the main focus of this course including analytical techniques, tools and concepts applicable to planning operations. Such concepts include Aggregate Planning and Forecasting, Capacity Planning, Materials Requirement Planning, Inventory management, Production Scheduling and Supply Chain Design and Logistic Networks. On completion of the course, students will be able to understand the strategic role of production planning and control in manufacturing plant operations.

**Course Outcomes:**

1. Ability to identify and apply operational methodologies to assess and improve the production performance.
2. Ability to develop a systematic approach to the solution of planning problems for a wide variety of manufacturing operations.
3. Ability to employ different strategies in manufacturing industries to plan production and control inventory.

**MMJ37303 TEKNOLOGI PEMBUATAN TERMAJU [ADVANCED MANUFACTURING TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course deals with Advanced Manufacturing Technology (AMT). In general, AMT uses innovative technologies to produce/improve products and/or processes, while also incorporating new business/management methodologies. In this course, the focus is on material removal processes that use various mediums for cutting including mechanical, lasers, electrical and chemical. Besides, micromachining, additive manufacturing and electronic manufacturing are also included. In addition, issues related to research and sustainability with respect to Advanced Machining will be also discussed.

**Course Outcomes:**

1. Ability to investigate and evaluate advanced manufacturing technologies.
2. Ability to identify and propose suitable advanced machining processes where required.
3. Ability to design and develop research/problem solving related to advanced manufacturing technology to enhance the manufacturing efficiency, capability, and sustainability.

**MMJ37503 SISTEM PNEUMATIK DAN HIDRAULIK [PNEUMATIC AND HYDRAULIC SYSTEM]****No of Credits: 3****Course Synopsis:**

This course will be exposed to students about the fundamental basics of theory and concept to Fluid Power which include Pneumatic and Hydraulic Systems that are being practiced in Industry today. This course will be focusing on basic introduction which covers symbols, components, and circuits used in Pneumatic and Hydraulic Systems as well as its application in industry. To increase knowledge of students in this course, a practical approach will be done using the Pneumatic and Hydraulic equipment aided by computer software to construct the related circuits application. At the end of this course, the Pneumatic System application will be combined with Electro-Pneumatic System which uses electric power, relay, sensor and limit switch to operate the components and actuator in the Pneumatic System.

**Course Outcomes:**

1. Ability to apply and evaluate theory and concepts of Pneumatic and Hydraulic Systems.

2. Ability to compare and differentiate the components and symbols of Pneumatic and Hydraulic Systems.
3. Ability to develop and evaluate applications on single and multiple circuits of Pneumatic and Hydraulic Systems.

**MMJ36203 KEJURUTERAAN BERBANTU KOMPUTER [COMPUTER-AIDED ENGINEERING]****No of Credits: 3****Course Synopsis:**

This is an introductory course to the theory and practice of Computer-Aided Engineering (CAE) which covers the fields of Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD) including thermal analysis. It will cover the fundamental theories, modelling and simulation approaches of FEA and CFD to practical engineering problems. This course aims to provide knowledge and understanding of engineering simulation to aid in engineering design and analysis.

**Course Synopsis:**

1. Ability to formulate and apply concepts and principles of finite element and finite volume methods in solving engineering problems.
2. Ability to model and perform engineering analysis using CAE softwares.
3. Ability to evaluate physical problems using CAE software.

**MMJ37203 ERGONOMIK INDUSTRI [INDUSTRIAL ERGONOMICS]****No of Credits: 3****Course Synopsis:**

Ergonomics is an essential and integral element of occupational safety and health practice. It encompasses the physical, cognitive, psycho-social and organizational aspects of work. This course is an application of knowledge about human capabilities and limitations to the design of workplaces, equipment, work processes and environments that can optimize worker safety, health and wellbeing. Topics include ergonomics principles, Work-related Musculoskeletal Disorders, biomechanics, human information processing, anthropometry, principles of workplace design, ergonomics risk assessment and evaluation methods and ergonomics problem solving techniques. This course provides students with the basic skill of analysing the relationship between people and their working environment, and the skill to decide suitable ergonomic principles and method(s) to use to solve practical problems. At the end of the course, students should be able to conduct activity/work analysis and solve problems related to ergonomic, health and safety issues.

**Course Outcomes:**

1. Ability to apply knowledge of basic concepts and principles of ergonomics and body mechanics.
2. Ability to analyze and perform suitable anthropometric study in workplace design.
3. Ability to use suitable assessment tools in the design and evaluation of work tasks.
4. Ability to solve and design a workplace to ensure worker safety, health and wellbeing.

**MMJ37403 PEMBUATAN "LEAN" [LEAN MANUFACTURING]****No of Credits: 3****Course Synopsis:**

This course provides the student with Lean Manufacturing describing the background behind its development and how evaluations and assessments of production systems are performed. The course focuses on gaining an understanding of Lean thinking and practices from both a technical standpoint and the people's perspective needed to bring the change and sustain the improvement. Examples of Lean applications in manufacturing systems and processes will be presented. At the end of the semester, the students should have a basic understanding of the application, design, operation, control, and sustain of lean manufacturing systems and will be able to use Lean thinking and tools to

model, analyze, and optimize the manufacturing systems.

**Course Outcomes:**

1. Ability to CONDUCT suitable Lean tools and techniques in manufacturing problems solving and continuous improvement.
2. Ability to DEVELOP the value stream mapping of a process and significant improvement with pull system concept and suitable lean tools.
3. Ability to DEVELOP the Lean culture towards sustaining Lean in the manufacturing system.

**MMJ37603 AUTOMASI INDUSTRI [INDUSTRIAL AUTOMATION]****No of Credits: 3****Course Synopsis:**

This course is to enhance the knowledge and understanding on automation and robotics which have been used in the industries today. It covers topics regarding Manufacturing Automated application including Automated Assembly Line, Flexible Manufacturing system (FMS), Automated Storage/Retrieval System (ASRS), Automated Material Handling System and Computer Integrated Manufacturing (CIM). This course also covers an explanation of autonomous robotics, classification of robot systems, end-of-arm tooling, robot safety and application of robots toward industrial revolution 4.0.

**Course Outcomes:**

1. Ability to EVALUATE concepts of manufacturing system and automation system in industries application.
2. Ability to DIFFERENTIATE hardware components for automation including actuators, sensors, and industrial control technology.
3. Ability to EVALUATE and DESIGN solving methods using Industrial Automation Systems approach including material, transport, and storage system.
4. Ability to EVALUATE robot anatomy and related attributes in industry application.

**MMJ47003 PROJEK REKA BENTUK BERSEPADU PEMBUATAN [MANUFACTURING INTEGRATED DESIGN PROJECT]****No of Credits: 3****Course Synopsis:**

Manufacturing Integrated Design Project (MIDP) is a multidisciplinary subject in which small groups of three to five students work together to complete a major project. Each project will require students to unravel manufacturing/industry/design problems that are being confronted by any organization in the community. The course emphasizes related manufacturing engineering knowledge ranging from concept till production of a product solving specific engineering problems. This solution may include engineering specification projects schedule/planning, costing analysis, sustainability issues and design solution as well as manufacturing drawings (eg: assembly drawing).

**Course Outcomes:**

1. Ability to CREATE appropriate design solutions on manufacturing engineering either involving process, system, or component, which may include production management, with the aim of producing a good quality product that meets customer requirements/needs.
2. Ability to EVALUATE aspects of design sustainability and environmental impact in manufacturing engineering problems.
3. Ability to EFFECTIVELY function as a team member in carrying out project assignments.
4. Ability to CONVINCINGLY present on engineering activities undertaken either verbally or in writings.
5. Ability to DEMONSTRATE understanding of engineering project management principles and engineering economics by applying them in decision making processes.
6. Ability to FORMULATE research needs from various resources.

**MMJ47202 PENYELIDIKAN OPERASI [OPERATIONAL RESEARCH]****No of Credits: 2****Course Synopsis:**

In science, engineering, economics, and industry, operational research (OR) has a wide range of uses. OR assists with decision-making in a variety of environments. This course will put a strong emphasis on mathematical modelling, teaching students how to create, evaluate, and resolve models that represent actual issues. The topics addressed in this course include linear programming, duality theory and sensitivity analysis, network optimisation, transportation and assignment problems, and integer programming. The students will learn how to make decisions using scientific methods to create and run a system as efficiently

as possible. By the end of the course, students will be able to develop new formulations, critically assess the effects of model assumptions, and select the best solution method for a particular problem.

**Course Outcomes:**

1. Ability to EVALUATE problems related to linear programming, duality theory and sensitivity analysis, integer linear programming, transportation problem and network optimization models.
2. Ability to INTEGRATE comprehensively the technological knowledge and changes in engaging continuous determination for the aim of problem solving as a life-long learning practice.

**MMJ47402 KEJURUTERAAN DAN PENGURUSAN PENYELENGGARAAN [MAINTENANCE ENGINEERING AND MANAGEMENT]****No of Credits: 2****Course Synopsis:**

Maintenance engineering and management are the two knowledge disciplines that focus on technical and managerial aspects to support asset maintenance operations. The objective of this course is to enhance knowledge and understanding in the area of maintenance engineering and management. The examples of industry cases and current research findings will be used and supported in teaching and learning processes. This directly exposes the students to a balance of knowledge domains in both theoretical and practical perspectives.

Therefore, this course is designed to equip students with a precise and concise understanding of maintenance engineering and management topics in terms of its requirements, concepts, problems and solutions. The course will expose students to the fundamentals of maintenance and the evolution of maintenance methods/techniques/strategies towards analyzing and solving maintenance problems in the context of technical and management. Hence, encourage them to create new ways or better solutions based on analytical and managerial approaches.

**Course Outcomes:**

1. Ability to ANALYZE and EVALUATE maintenance problems using various methods of maintenance engineering and management from the perspective of manufacturing applications.
2. Ability to INTEGRATE comprehensively the related technologies and knowledge in engaging continuous determination to solve various maintenance problems towards life-long learning practice.



**MMJ46102 REKA BENTUK UNTUK KELESTARIAN [DESIGN FOR SUSTAINABILITY]****No of Credits: 2****Course Synopsis:**

Sustainability in design and manufacturing vision is about rethinking manufacturing activities based on the three pillars of sustainability: environmental, social and economic. To foster sustainability in the manufacturing industry, one has to start at the source; that is design. Around 80% of the environmental impact of a product is defined at the early (design) stages of the product development process. By making thoughtful design choices, seizing opportunities to reduce material and maximizing usable life spans, product teams can do their part to make manufacturing cleaner and greener.

Sustainable design is a systems approach for the creation of products through economically sound processes. This can be achieved by incorporating design strategies to reduce negative environmental impacts, and use of energy and natural resources across the entire life cycle of products and services in order to conserve resources and promote a more sustainable future.

The course explores implementation of design strategies at the intersection of sustainability, design and manufacturing as it relates social, environment, and economic drivers during product development. Key metrics that influence sustainability and trade-off decisions during the early phases of design and selection (materials and manufacturing) that guide reuse and recycle will be explored. All types of waste that result from product development will be considered and the suitable actions to avoid, reduce, reuse or recycle existing waste will be presented. Case studies will be used to illustrate topics during in class discussions.

**Course Outcomes:**

1. Ability to evaluate the environmental impact of a product throughout its entire life cycle, including raw material extraction, production, use, and disposal.
2. Ability to propose a design strategy for the redesign of products to incorporate sustainable practices.

**MMJ46202 REKA BENTUK ACUAN SUNTIKAN [INJECTION MOLD DESIGN]****No of Credits: 2****Course Synopsis:**

The Injection Mould Design course offers a comprehensive understanding of the principles, techniques, and best practices involved in designing injection moulds for plastic components as practiced in industries. The course not only focuses on mould design but also covers essential topics such as plastic part design

guidelines, material flow analysis into injection moulds using commercial analysis software, and the optimization of processing parameters in the moulding process using Response Surface Methodology (RSM). Students will gain a solid foundation in injection mold design and acquire the skills needed to design plastic products, efficient moulds, analyse material flow, and optimize injection moulding processes for enhanced productivity and quality. The knowledge obtained from this course will provide an advantage for students who want to pursue careers as Research and Development (R&D) Engineers, Manufacturing Engineers, or Production Engineers.

**Course Outcomes:**

1. Ability to DESIGN new plastic products, including injection molds, as practiced in industries.
2. Ability to SUGGEST optimal processing parameters for injection moulding processes as practiced in industries.

**MMJ46302 REKA BENTUK ACUAN DAN PERKAKASAN [TOOL AND DIE DESIGN]****No of Credits: 2****Course Synopsis:**

Tool and Die Design is a discipline closely related to the stamping process, which is employed to manufacture products using metal materials. The primary objective of this course is to enhance students' knowledge and comprehension of Manufacturing Process and Product Design Development, particularly focusing on the design of Tool and Die for stamping processes. Throughout the course, students will be introduced to essential analyses necessary for creating efficient tool and die designs that function effectively in the stamping process. They will also gain a comprehensive understanding of all components within the tool and die structure and grasp the fundamental requirements for parts or product drawings essential to develop/design a complete set of tools and dies for stamping process applications.

**Course Outcomes:**

1. Ability to ANALYSE the concepts and principles of tool and die design for stamping process application.
2. Ability to CONSTRUCT the complete tools and die set design to engage in independent and life-long learning in the broadest context of technological change.

**MMJ47502 PENGURUSAN RANTAIAN BEKALAN [SUPPLY CHAIN MANAGEMENT]****No of Credits: 2****Course Synopsis:**

Supply Chain Management is concerned with the management of material, information, and financial movements in multi-stage production-distribution networks. With global competitiveness rising, supply chain management is both a difficulty and an opportunity for businesses. Hence the capacity to suggest changes and a solid understanding of supply chain management ideas are crucial. This course aims to give students an understanding of the ideas, concepts, and applications of global supply chain management and logistics in the corporate context. It also provides students with the knowledge and skills needed to analyse supply chain performance and provide suggestions to improve supply chain competitiveness. The topics include building a strategic framework to analyze supply chains, sourcing and procurement, pricing and revenue management, customer relationship management, supply chain and transportation network, warehousing, and supply chain risk and sustainability.

**Course Outcomes:**

1. Ability to solve problems in supply chain operation across a wide range of business domains.
2. Ability to integrate technological knowledge and changes thoroughly for advancement of personal and professional capabilities.

**MMJ14003 SAINS TUMBUHAN DAN HAIWAN [PLANT AND ANIMAL SCIENCES]****No of Credits: 3****Course Synopsis:**

This course covers various aspects of plant and animal sciences which are necessary to comprehend several other subjects in agricultural engineering such as soil engineering, agricultural engineering design, biomass conversion technology, postharvest engineering and bioproduct manufacturing. The first aspect of this course will deal with basic sciences of plant and animal such as morphological structures, anatomy and biological aspects. The second aspect deals with various physiological mechanisms of plant and animal systems, in relation to agricultural production systems. The third aspect comprises applied biological sciences of plant and animal which includes enhancement of technological aspects as well as in food and agricultural products.

**Course Outcomes:**

1. Ability to apply the fundamental knowledge of plant and animal anatomy and physiology.

2. Ability to examine the interaction and mechanism of different systems and processes in plant and animal.
3. Ability to assess the advances in industrial, environmental practices and engineering aspects to improve plant and animal productivity.
4. Ability to communicate effectively in writing and oral presentation on the biological and morphological mechanism in plant and animal.

**MMJ14102 SAINS FIZIKAL [PHYSICAL SCIENCE]****No of Credits: 3****Course Synopsis:**

The course is designed to provide students with a comprehensive understanding of the fundamental principles and concepts that underpin engineering. This includes an in-depth exploration of key units of measurement such as length, time, mass, force, temperature, electric current, energy, and power. Through a combination of lectures, demonstrations, and practical exercises, students will gain a solid grounding in how these concepts are used in engineering design and analysis. In addition, students will learn about the various tools and techniques used in engineering, as well as the ethical and social considerations involved in the field. By the end of the course, students will have the knowledge and skills needed to tackle a wide range of engineering challenges.

**Course Outcomes:**

1. Ability to analyze problems related to units of measurement, scalar and vector quantities, and apply appropriate mathematical and analytical tools to solve them.
2. Ability to analyze the motion of particles and apply appropriate mathematical and analytical tools to calculate position, force, velocity, and acceleration.

**MMJ14203 KEJURUTERAAN GEOMATIK [GEOMATIC ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course covers land surveying, remote sensing, and geographical information systems (GIS), with emphases on basic surveying, the fundamentals of remote sensing and its applications, and principles and applications of GIS in the agricultural field and precision agriculture. The students are exposed to fieldwork to develop skills in using surveying equipment. The main topics discussed are traversing, tachometry, mapping, calculation of areas and volumes, GIS, GPS, and remote sensing.

**Course Outcomes:**

1. Ability to relate the knowledge of geomatics engineering principles on various types of geomatics surveying and remote sensing to agriculture applications
2. Ability to evaluate the data from various types of geomatics surveying and geospatial data interpretation using geographical information systems (GIS)
3. Ability to perform the surveying task using surveying equipment
4. Ability to engage in independent and life-long learning in geomatics engineering field works and precision agriculture

**MMJ14303 SISTEM PENGELUARAN PERTANIAN [AGRICULTURAL PRODUCTION SYSTEMS]****No of Credits: 3****Course Synopsis:**

The course elaborates the major topics in agriculture which include the crop production system, farm and livestock practices and management systems in relation to current engineering technologies. The course also exposes students to the economics and ethics in agricultural production systems, outlines current farm management and recent trends in agricultural production.

**Course Outcomes:**

1. Ability to describe the issues, challenges and major problems related to agricultural production.
2. Ability to analyse the diversified sustainable agricultural production systems in relation to engineering aspects
3. Ability to apply the viable current technologies and ethical principles in agricultural production systems in relation to engineering aspects

**MMJ24003 TERMODINAMIK [THERMODYNAMICS]****No of Credits: 3****Course Synopsis:**

Thermodynamics is a very important branch of both physics and chemistry. The course covers fundamental aspects of engineering thermodynamics, principles of energy, the conversion of energy between different forms, and the ability of energy to do work. This course emphasis fundamental mathematical equations by exposing the students to realistic problems encountered in engineering practices particularly in agricultural engineering applications.

**Course Outcomes:**

1. Ability to analyse the properties of pure substances and apply the fundamental knowledge of basic thermodynamic properties.
2. Ability to analyse the engineering problems relate to energy in closed system and apply second law of thermodynamics in refrigeration cycle.
3. Ability to predict the P-V-T behavior of gas mixture and analyze the gas vapor pressure and chemical reaction using knowledge of thermodynamics properties for process of innovation.

**MMJ24103 TEKNOLOGI ELEKTRIK DAN ELEKTRONIK [ELECTRICAL AND ELECTRONIC TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course covers the principle of Ohm's Law and Kirchhoff's law in the complex series-parallel DC and AC circuit. This course discusses the basic concept of magnetism and electromagnetism in complex magnetic circuit, transformer, AC and DC machines systems. This course also introduces basic electronic engineering covering type of electronic filter, semiconductor, rectifier, and amplifier. This course elaborates logic circuit system using Boolean function and Karnaugh maps, combinational and sequential circuit.

**Course Outcomes:**

1. Ability to apply knowledge of electrical laws and theorem in the complex series-parallel Direct Current (DC) and Alternating Current (AC) circuit.
2. Ability to analyse the concept of magnetism and electromagnetism in magnetic circuit, transformer, Direct Current (DC) and Alternating Current (AC) machine systems.
3. Ability to analyse the type of active filters, n-type and p-type semiconductor and diodes in rectifiers and operational amplifier circuit.
4. Ability to design complex digital logic circuit using Boolean algebra and Karnaugh maps for combinational and sequential logic circuits.

**MMJ24203 KEJURUTERAAN HIDROLOGI DAN SUMBER AIR [HYDROLOGY AND WATER RESOURCES ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course introduces principles of surface water hydrology and their applications in water resources engineering. These include descriptive and quantitative applications of the hydrologic cycle, weather system, precipitation, evaporation, transpiration, surface and subsurface waters, stream flow hydrographs and flood routing. The course also covers applications of hydrologic and frequency analysis with respect to basic water management design procedures with emphases on earth embankments, reservoirs and flood design. Water quality management of water resources are also introduced in this course.

**Course Outcomes:**

1. Ability to analyse the components of hydrologic cycle and concept of watershed in agricultural engineering.
2. Ability to assess hydrological data to solve problems in water budget and hydrological gain and loss.
3. Ability to evaluate the engineering management principles of flood routing and structural measures for floodplain management.
4. Ability to use the hydrologic analysis techniques in hydrological components measurement.

**MMJ24303 PEMINDAHAN HABA DAN JISIM [HEAT AND MASS TRANSFER]****No of Credits: 3****Course Synopsis:**

This course introduces mechanisms by which heat is transferred from one body to another. The course covers steady state and transient heat conduction, convection and radiation, also mass transfer with special address on agricultural systems. Emphases are placed on formulation and application of respective mathematical models of heat and mass transfer across both physical and biological bodies, as well as design of heat exchangers for application to agricultural systems.

**Course Outcomes:**

1. Ability to analyse problems related to various heat and mass transfer mechanisms.
2. Ability to evaluate heat transfer for complex engineering problems related to agricultural systems.
3. Ability to design heat exchanger for application to agricultural related problems.

**MMJ24503 SIFAT KEJURUTERAAN BAHAN BIOLOGI [ENGINEERING PROPERTIES OF BIOLOGICAL MATERIALS]****No of Credits: 3****Course Synopsis:**

This course introduces principles and methods for determination and analysis of physical as well as thermal and electromagnetic properties of biological materials. The course also covers aspect of moisture determination and management of biological materials. These properties are essentials for engineers in designing process and equipment related to materials and food processing.

**Course Outcomes:**

1. Ability to apply knowledge of mathematics, natural sciences and engineering fundamentals related to the physical and rheological attributes and properties of biological materials
2. Ability to analyze engineering problems related to thermal and electromagnetic properties of biological materials.
3. Ability to evaluate solutions for engineering problems related to water activity and moisture management of biological materials.
4. Ability to analyze data from investigation or experimentation related to engineering properties of biological materials.

**MMJ34003 KEJURUTERAAN TANAH [SOIL ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course introduces the fundamental concept of soil engineering properties in relation to agricultural irrigation and crop water requirement; and soil mechanics that provide the knowledge on soil mechanical properties in relation to soil foundation for infrastructures and machinery. It also introduces the fundamental theories involve in various methods of soil dynamics in relation to agricultural machinery.

**Course Outcomes:**

1. Ability to analyze the soil textural classification and physical characteristics in relation to irrigation/drainage and foundation design.
2. Ability to evaluate mechanical properties of soil in relation to soil foundation design under the static condition (building) and dynamic condition (machine) using the standard.
3. Ability to synthesis the soil dynamics behavior in relation to soil-machine-traction design for agricultural production.

**MMJ34103 REKA BENTUK STRUKTUR LADANG [FARM STRUCTURAL DESIGN]****No of Credits: 3****Course Synopsis:**

This course covers the planning of farm layout, and engineering structural analysis, structural design together with a materials cost estimation of farm structures including greenhouses, structures for livestock husbandry, and other related agricultural structures. This course also covers in-depth analysis of structural analysis by structural elements for shear forces, bending moments, and deflection of beams, columns, slabs, and foundations. The structural design used Eurocodes for reinforced concrete, stainless steel, and timber by considering safety, ethics, environmental and sustainability aspects of the design.

**Course Outcomes:**

1. Ability to distinguish the main functional components in instrumentation and their working principle of various measurement devices.
2. Ability to differentiate roles and features of appropriate instruments for various measurements in agriculture engineering applications.
3. Ability to evaluate control engineering application to solve problems in agricultural system.
4. Ability to analyse complex engineering problems related to application of instrumentation in various agricultural engineering applications, write effective reports and deliver effective presentations.

**MMJ34203 PERALATAN, PENGUKURAN DAN KAWALAN [INSTRUMENTATION, MEASUREMENT AND CONTROL]****No of Credits: 3****Course Synopsis:**

This course introduces the basic principle of instrumentation and measurement which covers various of measuring devices and its process of manipulation, transmission and recording of data. It also includes the roles of instruments in various industries especially in agricultural engineering applications. Different methods in measuring and problem solving to various use in agricultural engineering will be addressed where applicable. This course also covers control engineering applications, which is an essential feature of any measurement programme.

**Course Outcomes:**

1. Ability to distinguish the main functional components in instrumentation and their working principle of various measurement devices.
2. Ability to differentiate roles and features of appropriate instruments for

various measurements in agriculture engineering applications.

3. Ability to evaluate control engineering application to solve problems in agricultural system.
4. Ability to analyse complex engineering problems related to application of instrumentation in various agricultural engineering applications, write effective reports and deliver effective presentations.

**MMJ34303 TENAGA DAN KUASA [ENERGY AND POWER]****No of Credits: 3****Course Synopsis:**

Energy and Power is the course that lays in four important thematic under the agricultural engineering field. One most important rationale on the offering this course which students will be exposed to the theoretical of renewable and non-renewable energy power productions. Those knowledge would lead the students to appreciate the use of renewable energy in a way of life deeper and exercising the minimization act on the use of non-renewable energy in a daily life. This lifelong learning aspect would prepare the students awareness on the globally environmental issues as a result from excessive use of non-renewable energy power production.

**Course Outcomes:**

1. Ability to evaluate the role of engineer to the society on the application of renewable energy and power generations.
2. Ability to analyze the working principles and performance of the internal combustion engines.
3. Ability to analyze the performance and efficiency of different types of engines.
4. Ability to synthesis the lifelong-learning component on the production of energy and power harvest from solar panels, also the processing of biofuels, biodiesel and biogas from biological materials.

**MMJ34403 REKA BENTUK MESIN [MACHINE DESIGN]****No of Credits: 3****Course Synopsis:**

The course encompasses on the concepts of energy and power generation from mechanical devices including engine, pump, compressor, fan and blower. The recent technology, production processes and engineering renewable energy development for sustainability from various sources such as wind, solar, hydro power, ocean and bioenergy are also discussed.

**Course Outcomes:**

1. Ability to evaluate the role of engineer to the society on the application of renewable energy and power generations.
2. Ability to analyze the working principles and performance of the internal combustion engines.
3. Ability to analyze the performance and efficiency of different types of engines
4. Ability to synthesis the lifelong-learning on the production of energy and power harvest from solar panels, also the processing of biofuels, biodiesel and biogas from biological materials.

**MMJ34503 JENTERA LADANG [FARM MACHINERY]****No of Credits: 3****Course Synopsis:**

This course intends to give students fair knowledge of farm machineries and off-road vehicles, their working principles, selection and management for use in agricultural operations. The topics includes tractorization, tillage, machineries for chemical applications, irrigation, planting and also harvesting. The topics also include application of agricultural machinery for optimal selection, operation and performance, and management of farm machinery such as tractors, tillage, seeding, chemical application, biomass and grain/fruit harvesting.

**Course Outcomes:**

1. Ability to evaluate specialized components and mechanized systems for production, handling and processing of biological materials.
2. Ability to compare machine components in agricultural operations and management of machineries.
3. Ability to assess safety & health of farm operator and machinery & systems for appropriate solutions as professional engineer's responsibilities

**MMJ34602 REKA BENTUK KEJURUTERAAN PERTANIAN I [AGRICULTURAL INTEGRATED DESIGN PROJECT I]****No of Credits: 2****Course Synopsis:**

Agricultural Engineering Design I is a part course covering aspects of engineering design related to open-ended design projects at professional level engineering design tasks in the agricultural engineering field. The design project is a team-based approach to provide capstone design experience emphasising the application of sciences, mathematics and engineering science acquired in earlier coursework in the design of projects. The scope of the course covers the knowledge of the elements in project formulation, planning/scheduling, management and communication, engineering economics including cost benefits analysis and budgeting, critical thinking, ethics and safety in engineering design, fundamental in engineering design methodology (the process and tools) and systems engineering.

**Course Outcomes:**

1. Ability to compose engineering problems and alternative solutions and formulate a sound proposal in agricultural engineering project using the systematic design process.
2. Ability to assess the impact of sustainable design and engineering solutions on society and the environment.
3. Ability to differentiate between ethical and legal issues and relate these issues to design projects in the agricultural engineering field.
4. Ability to demonstrate teamwork through weekly group meetings and class presentations.
5. Ability to evaluate economic feasibility study and project planning and management of a design project in the agricultural engineering field



**MMJ34703 OPERASI UNIT [UNIT OPERATION]****No of Credits: 3****Course Synopsis:**

This course intends to give students fair knowledge of unit operations in food and agro-based processing industries. The topics in this course includes basic knowledge of engineering in material and energy balances for selected unit operations in the industries. The other topics cover on drying, evaporation, raw material preparation, size reduction, mixing and separations.

**Course Outcomes:**

1. Ability to apply a basic principle of material, energy balances and drying in agro-based industries
2. Ability to assess separation operations and equipment in food and agro-based industries
3. Ability to design size reduction and mixing operation for food and agro-based industries
4. Ability to evaluate a basic design for single, multiple effects evaporators and drying equipment.

**MMJ34803 REKA BENTUK SISTEM AUTOMASI [DESIGN OF AUTOMATION SYSTEMS]****No of Credits: 3****Course Synopsis:**

This course covers the principles of automation and sensor technology applied in agricultural fields. It also includes the components of automation systems such as sensors, controllers, actuators and drive systems. Students will also be introduced to design of automation system using microprocessor programming to control sensors and actuators to create solutions for the complex engineering problems..

**Course Outcomes:**

1. Ability to analyze complex engineering problems of the sensors, actuators and drive systems in agricultural automation technology
2. Ability to design solution for automation systems in agricultural engineering using actuator and drive systems controlled by microcontroller programming
3. Ability to organize work effectively as an individual, and as a member or leader in diverse teams to create solution for complex engineering problems.
4. Ability to defend the proposed design on automation system in agricultural engineering through effective oral and written communication skills.

**MMJ34902 MODELLING AND SIMULATION [PEMODELAN DAN SIMULASI]****No of Credits: 2****Course Synopsis:**

The course advances students on concepts of systems analysis, modeling, and computer simulation of agricultural and biological systems. The primary focus is on developing knowledge and skills to construct static as well as dynamic models and perform sensitivity analysis, parameter estimation, and model evaluation. Review and analysis of models in agricultural and biological systems emphasizing crops and the environment are also covered. Laboratory work using Python enhances student's ability to simulate biological systems. A group project culminates the course.

**Course Outcomes:**

1. Ability to formulate mathematical models governing biological and physical behaviors of agricultural/biological systems.
2. Ability to construct computer programming to model and/or simulate agricultural or biological systems behaviors and responses.
3. Ability to demonstrate working effectively in teams in solving complex engineering problems related to agricultural/biological systems.
4. Ability to prepare a modelling or simulation report on agricultural/biological systems problems using various information and lifelong learning strategies

**MMJ44003 REKA BENTUK KEJURUTERAAN PERTANIAN II [AGRICULTURAL INTEGRATED DESIGN PROJECT II]****No of Credits: 3****Course Synopsis:**

This course covers topics on design aspects within related agricultural engineering thematic areas, including (but not limited to) automation and emerging technologies, machine systems, postharvest technology, structures and environment, soil and water, information technology, sustainable agriculture, and cutting across several important food and industrial crops. The scope of the course is to design components, equipment, processes, and systems to meet desired project needs within realistic constraints and to comprehend diverse and fast-changing technology and open-ended design problems in agricultural engineering and technology fields. The use of modern engineering design practices, tools, product/solution development process, troubleshooting methodology, learning and utilising a realistic simulation of the real-world design process, engineering analysis, and synthesis through their projects. Knowledge integration from other courses is required to identify, solve, and design solutions for complex engineering problems.

**Course Outcomes:**

1. Ability to apply knowledge of engineering fundamentals to solve complex engineering problems.
2. Ability to formulate solutions that properly address critical issues and assumptions that are conceptually and contextually valid and meet client expectations.
3. Ability to use modern engineering tools and software to design components, equipment, processes, and systems in agricultural engineering.
4. Ability to communicate on engineering design with written report and presentation.
5. Ability to prepare design report through the utilisation of diverse information sources and life-long learning strategies.
6. Ability to apply clear reasoning for adopting relevant design considerations associated with professional engineering practice.

**MMJ44103 PERTANIAN PERSIS [PRECISION AGRICULTURE]****No of Credits: 3****Course Synopsis:**

This course focuses on the concepts of precision agriculture. This course discusses on the Global Positioning System (GPS), Geographic Information System (GIS) and remote sensing technologies as the backbone of the precision agriculture. This

course elaborates on the sensing technology specific for sensing natural soil properties for effective variable rate fertilizing, crop properties for nutrients intake and uptake, site specific weed control, and yield recording. Using various information from the sensing technologies, map overlay and management zone is derived for site specific precision agriculture using available GIS software.

**Course Outcomes:**

1. Ability to analyse the concept of precision agriculture, GIS, GPS, and remote sensing for sustainable agricultural production.
2. Ability to assess the importance of the management zone in precision agriculture from the sensing elements including soil, crop, yield, weed and disease in the context of safety, health and cultural issues
3. Ability to propose solutions by investigating and analysing data using precision agriculture software/hardware technologies.

**MMJ44403 PEMBUATAN BIOPRODUK [BIOPRODUCT MANUFACTURING]****No of Credits: 3****Course Synopsis:**

This course offers a comprehensive understanding of the components, facilities, and processes necessary for manufacturing biological products in the food and agriculture sectors. It also covers process development and the practical use of pilot plant facilities. Furthermore, it highlights the importance of adhering to stringent standards and ethical practices in bioproduct manufacturing. By the course's conclusion, students will be capable of designing and proposing manufacturing processes while recognizing the ethical and regulatory considerations essential for maintaining high standards in their work.

**Course Outcomes:**

1. Ability to select the process of innovation and the need for sustainable development for the production and manufacturing of bio-based and agricultural products.
2. Ability to design the process related to the manufacturing production of food and agricultural products.
3. Ability to evaluate the importance of standards in bioproduct manufacturing in accordance with good practices and ethics.

**MMJ44503 CONTROLLED ENVIRONMENT ENGINEERING [KEJURUTERAAN PERSEKITARAN TERKAWAL]****No of Credits: 3****Course Synopsis:**

The course covers thermal and environmental engineering design and analyses appropriate for controlled environment agricultural related production facilities for plants, animals and aquaculture. Major topics include psychrometric, heat and mass transfer, ventilation, cooling and heating, air distribution within controlled environment buildings.

**Course Outcomes:**

1. Ability to analyze knowledge of heat and mass transfer in plant, animal, and aquaculture structures.
2. Ability to design natural and force ventilation, cooling and/or heating systems for plants, animals, and aquaculture structures.
3. Ability to appraise and value the existing design and operations of controlled environment agricultural production systems with respect to engineering, economics, as well as management by means of a groupwork project.

**MMJ44703 KEJURUTERAAN LEPAS TUAI [POSTHARVEST ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course focuses on the postharvest management and processes involved after harvesting highly perishable agricultural produces as well as grains. The course discusses the types and causes of spoilage in storage, conditions for storage such as functional requirements of storage with emphasis on highly perishable agricultural produce as well as cereal grains, control of temperature and relative humidity inside storage, and calculation of refrigeration load, designing conditioning of environment inside storage through natural, mechanical ventilation and cooling. This course covers the importance of moisture content in agricultural products, principle of drying, method and mechanisms of drying and the drying curve. The course also elaborates on different types of dryers, their performances, energy utilization and efficiency in relation to drying and dehydration of agricultural products. Finally the course discusses on the transportation method based on the cold chain network of the refrigerated agricultural produce for fresh and longer shelf life products.

**Course Outcomes:**

1. Ability to analyse the postharvest treatments and spoilage mechanism for safe handlings of highly perishable agricultural produce.

2. Ability to evaluate the refrigeration capacity in maintaining the quality of agricultural produce for transportation.
3. Ability to propose the appropriate conditioning based on the drying principles for highly perishable agricultural produce.

**UR6521002****Bachelor of Mechanical Engineering Technology (Machining) With Honours****PROGRAMME EDUCATIONAL OBJECTIVES (PEO)****PEO 1**

Engineering technology graduates engaged in the field of mechanical engineering technology as demonstrated through career advancement.

**PEO 2**

Engineering technology graduates who are members and contribute to professional society.

**PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities

**PEO 4**

Engineering technology graduates who are technopreneurs..

## PROGRAMME OUTCOMES (PO)

### P01

**Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialisation to defined and applied engineering procedures, processes, systems or methodologies.

### P02

**Problem Analysis:** Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialisation.

### P03

**Design/ development of solutions:** Design solutions for broadly-defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations

### P04

**Investigation:** Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, data bases and literature, design and conduct experiments to provide valid conclusions.

### P05

**Modern Tool Usage:** Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to broadly-defined engineering problems, with an understanding of the limitations.

### P06

**The Engineer and Society:** Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and solutions to broadly-defined engineering problems.

### P07

**Environment and Sustainability:** Understand the impact of engineering technology solutions of broadly-defined engineering problems in societal and environmental context and demonstrate knowledge of and need for sustainable development.

### P08

**Ethics:** Understand and commit to professional ethics and responsibilities and norms of engineering technology practice.

### P09

**Individual and Teamwork:** Function effectively as an individual, and as a member or leader in diverse technical teams.

### P010

**Communication:** Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments.

### P012

**Lifelong learning:** Recognize the need for, and have the ability to engage in independent and life-long learning in specialist technologies.

| CURRICULUM STRUCTURE                                                                  |                                                      |                                                       |                                                              |                                                          |                                                 |                                           |                                                 |                                 |
|---------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------|-------------------------------------------|-------------------------------------------------|---------------------------------|
| UR6521002 MECHANICAL ENGINEERING TECHNOLOGY (MACHINING) WITH HONOURS INTAKE 2024/2025 |                                                      |                                                       |                                                              |                                                          |                                                 |                                           |                                                 |                                 |
| YEAR                                                                                  | FIRST                                                |                                                       | SECOND                                                       |                                                          | THIRD                                           |                                           | FOURTH                                          |                                 |
| SEMESTER                                                                              | 1                                                    | 2                                                     | 3                                                            | 4                                                        | 5                                               | 6                                         | 7                                               | 8                               |
| <b>DISCIPLINE CORE &amp; ELECTIVE COURSES</b><br>(109 CREDITS)                        | MMK10103<br>Material Science                         | MMK11203<br>Fluid Mechanics                           | MMK11603<br>Computer Aided Design                            | MMK21103<br>Computer Aided Engineering                   | MMK32303<br>Geometric, Dimensioning & Tolerance | MMK31204<br>Final Year Project I          | MMK41206<br>Final Year Project II               | MMK49912<br>Industrial Training |
|                                                                                       | MMK10203<br>Statics & Dynamics                       | MMK11502<br>Manufacturing Technology                  | MMK20203<br>Strength of Materials                            | MMK11403<br>Project Management                           | MMK32403<br>Jigs & Fixtures Design              | MMK31103<br>Ergonomic & Safety            | Elective II                                     |                                 |
|                                                                                       | MMK10403<br>Engineering Graphics                     | MMK11103<br>Quality Control                           | MMK20103<br>Thermodynamics                                   | MMK11302<br>Computer Programming                         | MMK32503<br>Sustainable Machining               | MMK33104<br>Machining Project             | Elective III                                    |                                 |
|                                                                                       | MMK10502<br>Workshop Technology                      | MMK10303<br>Basic Electrical & Electronic             | MMK22104<br>Conventional Machining                           | MMK21203<br>Heat Transfer                                | MMK32603<br>Computer Aided Manufacturing        | MMK32703<br>Advanced Machining Technology |                                                 |                                 |
|                                                                                       |                                                      | MMK12103<br>Theory in Machining                       |                                                              | MMK22204<br>CNC Technology                               | MMK32103<br>Manufacturing Economics             | Elective I                                |                                                 |                                 |
| <b>COMMON CORE COURSES</b><br>(15 CREDITS)                                            | QMQ11103<br>Mathematics For Engineering Technology I | QMQ11203<br>Mathematics For Engineering Technology II | QMQ21303<br>Mathematics For Engineering Technology III       |                                                          |                                                 |                                           | MMK31303<br>Engineering Technologist in Society |                                 |
|                                                                                       |                                                      |                                                       |                                                              |                                                          |                                                 |                                           | MMK30103<br>Engineering Technology Management   |                                 |
| <b>UNIVERSITY REQUIREMENT COURSES</b><br>(16 CREDITS)                                 | SMU13002<br>Philosophy and Current Issues            | SMZXXX01<br>Co-Curriculum II                          | SMB20102<br>English for General Communication <sup>[4]</sup> | SMU12102<br>Integrity and Anti-Corruption <sup>[3]</sup> |                                                 |                                           |                                                 |                                 |
|                                                                                       | SMB41002<br>University Malay Language <sup>[2]</sup> |                                                       | SMU22402<br>Engineering Entrepreneurship                     | SMU13102<br>Appreciation of Ethics and Civilizations     |                                                 |                                           |                                                 |                                 |
|                                                                                       | SMZXXX01<br>Co-curriculum I                          |                                                       | SMB31202<br>English for Technical Communication              |                                                          |                                                 |                                           |                                                 |                                 |
| <b>TOTAL CREDITS</b><br>(140 CREDITS)                                                 | <b>19</b>                                            | <b>16</b>                                             | <b>18</b>                                                    | <b>19</b>                                                | <b>21</b>                                       | <b>17</b>                                 | <b>18</b>                                       | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                                  |                                                      | SMB10102<br>Preparatory English <sup>[1]</sup>        |                                                              |                                                          |                                                 |                                           |                                                 |                                 |

Elective I : MMK33103 Alloy & Metal Composite, MMK33203 Plastic Injection Moulding Simulation, MMK33303 Computational Fluid Dynamics.

Elective II : MMK43403 Modern Grinding Technology, MMK43503 Non-Destructive Testing, MMK43603 Noise and Vibration.

Elective III : MMK43703 Cutting Tool Technology, MMK43803 Advanced Characterization Process,

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[3] International students should register SMU13202 Malaysian Studies.

[4] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.



## **UR6521003**

### **Bachelor of Mechanical Engineering Technology (Agricultural Systems) with Honours**

#### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

##### **PEO 1**

Engineering technology graduates engaged in the field of mechanical engineering technology as demonstrated through career advancement.

##### **PEO 2**

Engineering technology graduates who are members and contribute to professional society

##### **PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities.

##### **PEO 4**

Engineering technology graduates who are technopreneurs

## PROGRAMME OUTCOMES (PO)

### P01

**Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to defined and applied engineering procedures, processes, systems, or methodologies.

### P02

**Problem Analysis:** Identify, formulate, research literature and analyze broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialization.

### P03

**Design/development of solutions:** Design solutions for broadly-defined engineering technology problems, and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

### P04

**Investigation:** Conduct investigations of broadly-defined problems, locate, search and select relevant data from codes, data bases and literature, design and conduct experiments to provide valid conclusions.

### P05

**Modern Tool Usage:** Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling to broadly-defined engineering problems, with an understanding of their limitations.

### P06

**The Engineer and Society:** Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and solutions to broadly-defined engineering problems.

### P07

**Environment and Sustainability:** Understand the impact of engineering technology solutions of broadly-defined engineering problems in societal and environmental context and demonstrate knowledge of and need for sustainable development.

### P08

**Ethics:** Understand and commit to professional ethics and responsibilities and norms of engineering technology practice.

### P09

**Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse technical teams.

### P010

**Communications:** Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments.

### P012

**Life-Long Learning:** Recognize the need for professional and have the ability to engage in independent and life-long learning in specialist technologist

| CURRICULUM STRUCTURE                                                                                         |                                                      |                                                              |                                                        |                                                             |                                                      |                                                 |                                                                |                                 |
|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------|---------------------------------|
| UR6521003 BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (AGRICULTURAL SYSTEMS) WITH HONOURS INTAKE 2024/2025 |                                                      |                                                              |                                                        |                                                             |                                                      |                                                 |                                                                |                                 |
| YEAR                                                                                                         | FIRST                                                |                                                              | SECOND                                                 |                                                             | THIRD                                                |                                                 | FOURTH                                                         |                                 |
| SEMESTER                                                                                                     | 1                                                    | 2                                                            | 3                                                      | 4                                                           | 5                                                    | 6                                               | 7                                                              | 8                               |
| <b>DISCIPLINE CORE &amp; ELECTIVE COURSES</b><br>(109 CREDITS)                                               | MMK10103<br>Material Science                         | MMK10303<br>Basic Electrical and Electronic                  | MMK20103<br>Thermodynamics                             | MMK21203<br>Heat Transfer                                   | MMK34103<br>Automations in Agricultural Systems      | MMK31204<br>Final Year Project 1                | MMK41206<br>Final Year Project 2                               | MMK49912<br>Industrial Training |
|                                                                                                              | MMK10203<br>Static and Dynamic                       | MMK11203<br>Fluid Mechanics                                  | MMK20203<br>Strength of Materials                      | MMK24103<br>Pneumatic and Hydraulic Systems                 | MMK11403<br>Project Management                       | MMK34203<br>Agricultural Design Project]        | MMK44103<br>Farm Power and Machinery                           |                                 |
|                                                                                                              | MMK10403<br>Engineering Graphics                     | MMK11603<br>Computer Aided Design                            | MMK21103<br>Computer Aided Engineering                 | MMK24203<br>Instrumentation and Control                     | MMK11103<br>Quality Control                          | MMK31103<br>Ergonomic and Safety                | MMK45103<br>Agricultural waste Management and Utilization Eng. |                                 |
|                                                                                                              | MMK10502<br>Workshop Technology                      | MMK11502<br>Manufacturing Technology                         | MMK11302<br>Computer Programming                       | MMK25202<br>Soil Engineering                                | MMK35103<br>Post-Harvest Technology                  | Elektif I/3<br>Elective I/3                     | Elective II/3                                                  |                                 |
|                                                                                                              | MMK15103<br>Applied Biology                          | MMK15202<br>Introduction to Agriculture                      | MMK25103<br>Plantation Crop Production Technology      | MMK25303<br>Livestock and Aquaculture Production Technology |                                                      |                                                 |                                                                |                                 |
|                                                                                                              |                                                      |                                                              |                                                        | MMK25402<br>Food Crop Production Technology                 |                                                      |                                                 |                                                                |                                 |
| <b>COMMON CORE COURSES</b><br>(15 CREDITS)                                                                   | QMQ11103<br>Mathematics for Engineering Technology I | QMQ11203<br>Mathematics for Engineering Technology II        | QMQ21303<br>Mathematics for Engineering Technology III |                                                             | MMK30103<br>Engineering Technology Management        | MMK31303<br>Engineering Technologist in Society |                                                                |                                 |
| <b>UNIVERSITY REQUIREMENT COURSES</b><br>(16 CREDITS)                                                        | SMB41002<br>University Malay Language <sup>[2]</sup> | SMB20102<br>English for General Communication <sup>[4]</sup> | SMB31202<br>English for Technical Communication        | SMU12102<br>Integrity and Anti-Corruption <sup>[3]</sup>    | SMU13102<br>Appreciation of Ethics and Civilizations | SMU13002<br>Philosophy and Current Issues       |                                                                |                                 |
|                                                                                                              | SMZXXX01<br>Co-curriculum I                          | SMZXXX01<br>Co-Curriculum II                                 |                                                        | SMU22402<br>Engineering Entrepreneurship                    |                                                      |                                                 |                                                                |                                 |
| <b>TOTAL CREDITS</b><br>(140 CREDITS)                                                                        | <b>20</b>                                            | <b>19</b>                                                    | <b>19</b>                                              | <b>20</b>                                                   | <b>17</b>                                            | <b>18</b>                                       | <b>15</b>                                                      | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                                                         | SMB10102<br>Preparatory English <sup>[1]</sup>       |                                                              |                                                        |                                                             |                                                      |                                                 |                                                                |                                 |

Elective I : MMK35203 Precision Farming Technology, MMK35303 Renewable Energy in Agriculture Systems

Elective II : MMK45203 Controlled Environment for Agriculture, MMK45303 Food Processing Engineering

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[3] International students should register SMU13202 Malaysian Studies.

[4] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

**UR6521004****Bachelor of Mechanical Engineering Technology (Product Design) with Honours****PROGRAMME EDUCATIONAL OBJECTIVES (PEO)****PEO 1**

Engineering technology graduates engaged in the field of mechanical engineering technology as demonstrated through career advancement.

**PEO 2**

Engineering technology graduates who are members and contribute to professional society

**PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities

**PEO 4**

Engineering technology graduates who are technopreneurs.



## PROGRAMME OUTCOMES (PO)

### P01

**Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialisation to defined and applied engineering procedures, processes, systems or methodologies. (SK1 to SK4)

### P02

**Problem Analysis:** Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialisation. (SK1 to SK4)

### P03

**Design/ development of solutions:** Design solutions for broadly-defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (SK5)

### P04

**Investigation:** Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, data bases and literature, design and conduct experiments to provide valid conclusions. (SK8)

### P05

**Modern Tool Usage:** Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to broadly-defined engineering problems, with an understanding of the limitations. (SK6)

### P06

**The Engineer and Society:** Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and solutions to broadly-defined engineering problems. (SK7)

### P07

**Environment and Sustainability:** Understand the impact of engineering technology solutions of broadly-defined engineering problems in societal and environmental context and demonstrate knowledge of and need for sustainable development. (SK7)

### P08

**Ethics:** Understand and commit to professional ethics and responsibilities and norms of engineering technology practice. (SK7)

### P09

**Individual and Teamwork:** Function effectively as an individual, and as a member or leader in diverse technical teams.

### P010

**Communication:** Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments.

### P012

**Lifelong learning:** Recognize the need for, and have the ability to engage in independent and life-long learning in specialist technologies

| CURRICULUM STRUCTURE                                                                                   |                                                           |                                                            |                                                                 |                                                                |                                                                  |                                                         |                                                       |                                   |
|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------|-----------------------------------|
| UR6521004 BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (PRODUCT DESIGN) WITH HONOURS INTAKE 2024/2025 |                                                           |                                                            |                                                                 |                                                                |                                                                  |                                                         |                                                       |                                   |
| YEAR                                                                                                   | FIRST                                                     |                                                            | SECOND                                                          |                                                                | THIRD                                                            |                                                         | FOURTH                                                |                                   |
| SEMESTER                                                                                               | 1                                                         | 2                                                          | 3                                                               | 4                                                              | 5                                                                | 6                                                       | 7                                                     | 8                                 |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES<br/>(109 CREDITS)</b>                                | MMK10203<br>Statics and<br>Dynamics                       | MMK10103<br>Materials Science                              | MMK20203<br>Strength<br>Of Materials                            | MMK21203<br>Heat Transfer                                      | MMK11403<br>Project<br>Management                                | MMK31204<br>Final Year Project I                        | MMK41206<br>Final Year Project II                     | MMK49912 I<br>Industrial Training |
|                                                                                                        | MMK10403<br>Engineering<br>Graphics                       | MMK11603<br>Computer Aided<br>Design (CAD)                 | MMK26003<br>Computer Aided<br>Design II (CAD II)                | MMK21103<br>Computer Aided<br>Engineering (CAE)                | MMK36003<br>Computer Aided<br>Engineering II (CAE II)            | MMK31103<br>Ergonomic And<br>Safety                     |                                                       |                                   |
|                                                                                                        | MMK10303<br>Basic Electrical &<br>Electronics             | MMK11203<br>Fluid Mechanics                                | MMK20103<br>Thermodynamics                                      | MMK11302<br>Computer<br>Programming                            |                                                                  |                                                         |                                                       |                                   |
|                                                                                                        | MMK10502<br>Workshop<br>Technology                        | MMK11103<br>Quality Control                                |                                                                 |                                                                | MMK37403<br>Innovation<br>Management &<br>Product<br>Development | Elective I-3                                            | MMK47703<br>Design For<br>Manufacture &<br>Assembly   |                                   |
|                                                                                                        | MMK11502<br>Manufacturing<br>Technology                   |                                                            | MMK26203<br>Prototyping And<br>Model Making                     | MMK26103<br>Reverse Engineering<br>& Additive<br>Manufacturing | MMK36503<br>Industrial Revolution                                | Elective II-3                                           |                                                       |                                   |
|                                                                                                        | MMK17003<br>Basic Industrial<br>Design                    | MMK17103<br>Design Visualization                           | MMK27303<br>Design Studio I                                     | MMK27203<br>Design Integration                                 | MMK36403<br>Design Studio II                                     |                                                         |                                                       |                                   |
| <b>COMMON<br/>CORE COURSES<br/>(15 CREDITS)</b>                                                        | QM11103<br>Mathematics for<br>Engineering<br>Technology I | QM11203<br>Mathematics for<br>Engineering<br>Technology II | QM12103<br>Mathematics for<br>Engineering<br>Technology III     |                                                                |                                                                  | MMK30103<br>Engineering<br>Technology<br>Management     | MMK31303<br>Engineering<br>Technologist in<br>Society |                                   |
| <b>UNIVERSITY<br/>REQUIREMENT COURSES<br/>(16 CREDITS)</b>                                             | SMZXXX01<br>Co-curriculum I                               | SMZXXX01<br>Co-Curriculum II                               | SMB20102<br>English for General<br>Communication <sup>[4]</sup> | SMU22402<br>Engineering<br>Entrepreneurship                    | SMB31202<br>English for Technical<br>Communication               | SMU13002<br>Philosophy and Current<br>Issues            |                                                       |                                   |
|                                                                                                        |                                                           |                                                            |                                                                 | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[3]</sup>   |                                                                  | SMU13102<br>Appreciation of Ethics<br>and Civilizations |                                                       |                                   |
|                                                                                                        |                                                           |                                                            |                                                                 | SMB41002<br>University Malay<br>Language <sup>[2]</sup>        |                                                                  |                                                         |                                                       |                                   |
| <b>TOTAL CREDITS<br/>(140 CREDITS)</b>                                                                 | <b>20</b>                                                 | <b>19</b>                                                  | <b>20</b>                                                       | <b>20</b>                                                      | <b>17</b>                                                        | <b>20</b>                                               | <b>12</b>                                             | <b>12</b>                         |
| <b>AUDIT COURSES</b>                                                                                   |                                                           | SMB10102<br>Preparatory<br>English <sup>[1]</sup>          |                                                                 |                                                                |                                                                  |                                                         |                                                       |                                   |

Elective I : **MMK37503 PRODUCTION MANAGEMENT FOR DESIGNERS** OR **MMK37603 PRODUCT STUDY & PROFESSIONAL PRACTICE**

Elective II : **MMK37703 DESIGN VISUALIZATION II** OR **MMK37803 DESIGN FOR MEDICAL DEVICE**

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[3] International students should register SMU13202 Malaysian Studies.

[4] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.



# **UR6543001**

## **Bachelor of Mechanical Engineering Technology (Material Processing) with Honours**

### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

#### **PEO 1**

Engineering technology graduates engaged in the field of mechanical engineering technology as demonstrated through career advancement.

#### **PEO 2**

Engineering technology graduates who are members and contribute to professional society

#### **PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities.

#### **PEO 4**

Engineering technology graduates who are technopreneurs.

## PROGRAMME OUTCOMES (PO)

### P01

**Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialisation to defined and applied engineering procedures, processes, systems or methodologies.

### P02

**Problem Analysis:** Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialisation.

### P03

**Design/ development of solutions:** Design solutions for broadly-defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

### P04

**Investigation:** Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, data bases and literature, design and conduct experiments to provide valid conclusions.

### P05

**Modern Tool Usage:** Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to broadly-defined engineering problems, with an understanding of the limitations.

### P06

**The Engineer and Society:** Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and solutions to broadly-defined engineering problems

### P07

**Environment and Sustainability:** Understand the impact of engineering technology solutions of broadly-defined engineering problems in societal and environmental context and demonstrate knowledge of and need for sustainable development.

### P08

**Ethics:** Understand and commit to professional ethics and responsibilities and norms of engineering technology practice.

### P09

**Individual and Teamwork:** Function effectively as an individual, and as a member or leader in diverse technical teams.

### P010

**Communication:** Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments.

### P012

**Lifelong learning:** Recognize the need for, and have the ability to engage in independent and life-long learning in specialist technologies.

| CURRICULUM STRUCTURE                                                                                        |                                                      |                                                       |                                                              |                                                      |                                                      |                                                          |                                                                  |                                 |
|-------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------|--------------------------------------------------------------|------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------------|---------------------------------|
| UR6543001 BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (MATERIAL PROCESSING) WITH HONOURS INTAKE 2024/2025 |                                                      |                                                       |                                                              |                                                      |                                                      |                                                          |                                                                  |                                 |
| YEAR                                                                                                        | FIRST                                                |                                                       | SECOND                                                       |                                                      | THIRD                                                |                                                          | FOURTH                                                           |                                 |
| SEMESTER                                                                                                    | 1                                                    | 2                                                     | 3                                                            | 4                                                    | 5                                                    | 6                                                        | 7                                                                | 8                               |
| <b>DISCIPLINE CORE &amp; ELECTIVE COURSES</b><br>(109 CREDITS)                                              | MMK10103<br>Material Science                         | MMK11203<br>Fluid Mechanics                           | MMK11603<br>Computer-Aided Design                            | MMK21103<br>Computer Aided Engineering               | MMK38103<br>Process Control                          | MMK31204<br>Final Year Project I                         | MMK41206<br>Final Year Project II                                | MMK49912<br>Industrial Training |
|                                                                                                             | MMK10203<br>Statics & Dynamics                       | MMK11502<br>Manufacturing Technology                  | MMK20203<br>Strength of Materials                            | MMK21203<br>Heat Transfer                            | MMK38303<br>Metal Fabrication Technology             | MMK31103<br>Ergonomic & Safety                           | MMK48103<br>Material for Energy and Environmental Sustainability |                                 |
|                                                                                                             | MMK10403<br>Engineering Graphics                     | MMK11103<br>Quality Control                           | MMK20103<br>Thermodynamics                                   | MMK28303<br>Whiteware Ceramic Processing             | MMK33203<br>Plastic Injection Molding Simulation     | MMK38503<br>Materials Selection and Design               | Elective III                                                     |                                 |
|                                                                                                             | MMK10502<br>Workshop Technology                      | MMK11403<br>Project Management                        | MMK28103<br>Materials Testing                                | MMK28403<br>Metal Extraction Technology              | MMK38403<br>Composite Materials Processing           | Elective II                                              |                                                                  |                                 |
|                                                                                                             | MMK10303<br>Basic Electrical & Electronics           | MMK11302<br>Computer Programming                      | MMK28203<br>Materials Characterization                       | MMK28503<br>Plastic Processing                       | Elective I                                           |                                                          |                                                                  |                                 |
| <b>COMMON CORE COURSES</b><br>(15 CREDITS)                                                                  | QMQ11103<br>Mathematics for Engineering Technology I | QMQ11203<br>Mathematics for Engineering Technology II | QMQ21303<br>Mathematics for Engineering Technology III       |                                                      |                                                      | MMK30103<br>Engineering Technology Management            | MMK31303<br>Engineering Technologist in Society                  |                                 |
| <b>UNIVERSITY REQUIREMENT COURSES</b><br>(16 CREDITS)                                                       | SMU13002<br>Philosophy and Current Issues            | SMZXXX01<br>Co-Curriculum II                          | SMB20102<br>English for General Communication <sup>[4]</sup> | SMU22402<br>Engineering Entrepreneurship             | SMB41002<br>University Malay Language <sup>[2]</sup> | SMU12102<br>Integrity and Anti-Corruption <sup>[3]</sup> |                                                                  |                                 |
|                                                                                                             | SMZXXX01<br>Co-curriculum I                          |                                                       |                                                              | SMU13102<br>Appreciation of Ethics and Civilizations |                                                      | SMB31202<br>English for Technical Communication          |                                                                  |                                 |
| <b>TOTAL CREDITS</b><br>(140 CREDITS)                                                                       | <b>20</b>                                            | <b>17</b>                                             | <b>20</b>                                                    | <b>19</b>                                            | <b>17</b>                                            | <b>20</b>                                                | <b>15</b>                                                        | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                                                        |                                                      | SMB10102<br>Preparatory English <sup>[1]</sup>        |                                                              |                                                      |                                                      |                                                          |                                                                  |                                 |

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[3] International students should register SMU13202 Malaysian Studies.

[4] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

**LIST OF COURSES**

| COURSE CODE | COURSE NAME                                                       |
|-------------|-------------------------------------------------------------------|
| MMK10103    | Sains Bahan [Materials Science]                                   |
| MMK10203    | Statik dan Dinamik [Statics and Dynamics]                         |
| MMK10303    | Asas Elektrikal dan Elektronik [Basic Electrical and Electronics] |
| MMK10403    | Grafik Kejuruteraan [Engineering Graphics]                        |
| MMK10502    | Teknologi Bengkel [Workshop Technology]                           |
| MMK11103    | Kawalan Kualiti [Quality Control]                                 |
| MMK11203    | Mekanik Bendalir [Fluid Mechanics]                                |
| MMK11302    | Pengaturcaraan Komputer [Computer Programming]                    |
| MMK11403    | Pengurusan Projek [Project Management]                            |
| MMK11502    | Teknologi Pembuatan [Manufacturing Technology]                    |
| MMK20103    | Termodinamik [Thermodynamics]                                     |
| MMK20203    | Kekuatan Bahan [Strength of Materials]                            |
| MMK11603    | Rekabentuk Berbantu Komputer [Computer Aided Design]              |
| MMK21103    | Kejuruteraan Berbantu Komputer [Computer Aided Engineering]       |
| MMK21203    | Pemindahan Haba [Heat Transfer]                                   |
| MMK32103    | Ekonomi Pembuatan [Manufacturing Economics]                       |
| MMK33104    | Projek Pemesinan [Machining Project]                              |
| MMK12103    | Teori Dalam Pemesinan [Theory in Machining]                       |
| MMK22104    | Pemesinan Kovensional [Coventional Machining]                     |

| COURSE CODE | COURSE NAME                                                                    |
|-------------|--------------------------------------------------------------------------------|
| MMK22204    | Teknologi CNC [CNC Technology]                                                 |
| MMK31103    | Ergonomik dan Keselamatan [Ergonomics and Safety]                              |
| MMK31204    | Projek Tahun Akhir I [Final Year Project I]                                    |
| MMK41206    | Projek Tahun Akhir II [Final Year Project II]                                  |
| MMK32303    | Geometri, Pendimensian dan Toleransi [Geometric, Dimensioning and Tolerancing] |
| MMK32403    | Rekabentuk Jig dan Lekapan [Jig and Fixture Design]                            |
| MMK32503    | Pemesinan Mapan [Sustainable Machining]                                        |
| MMK32603    | Pembuatan Berbantu Komputer [Computer Aided Manufacturing]                     |
| MMK32703    | Teknologi Pemesinan Termaju [Advanced Machining Technology]                    |
| MMK33103    | Aloi dan Komposit Logam [Alloy & Metal Composite]                              |
| MMK33203    | Simulasi Suntikan Acuan Plastik [Plastic Injection Moulding Simulation]        |
| MMK33303    | Pengkomputeran Dinamik Bendalir [Computational Fluid Dynamics]                 |
| MMK43403    | Teknologi Pengisaran Moden [Modern Grinding Technology]                        |
| MMK43503    | Ujian Tak Musnah [Non-Destructive Testing]                                     |
| MMK43603    | Hingar & Getaran [Noise and Vibration]                                         |
| MMK43703    | Teknologi Mata Alat Pemetong [Cutting Tool Technology]                         |
| MMK43803    | Proses Pencirian Termaju [Advanced Characterization Process]                   |
| MMK30103    | Pengurusan Teknologi Kejuruteraan [Engineering Technology Management]          |
| MMK31303    | Teknologi Kejuruteraan Dalam Masyarakat [Engineering Technologist in Society]  |

| COURSE CODE | COURSE NAME                                                                                                         |
|-------------|---------------------------------------------------------------------------------------------------------------------|
| MMK49912    | Latihan Industri [Industrial Training]                                                                              |
| MMK15103    | Biologi Gunaan[Applied Biology]                                                                                     |
| MMK15202    | Pengenalan kepada Pertanian [Introduction to Agriculture]                                                           |
| MMK25103    | Teknologi Pengeluaran Tanaman Ladang [Plantation Crop Production Technology]                                        |
| MMK24103    | Sistem Hidraulik dan Pneumatik [Pneumatic and Hydraulic Systems]                                                    |
| MMK24204    | Kawalan dan Instrumentasi [Instrumentation and Control]                                                             |
| MMK25202    | Kejuruteraan Tanah [Soil Engineering]                                                                               |
| MMK25303    | Teknologi Pengeluaran Akuakultur dan Penternakan [Livestock and Aquaculture Production Technology]                  |
| MMK25402    | Teknologi Pengeluaran Tanaman Makanan [Food Crop Production Technology]                                             |
| MMK34103    | Automasi dalam Sistem Pertanian [Automations in Agricultural Systems]                                               |
| MMK35103    | Teknologi Lepas Tuai [Postharvest Technology]                                                                       |
| MMK34203    | Projek Rekabentuk Pertanian [Agricultural Designn Project]                                                          |
| MMK35203    | Teknologi Pertanian Tepat [Precision Farming Technology]                                                            |
| MMK35303    | Tenaga Diperbaharui dalam Sistem Pertanian [Renewable Energy in Agriculture Systems]                                |
| MMK44103    | Jentera dan Kuasa Ladang [Farm Power and Machinery]                                                                 |
| MMK45103    | Pengurusan Sisa Pertanian dan Kejuruteraan Kepenggunaan [Agricultural Waste Management and Utilization Engineering] |
| MMK45203    | Persekitaran Terkawal dalam Pertanian [Controlled Environment in Agriculture]                                       |
| MMK45303    | Kejuruteraan Pemprosesn Makanan [Food Processing Engineering]                                                       |
| MMK17003    | Asas Reka Bentuk Industri [Basic Industrial Design]                                                                 |



| COURSE CODE | COURSE NAME                                                                           |
|-------------|---------------------------------------------------------------------------------------|
| MMK17102    | Reka Bentuk Visual [Design Visualization]                                             |
| MMK26003    | Reka Bentuk Berbantu Komputer II [Computer Aided Design II (CAD II)]                  |
| MMK26103    | Prototaip dan Pembuatan Model [Reverse Engineering & Additive Manufacturing]          |
| MMK26203    | Prototaip dan Pembuatan Model [Prototyping and Model Making ]                         |
| MMK27203    | Reka Bentuk Integrasi [Design Integration]                                            |
| MMK27303    | Reka Bentuk Studio I [Design Studio I]                                                |
| MMK36303    | Kejuruteraan Berbantu Komputer II [Computer Aided Engineering II (CAE II)]            |
| MMK36403    | Studio Reka Bentuk II [Design Studio II]                                              |
| MMK36503    | Revolusi Industri [Industrial Revolution]                                             |
| MMK37403    | Pengurusan Inovasi & Pembangunan Produk [Innovation Management & Product Development] |
| MMK37503    | Pengurusan Produk Bagi Pereka Bentuk [Product Management for Designers]               |
| MMK37603    | Pengkajian Produk dan Amalan Profesional [Product Study and Professional Practice]    |
| MMK37703    | Persembahan Digital [Digital Rendering]                                               |
| MMK37803    | Reka bentuk Untuk Peranti Perubatan [Design for Medical Device]                       |
| MMK47703    | Reka Bentuk Untuk Pembuatan dan Pemasangan [Design for Manufacturing and Assembly]    |
| MMK28103    | Materials Testing                                                                     |
| MMK28203    | Materials Characterization                                                            |
| MMK28303    | Whiteware Ceramic Processing                                                          |
| MMK28403    | Metal Extraction Technology                                                           |

| COURSE CODE | COURSE NAME                                          |
|-------------|------------------------------------------------------|
| MMK28503    | Plastic Processing                                   |
| MMK38103    | Process Control                                      |
| MMK38303    | Metal Fabrication Technology                         |
| MMK38403    | Composite Materials Processing                       |
| MMK38503    | Materials Selection and Design                       |
| MMK48103    | Material for Energy and Environmental Sustainability |

**MMK10103 SAINS BAHAN [MATERIALS SCIENCE]****No Of Credits: 3****Course Synopsis:**

This course introduces students to the historical perspective of materials science and engineering fundamentals characteristics begin from understanding the atomic structures, atomic bonding in solids, crystal structures, mechanical and physical properties of materials. Students will then apply the understanding of the properties of materials through phase diagrams, transformations, and heat treatment processing on ferrous and non-ferrous alloys, polymer and advanced materials.

**Course Outcome:**

1. Ability to differentiate the classification and properties of materials, atomic structures, bonding, crystal structure and imperfections.
2. Ability to follow and analyse the properties of materials using various equipment in laboratory.
3. Ability to manipulate the heat treatment process.
4. Ability to evaluate and explain the optical, microstructure, phase diagram and heat treatment process.

**MMK10203 STATIK DAN DINAMIK [STATICS AND DYNAMICS]****No Of Credits: 3****Course Synopsis:**

This course is mainly divided into two parts; statics and dynamics. In statics, student will be exposed to the basic concepts of engineering mechanics such as forces, moments and friction. They will apply this basic knowledge to analyze the equilibrium of rigid bodies, as well as the stability of a structure. The subject of dynamics will be dealt in two parts: kinematics, which treats only the geometric aspects of the motion, and kinetics, which is the analysis of the forces causing the motion. Analysis regarding kinetic problems will be solved by using acceleration method, principle of work and energy, and principle of impulse and momentum.

**Course Outcome:**

1. Ability to apply the basic principles of physics related to static such as force, moment, Newton's First, second and Third Law, trusses, frame and machine.
2. Ability to analyse the structures and frameworks problems by constructing, sketching and/or drawing free body diagram in ensuring static equilibrium.
3. Ability to apply the kinematics and kinetics for particles and systems of particles.
4. Ability to analyse the planar kinematics and kinetics of a rigid body.

**MMK10303 ASAS ELEKTRIKAL DAN ELEKTRONIK [BASIC ELECTRICAL AND ELECTRONICS]****No Of Credits: 3****Course Synopsis:**

This course intends provide basic knowledge of solving AC electrical circuits. It also covers the fundamentals of electrical machines. The electronics section includes basic semiconductor diodes and transistors as well as the fundamentals of digital systems. At the end of the semester students will be able to understand, analyze and apply basic electrical and electronics concepts and principles.

**Course Outcome:**

1. Ability to demonstrate knowledge of fundamental in basic electrical circuits,
2. Ability to evaluate and relate the knowledge in single phase and three phase AC circuits.
3. Ability to operate equipment in basic electric and electronic circuits.

**MMK10403 GRAFIK KEJURTERAAN [ENGINEERING GRAPHICS]****No Of Credits: 3****Course Synopsis:**

This course provides the skills to students the basics of Engineering Drawing, Computer Aided Drafting (CAD) and their engineering applications. The course covers the detail of Engineering Drawing for beginners followed with projection systems, oblique and isometric sketches. The course also introduced the Computer Aided Drafting using dedicated software, AUTOCAD, which focuses on product design in 2D and 3D environment. Fundamental knowledge in dimensioning and geometrical tolerance (GDT) enhances student's ability in interpreting and assessing information from basic raw data of an engineering drawing.

**Course Outcome:**

1. Ability to demonstrate the basic drafting, sketching engineering components, geometric, dimensioning and tolerancing (GDT) and common term used in engineering drawing.
2. Ability to demonstrate orthographic, auxiliary view, cross section and isometric in engineering drawing.
3. Ability to construct detail and assembly drawing in engineering drawing.

**MMK10502 TEKNOLOGI BENGKEL [WORKSHOP TECHNOLOGY]****No Of Credits: 2****Course Synopsis:**

This course aims to familiarize students with basic workshop technology, practices, and skills. Techniques such as cutting, drilling, filling, joining, fastening, punching, folding, shearing and finishing are among many concepts that will be familiarized. Practical work will help the students to gain effective understanding in the workshop technology course. At the end of this course, students are expected to be able to use modern tools and apply appropriately.

**Course Outcome:**

1. Ability to describe tools and its usage in workshops.
2. Ability to reproduce work practices using specified tools based on given instructions.
3. Ability to apply various workshop tools to produce work specimens with various processes.

**MMK11103 KAWALAN KUALITI [QUALITY CONTROL]****No Of Credits: 3****Course Synopsis:**

This course covers the principles of quality control that can be applied in related fields of chemical engineering. The course covers related process and standard commonly used in industry. The course also discusses on the statistical method and acceptance sampling as tools and techniques that broadly implemented in quality assurance and quality control.

**Course Outcome:**

1. Ability to examine and apply the principles for quality assurance, quality control and management improvement.
2. Ability to formulate the processes in quality assurance and quality control with statistical method.
3. Ability to evaluate the suitable sampling and testing procedure in quality assurance and quality control.

**MMK11203 MEKANIK BENDALIR [FLUID MECHANICS]****No Of Credits: 3****Course Synopsis:**

This course introduces the basic concepts of fluid mechanics, with emphasis on the properties of fluid, pressure and fluid statics, mass, Bernoulli and energy equations, momentum analysis of flow system, internal flows and external flows. These concepts will be applied in experiments for a better real-world understanding of fluid mechanics.

**Course Outcome:**

1. Ability to analyse the properties of fluids, fluid static and fluid flow principle.
2. Ability to analyse internal and external flows.
3. Ability to demonstrate fluid mechanics principles through experiments, modelling of- simulations

**MMK11302 PENGATURCARAAN KOMPUTER [COMPUTER PROGRAMMING]****No Of Credits: 2****Course Synopsis:**

This course introduces basic programming using high level language (C language). The main objective of this course is to prepare the students with the ability of problem solving with programming tools such as organization chart, IPO chart, flowchart and pseudo code and then implement them by developing C program.

**Course Outcome:**

1. Ability to analyze and construct simple and straightforward manner in C Programs.
2. Ability to create and construct C programs with variables, to perform mathematics functions and to configure with desired input/ output.
3. Ability to create and design C Programs with control structure, looping functions and numeric arrays.

**MMK11403 PENGURUSAN PROJEK [PROJECT MANAGEMENT]****No Of Credits: 3****Course Synopsis:**

This course includes the concepts, technique and application tools use in the related organization on business process system on operation and production. With all the topic including forecasting technique, inventory system, quality, design and production management can help to achieve smooth flow in operation system.

**Course Outcome:**

1. Ability to explain the organization structure and the various components, sub-system and function of operation and project management.
2. Ability to analyze production performances such as productivity, quality, process optimization and customer service of the operation and project management.
3. Ability to analyze the quantitative and qualitative techniques for designing.
4. Ability to organizes the locating the production facilities.

**MMK11502 TEKNOLOGI PEMBUATAN [MANUFACTURING TECHNOLOGY]****No Of Credits: 2****Course Synopsis:**

This course explores the manufacturing processes and technologies, which are used in the industry to convert raw material into finished products. This course is divided into four sections, which are the solidification and shaping process, forming process, the joining and assembly process, and special processing and assembly technologies. The solidification and shaping process covers the metal casting and shaping process for plastics. For forming process, the topics cover metal forming and sheet metalworking technologies including rolling, forging, extrusion, cutting, bending, deep drawing, etc. In joining and assembly, the topics cover are welding, soldering, brazing, adhesive bonding, and mechanical fastening. The last part is special processing and assembly technologies, which covers rapid prototyping, micro and nanofabrication technology.

**Course Outcome:**

1. Ability to interpret the concept and principle for solidification and shaping process.
2. Ability to analyze the related problems of metal forming and sheet metalworking process and technology.
3. Ability to analyze the related problems of joining and assembly process and technology.
4. Ability to interpret the concept and principle for special processing and assembly technologies.

**MMK20103 TERMODINAMIK [THERMODYNAMICS]****No Of Credits: 3****Course Synopsis:**

This course covers the basic concepts in thermodynamic laws such as the properties of substances, energy principles, first and second law of thermodynamics which applicable in engineering applications. The course emphasizes the study of energy sources and conservation through its concept and principles.

**Course Outcome:**

1. Ability to analyze the properties of pure substance.
2. Ability to analyze and respond the first law of thermodynamics.
3. Ability to analyze and respond the second law of thermodynamics and entropy changes of the substances.

**MMK20203 KEKUATAN BAHAN [STRENGTH OF MATERIALS]****No Of Credits: 3****Course Synopsis:**

This course is intended to provide the students with clear understanding of theory and application of the principles of mechanics of materials. The important concepts of statics, deformation, stresses, and strain that are exist in a solid body when subjected to external loads are discussed. Students are taught to solve problems of loading on solid bodies under axial, torsion and bending loading conditions. Besides, the state of stress caused by combination of several loadings are presented. Discussion on the stability, support types, and design of column are also covered at the end of the course.

**Course Outcome:**

1. Ability to analyze the basic principles of deformation, stress, and strain in load-bearing structures.
2. Ability to analyze the structures subjected to axial and torsional loading.
3. Ability to evaluate the case of bending in beams and state of stress caused by combined loadings.
4. Ability to evaluate buckling structure supporting axial compressive load.

**MMK11603 REKABENTUK BERBANTU KOMPUTER [COMPUTER AIDED DESIGN]****No Of Credits: 3****Course Synopsis:**

This course focuses on giving exposure and skill to students about the basics of 3D and geometry modelling and its application in the engineering field by using 3D Modelling software. This course includes details on 3D modelling followed by producing 2D drawing, from 2D drawing into 3D modelling, assembly drawing, exploded drawing, and rendering. All this skill will help students to produce technical drawing and virtual prototype or model which suit manufacturing processes. This skill is very demanding in industry.

**Course Outcome:**

1. Ability to identify the principles and tools to develop 2D and 3D data.
2. Ability to construct 2D and 3D data by using tools effectively.
3. Ability to organize 2D and 3D data output formally.

**MMK21103 KEJURUTERAAN BERBANTU KOMPUTER [COMPUTER AIDED ENGINEERING]****No Of Credits: 3****Course Synopsis:**

This course provides the students with an understanding of the structural analysis through Finite Element Analysis (FEA). It will also deliver a proper background for the intelligent and appropriate use of commercial FEA software. The course initially covers the introduction of FEA, matrix algebra, and solution of linear equation (SLE). The solutions for one-, two-, and three-dimensional problems are reviewed in theoretical basis and through the application of available FEA software. At the end of the course, the students are expected to be able to solve real-life engineering problems related to structural domains.

**Course Outcome:**

1. Ability to analyse engineering problems using basic concept and knowledge infinite element analysis.
2. Ability to demonstrate engineering problems using computational tools.
3. Ability to explain the processes and findings of finite element analysis in a form of oral and/or written presentation.

**MMK21203 PEMINDAHAN HABA [HEAT TRANSFER]****No Of Credits: 3****Course Synopsis:**

This course is designed to enhance and extend student's ability to apply the principles of heat transfer, especially its three major modes: conduction, convection, and radiation. In addition to the three modes of heat transfer, students will learn the application of the principles of heat transfer and discusses the design of equipment to accomplish a certain requirement.

**Course Outcome:**

1. Ability to apply fundamental knowledge of heat transfer mechanism.
2. Ability to evaluate and operate thermal engineering problems in conduction, convection and radiation.
3. Ability to evaluate thermal engineering problems in heat exchanger systems.

**MMK32103 EKONOMI PEMBUATAN [MANUFACTURING ECONOMICS]****No Of Credits: 3****Course Synopsis:**

This course proposes the decision-making techniques that should be taken into consideration in a particular engineering's projects. It also examines the profitability consequences on the project designed. Besides, this course introduces fundamental economics and costs concepts in decision making to the students. Time relationship (also called time value of money) and concept of equivalence expose the students to the value of investment by estimating future costs or revenues. The application of money-time relationship in comparing different alternatives helps to choose the best solution before enhancing any project.

**Course Outcome:**

1. Ability to analyse the general concept of engineering economy and the time value of money concept.
2. Ability to analyse the benefit-cost ratios of public works projects.
3. Ability to evaluate the economical problems involving comparison with specified methods/analysis and economic decision making.
4. Ability to demonstrate the effects of depreciation, income taxes, inflation, and price change in engineering economic analysis problems.



**MMK33104 PROJEK PEMESINAN [MACHINING PROJECT]****No Of Credits: 4****Course Synopsis:**

Machining project is a multi-disciplinary integrated subject in which small groups of three or four students work together to complete a major project. Each project will require students to solve problems related to the machining practices in term of design, process, or industry. The project can be titled either based on product design, product fabrication, experimental analysis, case study or investigation of problems in industry.

**Course Outcome:**

1. Ability to generate problem solution based on knowledge and comprehension of concept, methodologies & project management principles.
2. Ability to demonstrate solution by using techniques, skills and modern engineering tools to solve and evaluate the machining practices.
3. Ability to organise in group and communicates effectively using the project management principles.

**MMK12103 TEORI DALAM PEMESINAN [THEORY IN MACHINING]****No Of Credits: 3****Course Synopsis:**

In this course, the students learn the fundamentals and principles of metal cutting/machining processes common to current industrial practices. This includes single-point orthogonal and turning operations, multi-point cutting operations, i.e., milling, drilling; and abrasive processes/grinding operations. Key technological principles and mechanisms of chip formations are initially explained. This is followed by discussions and evaluations of various conventional machining operations for different part shape requirements. Basic tooling for machining operations are introduced along with the machine tool structures to perform the cutting operations. Material removal rate, machining time, and machining economics are analyzed as part of machinability analyses.

**Course Outcome:**

1. Ability to discuss the principles of metal cutting and chip formation processes.
2. Ability to analyses Merchant force equation for machining force relationships.
3. Ability to evaluate the concepts machine tools and machining operations for various engineering shapes.
4. Ability to formulate the machinability of various metallic materials based on technical and economic factors.

**MMK22104 PEMESINAN KONVENSIONAL [CONVENTIONAL MACHINING]****No Of Credits: 4****Course Synopsis:**

This course is a practical exposure to conventional machining processes used in the industry to transform raw materials into final products that involve selecting of machining operation, cutting tools and cutting conditions to get good surface finish. Conventional machining operations involved include turning, milling, drilling, and grinding.

**Course Outcome:**

1. Ability to perform turning process by using appropriate machining operations, cutting tools and machining conditions.
2. Ability to perform milling process by using appropriate machining operations, cutting tools and machining conditions.
3. Ability to perform drilling and grinding process by using appropriate machining operations, cutting tools and machining conditions.
4. Ability to construct product with suitable machining process in group.

**MMK22204 TEKNOLOGI CNC [CNC TECHNOLOGY]****No Of Credits: 4****Course Synopsis:**

This course studies on the principles and concepts of computer numerical control (CNC) used in the modern manufacturing facilities. The student will develop an increased understanding of CNC machine set-up, machine operation, tooling, and programming principles. G & M code programming language will be utilized to write part programs. Although there is a variety of machines and CNC controllers, this course focuses on the G & M codes that remain common from one machine to another. Students will also be exposed with Programmable Logic Controller (PLC).

**Course Outcome:**

1. Ability to apply the concept of NC machining operation such as workpiece zero setting and tool setting.
2. Ability to generate G and M code programs and documentation for machining operation on CNC machine tools.
3. Ability to explain concept of automated system available in a CNC machine.
4. Ability to demonstrate CNC milling and turning machine.

**MMK31103 ERGONOMIK DAN KESELAMATAN [ERGONOMICS AND SAFETY]****No Of Credits: 3****Course Synopsis:**

The objectives of this course are to introduce to the students the ergonomics fundamental principles, human capacity and body mechanics in product design and development process, the application of suitable ergonomics assessment tool to solve the ergonomics issues in product design and to guide the students on effective design solutions in order to enhance product intervention, usability, sustainability and safety for society benefits. The contents of this course will cover the ergonomics introduction in design, human capacity and biomechanics, ergonomics assessment and evaluation, design for usability and user centered design, design for safety and health, design of equipment and hand operated devices and finally designs for the special population. This course will be delivered by applying lectures, lab and problem-based approach and continuous assessment will be conducted to assess the understanding of the students on this course. At the end of this course, student will be able to APPLY the ergonomics fundamental principles, human capacity and body mechanics in product design and development process, able to ANALYSIS the application of suitable ergonomics assessment tool to solve the ergonomics issues in product design and to able to PROPOSE effective design solutions in order to enhance product intervention, usability, sustainability and safety for society benefits.

**Course Outcome:**

1. Ability to apply the ergonomics fundamental and principles, human capacity and body mechanics in product design and development process.
2. Ability to analysis and evaluate ergonomic issues using suitable assessment tools and method for society impact.
3. Ability to propose an effective design solution to enhance product intervention, usability, sustainability, and safety for society benefits.

**MMK31204 PROJEK TAHUN AKHIR I [FINAL YEAR PROJECT I]****No Of Credits: 4****Course Synopsis:**

This course consists of lectures and independent study on the technique of conducting literature review, identification of problem statements, project objectives and research methodology. The students are guided on the proper techniques and format of thesis writing, submit the project proposal and present the final year project to the internal examiners.

**Course Outcome:**

1. Ability to integrate knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to solve engineering

problems related to the research area.

2. Ability to apply, identify and formulate related research literature in order to understand and construct the research comprehensively.
3. Ability to develop methodology or design solutions that meet specified needs in order to solve broadly defined engineering technology problems.
4. Ability to conduct effective management principle into the project progress by demonstrating knowledge and understanding of engineering management principles to manage projects in multidisciplinary environments.
5. Ability to exhibit effective presentation and write effective reports and design documentation for the research undertaken.
6. Ability to establish the need to engage in independent and lifelong learning in specialist technologies to complete the research project.

**MMK41206 PROJEK TAHUN AKHIR II [FINAL YEAR PROJECT II]****No Of Credits: 6****Course Synopsis:**

In this course, students will apply the knowledge they have learned throughout this program to complete the ongoing research project (Final Year Project I) under the supervision of a supervisor. The supervisor is responsible for guiding students on the techniques and overall implementation of the research. For the Final Year Project II, students will be focused on the fabrication of the product (if applicable), data analysis and interpretation, and conclusion. The documentation of the whole project will be written in the Final Year Project II report. Students will present their works and finding on the research project during the viva session.

**Course Outcome:**

1. Ability to interpret related research literature in constructing a comprehensive scope of the FYP Project and develop specific solutions for the objectives set.
2. Ability to conduct investigations based on experiment and/or prototype, in order to evaluate, interpret and analyze the outcome of the FYP project.
3. Ability to analyze knowledge of mathematics, science, engineering fundamentals, and engineering and engineering specialization in order to solve problems of the FYP project and give conclusions.
4. Ability to combine appropriate techniques and modern engineering tools to solve the problems of the FYP project.
5. Ability to exhibit effective presentation and write effective reports and documentation for the FYP project.
6. Ability to conduct effective management principles in a multidisciplinary environment to manage the FYP project.

**MMK32303 GEOMETRI, PENDIMENSIONIAN DAN TOLERANSI [GEOMETRIC, DIMENSIONING AND TOLERANCING]****No Of Credits: 3****Course Synopsis:**

This course focuses on the theory of Geometric Dimensioning and Tolerancing (G, D & T) as a graphic language in practical applications in engineering. This course is designed in a way to build a basic understanding of the core concepts of engineering drawing. The concept, rules, and language of GD&T from a functional viewpoint to a real example application will be delivered.

**Course Outcome:**

1. Ability to apply knowledge on theories and concepts of Geometric Dimensioning and Tolerancing using symbols, terms, and rules.
2. Ability to investigate datums, position, concentricity and symmetry applied to the type of forms, orientation, profile, and runout of Geometric Dimensioning and Tolerancing.
3. Ability to evaluate the concept of tolerance and fits and strategize.

**MMK32403 REKABENTUK JIG DAN LEKAPAN [JIG AND FIXTURE DESIGN]****No Of Credits: 3****Course Synopsis:**

This course introduces students to fundamental of Jig and Fixture Design in machining applications. It starts with types and functions of Jig and Fixture. In addition, students will be exposed to knowledge about classification of jig and fixture for selected operation on sample parts that apply in machining process. In this course, the tool drawing is important to students to design the jig and fixture according specifies methods and rule of metric dimensioning. This course also will introduce student to identify the principles and economic analysis of a tool design in jig and fixture application. One project will be given (in group) to evaluate the knowledge of students in this course.

**Course Outcome:**

1. Ability to apply knowledge and comprehension of fundamental jig and fixture design in machining application.
2. Ability to apply the knowledge in order to select and use the tool material in jig and fixture design.
3. Ability to evaluate the principles of design economy in jig and fixture design.

**MMK32503 PEMESINAN MAPAN [SUSTAINABLE MACHINING]****No Of Credits: 3****Course Synopsis:**

This course covers the recent techniques and requirements in green and sustainable machining practices. It includes about the definition of green manufacturing, machining with minimum metalworking fluid, dry machining, gas-cooled machining, recent literature studies unsustainable machining, offline and online optimization of machining processes, economics of environmentally friendly machining, and epilogue: looking at the future.

**Course Outcome:**

1. Able to analyse the concept of green manufacturing and sustainability machining practices and relates with the economical and future issues in sustainable machining.
2. Able to evaluate the principles and sustainability using minimum cutting fluid, dry machining and gas-cooled in various machining operations.
3. Able to evaluate the practices of optimisation in machining operations and the advanced material used in machining operations

**MMK32603 PEMBUATAN BERBANTU KOMPUTER [COMPUTER AIDED MANUFACTURING]****No Of Credits: 3****Course Synopsis:**

This course enhances the students with skills of using Computer Aided Manufacturing (CAM) software for generating NC part programming in machining processes. It also enables students to understand the theory, concept, and application of CAM in machining that applied in industries. It covers five sections in CAM application which are 2-Axis Machining in Milling operation, 3-Axis Machining in Milling operation, 4 or 5-Axis Machining in Milling operation, CAM on Turning operation and CAM on Turn and Mill operation.

**Course Outcome:**

1. Ability to perform the NC part programming for 2-axis and 3-Axis machining of milling process using CAM software.
2. Ability to perform the NC part programming for turning operation using CAM software.
3. Ability to demonstrate the CNC 3-Axis milling and CNC turning machine.
4. Ability to perform the NC part programming for multi axis machining of milling process using CAM software.

**MMK32703 TEKNOLOGI PEMESINAN TERMAJU [ADVANCED MACHINING TECHNOLOGY]****No Of Credits: 3****Course Synopsis:**

This course exposes the students about various non-traditional manufacturing technologies which are used in industries nowadays. It covers four classifications of techniques in non-traditional machining technologies which are Mechanical, Electrical, Thermal and Chemical. The topics are Electrical Discharge Machining (EDM) technology, Chemical Machining, Electrochemical Machining, Ultrasonic Machining, Water Jet Machining, Laser-Beam machining, Electron Beam Machining and Additive Manufacturing (3D printing). It also covers the criteria for process selections and economics of the advanced machining processes. It gives students the basic skills in analysing advanced manufacturing technology and the necessary knowledge to operate and manufacture a particular product.

**Course Outcome:**

1. Ability to evaluate the concept and methodology of Electrical and Wire Electrical Discharge Machining (EDM and WEDM) processes.
2. Ability to evaluate the concept and methodology of Chemical and Electrochemical Machining (CHM and ECM) processes.
3. Ability to evaluate the concept and methodology of Ultrasonic and Water Jet Machining (USM and WJM) processes.
4. Ability to evaluate the concept and methodology of Laser Beam and Electron Beam Machining (LBM and EBM) processes.
5. Ability to evaluate the concept and methodology of additive manufacturing particularly for 3D printing.

**MMK33103 ALOI DAN KOMPOSIT LOGAM [ALLOY AND METAL COMPOSITE]****No Of Credits: 3****Course Synopsis:**

Most of the advanced manufacturing and machining industries involved metals either as their main products or equipments and tools used during the processing. This course consists of complete review on metal and their alloys and has been designed to suit with mechanical (machining) students. The course started with the introduction of fundamental knowledge of metal-alloys regarding their types, properties, classifications, fabrications, and applications. The important physical and mechanical properties of metal were discussed including the common mechanical failures occurred in metals. The basic knowledge in metal phase diagram and common practiced heat treatments were also discussed. Apart from that, metal composites area was also overviewed in this course including their classification, fabrications, and applications. During this course, students

need to complete a mini project which covering the element of design, fabrication, machining, and heat treatment intended for specific application. This course will impose an extra added value for mechanical (machining) students before they are entering into the real industrial sector.

**Course Outcome:**

1. Ability to apply fundamental knowledge of science and engineering for describing basic process, properties and applications of metals, alloys and composites.
2. Ability to analyse information and technical data for assessing problems and provide conclusions in metals, alloys and composites.
3. Ability to design specific process or composition to meet specified needs in metals, alloys and composites.
4. Ability to reproduce investigation effectively on a given task using appropriate techniques.

**MMK33203 SIMULASI SUNTIKAN ACUAN PLASTIK [PLASTIC INJECTION MOULDING SIMULATION]****No Of Credits: 3****Course Synopsis:**

This course introduces students to basic knowledge of plastic injection mould technology and plastic materials used in the injection moulding process. This module focuses more on analyzing and evaluating the finite element mesh technology introduced in Moldflow and how these mesh quality influence the quality of the mesh. This module also introduces the concept of gate placement as well as the design concept of gates, runners and cooling system. Emphasis also be given on conducting several analysis in evaluating the part and mould design via gate location analysis, molding window analysis, fast fill analysis and cool+flow+pack+warp analysis in eliminating the causes of defects that might be occurred in the plastic part produced.

**Course Outcome:**

1. Ability to evaluate the basic terminology in plastic injection moulding, process, mould types and components, plastic materials for injection moulding.
2. Ability to create good and satisfactory simulation models that fulfil meshing requirements.
3. Ability to evaluate gate location and moulding window simulation and interpret the results.
4. Ability to design feed system for fast fill simulation and evaluate the results
5. Ability to create cooling system, setting the injection processing parameters in cool+flow+pack+warp simulation and evaluate the results

**MMK33303 PENGKOMPUTERAN DINAMIK BENDALIR [COMPUTATIONAL FLUID DYNAMICS]****No Of Credits: 3****Course Synopsis:**

This course exposes the techniques for obtaining solution of fluid flow problems numerically. The aim of this course is to introduce the fundamental application of simulation of fluid dynamics and heat transfer phenomenon and solving thermo-fluids problem via computational method. Holistic approaches of commercial software are essential towards solving, analyzing and evaluating the results of thermo-fluid problems. The course focuses on solving of two- and three-dimensional fluid flow and heat transfer problems utilize commercial software. The course starts by introducing the history and applications of Computational Fluid Dynamics (CFD). Then it revises the behavior of fluids in motion and derivation of the governing flow equations before detail discussion of various discretization techniques. Moreover, the course discusses the practical guidelines for CFD and simulation of thermo-fluid problems using commercial software.

**Course Outcome:**

1. Ability to apply the basic concept and knowledge of computational fluid dynamics.
2. Ability to operate the software tools in solving the various thermo-fluids problems.
3. Ability to Justify the results of computational fluid dynamics analysis.

**MMK43403 TEKNOLOGI PENGISARAN MODEN [MODERN GRINDING TECHNOLOGY]****No Of Credits: 3****Course Synopsis:**

In this course, students will be exposed to the basic concepts of modern grinding technology and its role in manufacturing. This is followed by explanation on related theories such as the grinding system elements, material removal and grinding wheel specifications (which includes grinding wheel contacts, dressing, tools and wear) and grinding process control. The trends and technologies in centerless grinding and high-speed grinding will be discussed as well. At the end of the course, students will be exposed to problem solving on grinding process.

**Course Outcome:**

1. Ability to evaluate the concept of grinding process and grinding wheel composition, properties, geometry and kinematics.
2. Ability to evaluate the concept of dressing, truing and analyze the wheel contact and wear effects.

3. Ability to evaluate the concept of grinding machine and operation including centerless, high speed grinding as well as deflections and problems related to grinding operation.

**MMK43503 UJIAN TAK MUSNAH [NON-DESTRUCTIVE TESTING]****No Of Credits: 3****Course Synopsis:**

Non-Destructive Testing (NDT) plays a crucial role in everyday life for companies using pipelines, bridges, refineries, oil platforms, power stations, and many more. NDT is a comprehensive way to find, size, and locate surface and subsurface flaws and defects that could have an adverse impact on safety, reliability, and the environment. Testing implies for finding defective area does not damage or ruined the tested part. Identifying defects and flaws in material which could not be seen using our naked eyes is absolutely important in determining the structural life span and the material performance. The effective method of NDT is also depending on the knowledge and skill of the person in charge. This course offering the introduction, fundamental and basic knowledge on NDT technology. This course is basically covering the general NDT methods that are commonly used during inspection such as liquid penetrants, magnetic particles, eddy current, ultrasonics, and radiography techniques. Besides that, this course also introduces other types of up-to-date NDT techniques such as optical inspection probes, neutron radiography, laser-induced ultrasonics, acoustic emission inspection gauges and thermography.

**Course Outcome:**

1. Ability to apply fundamental knowledge of science and engineering specialization in NDT.
2. Ability to identify flaws and defects conditions for assessment and provide conclusions in NDT inspections.
3. Ability to displays appropriate techniques and procedures effectively on the given task using NDT tools.

**MMK43603 HINGAR & GETARAN [NOISE & VIBRATION]****No Of Credits: 3****Course Synopsis:**

This course introduces the student with the skills and knowledge in vibrations and noise disciplines. The syllabus covers the fundamental of vibration and oscillation motion, free vibration, force vibration, two degree of freedom systems, multiple degree of freedom systems the effects of noise and how to control the problems. The student will be well-prepared towards industrial application elements such as vibration control, vibration measurement, and noise control.

**Course Outcome:**

1. Ability to analyse free and force vibration for single and two degree of freedom.
2. Ability to evaluate the response of various systems (multi degrees of freedom) and noise measurement.
3. Ability to OPERATE the apparatus and equipment in the laboratory.

**MMK43703 TEKNOLOGI MATA ALAT PEMOTONG [CUTTING TOOL TECHNOLOGY]****No Of Credits: 3****Course Synopsis:**

This course covers the fundamental and recent technologies related to cutting tools for machining processes. It includes topics such as trends and development of cutting tool materials, heat, forces and stresses on cutting tools, single point turning tools and chip breaking techniques, multi-point tools. In addition to that, this course reviews the fundamental issues on tool wear and tool life, tool condition monitoring and special topics on machining advanced materials.

**Course Outcome:**

1. Able to differentiate cutting tools types and materials for different application of metal, polymer, and composite material.
2. Able to evaluate the technologies of cutting tool for different method of machining processes.
3. Able to analyze the cutting tool monitoring system for wear and life.

**MMK43803 PROSES PENCIRIAN TERMAJU [ADVANCE CHARACTERIZATION PROCESS]****No Of Credits: 3****Course Synopsis:**

This course covers a fundamental of the advanced characterization processes,

divided into three

categorize; physical, mechanical, and thermal analysis. This includes spectroscopic characterization such as Fourier Transform Infrared Spectroscopy (FTIR) and Spark or Arc Atomic Emission Spectroscopy (AAEM); electron microscopy techniques such as Transmission Electron Microscopy (TEM), Scanning Electron Microscopy (SEM) and, Field Emission Scanning Electron Microscope (FeSEM) and, its sample preparation processing. X-Ray Diffraction (XRD) and X-ray Fluorescence (XRF); Thermal Analysis such as Thermal Gravimetric Analysis (TGA) and Differential Scanning Calorimetry, (DSC), surface roughness and follow by mechanical analysis; Impact, bending and flexural analytical test.

**Course Outcome:**

1. Ability to identifying the basic concepts of material (ceramic, composite, metal, and polymer) through various testing and characterization process.
2. Ability to interpret the obtained experimental results of materials.
3. Ability to analyze various testing and characterization process to solve problems related to materials.
4. Ability to conduct the experiments and determine the results obtained associate with materials.

**MMK30103 PENGURUSAN TEKNOLOGI KEJURUTERAAN [ENGINEERING TECHNOLOGY MANAGEMENT]****No Of Credits: 3****Course Synopsis:**

This course aims to teach students on how to apply the projects management skills and economic techniques in evaluating the design. The role of economics is to assess the appropriateness of a given project, estimate its value, and justify it from an engineering technology standpoint. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineering technologist relating to project management in the current economic scenarios.

**Course Outcome:**

1. Ability to evaluate the process of project management, develop work plans, do cost estimation and perform project evaluation.
2. Ability to evaluate economic scenarios and apply decision-making process to engineering project and business venture.
3. Ability to propose successfully establish, lead, manage and work in multidisciplinary teams.
4. Ability to demonstrate the problem-solving and rational effective decision making under uncertainty by applying the principles and core concepts of project/business venture.



**MMK31303 TEKNOLOGI KEJURUTERAAN DALAM MASYARAKAT [ENGINEERING TECHNOLOGIST IN SOCIETY]****No Of Credits: 3****Course Synopsis:**

This course aims to explain the main concepts in engineering and technology ethics, risk management and occupational safety and health as well as to expose the students to basic of law in the engineering and technology context. The course presents an introductory nature to enable technologists to appreciate factors that have to be taken into account in decision-making. Examine and assess issues and challenges faced by technologists relating to engineering and technology ethics, risk management and to understand the legal requirements related engineering and technology field.

**Course Outcome:**

1. Ability to explain hazards, the function of risk management and occupational safety and health (OSHA).
2. Ability to analyse the aspects and procedures of legal on engineering and technology issues.
3. Ability to integrate and cooperate the issues and challenges of engineering and technology ethics in the community.

**MMK49912 LATIHAN INDUSTRI [INDUSTRIAL TRAINING]****No Of Credits: 12****Course Synopsis:**

This practical-based course exposes students to a company technical functions and organizational structure and operation such as departmental function, work procedure, safety procedure, communication, technical skills and project management in achieve appreciation and/or capability of carrying out complex engineering activities. During this course, the students will apply knowledge acquired at the university and increase their related skills in their future profession.

**Course Outcome:**

1. Ability to demonstrate technical knowledge and practical skills.
2. Ability to practice the health, safety, legal and cultural issues in a working environment.
3. Ability to apply societal environmental and sustainable development in engineering problems.
4. Ability to demonstrate good work performance, work ethics during training period.
5. Ability to perform as individual a member or leader in diverse technical

teams.

6. Ability to communicate and operate assigned task given by host company.
7. Ability to engage in independent and life- long learning in specialist technologies.

**MMK15103 BIOLOGI GUNAAN [APPLIED BIOLOGY]****No Of Credits: 3****Course Synopsis:**

This course introduces general concepts of biology which are related to the agricultural technology and system. The general concepts include the molecular and cellular aspects of living things, structure and function of plants and animals, plant and animal diversity, physiological requirements and response of plant and animal towards internal and external stimuli. At the end of this course, the students are expected to apply the knowledge of biological science in agroecosystem and agrotechnology.

**Course Outcome:**

1. Ability to illustrate biological phenomena at various levels, from cellular to ecological systems
2. Ability to analyze various groups of organisms according to morphological, anatomical, reproductive and physiological parameters
3. Ability to evaluate organism responses to internal and external stimuli

**MMK15202 PENGENALAN KEPADA PERTANIAN [INTRODUCTION TO AGRICULTURE]****No Of Credits: 2****Course Synopsis:**

This course explores the manufacturing processes and technologies, which are used in the Industry to convert raw material into finished products. This course is divided into four sections, which are the solidification and shaping process, forming process, the joining and assembly process, and special processing and assembly technologies. The solidification and shaping process covers the metal casting and shaping process for plastics. For forming process, the topics cover metal forming and sheet metalworking technologies including rolling, forging, extrusion, cutting, bending, deep drawing, etc. In joining and assembly, the topics cover are welding, soldering, brazing, adhesive bonding, and mechanical fastening. The last part is special processing and assembly technologies, which covers rapid prototyping, micro and nanofabrication technology.

**Course Outcome:**

1. Ability to interpret the concept and principle for solidification and shaping process.
2. Ability to analyze the related problems of metal forming and sheet metalworking process and technology.
3. Ability to analyze the related problems of joining and assembly process and technology.
4. Ability to interpret the concept and principle for special processing and assembly technologies.

**MMK24103 SISTEM HIDRAULIK DAN PNEUMATIK [PNEUMATIC AND HYDRAULIC SYSTEMS]****No Of Credits: 3****Course Synopsis:**

This course exposes students to the fundamentals of theory and concepts in pneumatic and hydraulic systems. This course focuses on the introduction of symbols, components, and circuits used in pneumatic and hydraulic systems, as well as their application in industry. To improve the learning experience, a practical approach was used using pneumatic and hydraulic equipment in the laboratory to construct the related circuits. At the end of this course, the pneumatic system application is combined with the electro-pneumatic system, which uses electric power, a relay, a sensor, and a limit switch to control the pneumatic components.

**Course Outcome:**

1. Ability to apply fundamental knowledge of pneumatic and hydraulic systems.
2. Ability to evaluate design circuit operations in relation to the performance of the individual components themselves
3. Ability to respond to assigned circuit operations in pneumatic and hydraulic systems

**MMK24203 KAWALAN DAN INSTRUMENTASI [INSTRUMENTATION AND CONTROL]****No Of Credits: 3****Course Synopsis:**

This course introduces students to fundamental knowledge about instrumentation and control system technology. Students will be exposed to basic instrumentation and measurement concepts including the general measurement system, transducers, working principle of various sensors and signal conditioning. Students

will also be exposed to the basic knowledge of control system technology, including control system models, transfer functions, system response and process controllers.

**Course Outcome:**

1. Ability to analyse concepts of instrumentation system including sensors, transducers and signal processing.
2. Ability to analyse basic concepts of control system technology.
3. Ability to demonstrate instrumentation and control principles through experiments, modelling and simulations.

**MMK25202 KEJURUTERAAN TANAH [SOIL ENGINEERING]****No Of Credits: 2****Course Synopsis:**

This course introduces the basic concepts of soil engineering and soil mechanics. It covers the fundamental multi-phase nature of soils, provides an understanding of soil description and classification, the soil effective shear-strength-stress concept and the soil properties that is associated with soil tillage.

**Course Outcome:**

1. Ability to analyse soils including soil and water weight-volume relationships.
2. Ability to evaluate the state of stress and shear strength of a soil mass.
3. Ability to relate soil properties to soil tillage.
4. Ability to perform soil analysis as demonstrated during laboratory

**MMK25303 TEKNOLOGI PENGELUARAN AKUAKULTUR DAN PENTERNAKAN [LIVESTOCK AND AQUACULTURE PRODUCTION TECHNOLOGY]****No Of Credits: 3****Course Synopsis:**

This course covers terminology, basic biological aspects of animal and fish, production management technology, nutrition and feed, disease management, meat, dairy and aquaculture product management and marketing. The students are able to use innovative technology and products which enhance the growth of animal protein production in Malaysia and allow entrepreneurs to learn new methods to improve their efficiency. The relevance of livestock industry in Malaysia and global, including production and market aspects will also be taught.

**Course Outcome:**

1. Ability to compare the processes involved in livestock and aquaculture production
2. Ability to recommend modern livestock and aquaculture production technologies and management practices with consideration of public health and environment safety.
3. Ability to show the management practices of ruminant, non-ruminant livestock and aquaculture production systems
4. Ability to explain good agricultural practices in livestock and aquaculture production systems

**MMK25402 TEKNOLOGI PENGELUARAN TANAMAN MAKANAN [FOOD CROP PRODUCTION TECHNOLOGY]****No Of Credits: 2****Course Synopsis:**

This course covers principles of agronomy, soil and plant relationships, farm management, and enterprise management in the agricultural sector for sustaining agricultural growth and slowing down environmental degradation. Students are able to use innovative science and technology which enhance the growth of food crop production in Malaysia and allow them to learn new methods to improve their efficiency. The relevance of crop industry in Malaysia and global, including production and market aspects will also be taught.

**Course Outcome:**

1. Ability to discuss the principles and processes involved in food crop production.
2. Ability to display the appropriate food crop production technology.
3. Ability to apply good agricultural practices in food crop production with consideration of public health and environment safety.

**MMK34103 AUTOMASI DALAM SISTEM PERTANIAN [AUTOMATIONS IN AGRICULTURAL SYSTEMS]****No Of Credits: 3****Course Synopsis:**

This course covers the use of automation in the agricultural system. Various automation elements such as sensors, controllers, actuators, regulators, servos and others that are used in farm vehicles will be studied in this course. In addition, automation technologies in field crops and orchard productions such as irrigation, drainage and soil conservation practices, chemical applications, post-harvest operations, animal and aquacultural productions, food processing operations and waste management.

**Course Outcome:**

1. Ability to apply principle of automation and sensor technology in agricultural systems
2. Ability to analyse different actuator components and applications in agricultural systems
3. Ability to design automation system for agricultural and biological production system.
4. Ability to respond to different actuator components and applications in agricultural systems

**MMK35103 TEKNOLOGI LEPAS TUAI [POSTHARVEST TECHNOLOGY]****No Of Credits: 3****Course Synopsis:**

This course provides the overview on postharvest handling technology of agricultural produce. The course emphasizes the basic of postharvest handling technology, pre-harvest and harvesting factors affecting the postharvest quality, postharvest operations in the packinghouse and appropriate equipment or chemicals that relates to postharvest treatments and storage of agricultural products, quality assurance and preparation of fresh-cuts, and postharvest socio-economics.

**Course Outcome:**

1. Ability to compare the principles and operations applied in postharvest technology
2. Ability to evaluate the problem that involved during postharvest handlings and operation.
3. Ability to discover appropriate techniques/ methods/ tools in preserving the quality properties of agricultural produce
4. Ability to demonstrate professional ethics and responsibilities of postharvest technology practice for food quality assurance

**MMK34203 PROJEK REKABENTUK PERTANIAN [AGRICULTURAL DESIGNN PROJECT]****No Of Credits: 3****Course Synopsis:**

Agricultural Design Project is a multi-disciplinary subject in which small group of three to five students work together to complete a major project. Each project will require students to unravel agricultural field of industry/product/system problems that are being confronted by any organization in community. The course emphasizes related agricultural engineering technology knowledge ranging from concept till production of a product or system in solving specific engineering technology problem. This solution may include engineering specifications, project scheduling/planning, costing analysis, sustainability issues and design/system solution in any agricultural area.

**Course Outcome:**

1. Ability to create appropriate design/system solution on agricultural engineering technology either involving process, system or component, which may including production management, with the aim of producing a good quality solution that meet customer requirements.
2. Ability TO investigate the appropriate methodologies for data collection in order to make learned decisions and thereby valid conclusions in solving agricultural engineering technology problems.
3. Ability to conduct appropriate engineering technology technique/method/tool and practice in solving relevant problems/tasks.
4. Ability to evaluate aspects of design sustainability and environmental impact in agricultural engineering technology problems.
5. Ability to work with team members effectively in carrying out and complete tasks assigned.
6. Ability to communicate with team members and public during gaining solution to problem and to make effective presentation to convince the solution provided.
7. Ability to demonstrate understanding of engineering technology project management principles and engineering economics by applying them in decision making process.

**MMK35203 TEKNOLOGI PERTANIAN TEPAT [PRECISION FARMING TECHNOLOGY]****No Of Credits: 3****Course Synopsis:**

This course covers the essential aspects of Precision Farming Technology concepts including soil/landscape and crop spatial variability, GIS, GPS, sensors, variable rate machinery, PA software, remote sensing, geostatistics, sampling,

experimental designs, precision integrated crop management, data acquisition, processing, management, socio-economical aspects.

**Course Outcome:**

1. Ability to illustrate the concept, component and application of precision farming
2. Ability to analyze geo-referenced data using spatial information technologies.
3. Ability to practice spatial information and precision farming technology to improve soil and crop management, environmental, socio-economical aspects.
4. Ability to communicate effectively as a member or leader in spatial information and precision farming technology technical teams

**MMK35303 TENAGA DIPERBAHARUI DALAM SISTEM PERTANIAN [RENEWABLE ENERGY IN AGRICULTURE SYSTEMS]****No Of Credits: 3****Course Synopsis:**

This course covers the application of various energy resources to generate power useful for processing biological materials and focuses on the technology production process and engineering of renewable sources of energy which include solar, wind, wave and energy from biomass.

**Course Outcome:**

1. Ability to illustrate technologies used in generating mechanical and electrical power
2. Ability to evaluate the efficiency and performance of different renewable energy generating systems
3. Ability to practice renewable energy conversion
4. Ability to communicate effectively as a member or leader in renewable energy technology technical teams

**MMK44103 JENTERA DAN KUASA LADANG [FARM POWER AND MACHINERY]****No Of Credits: 3****Course Synopsis:**

This course covers the basic of machines and the importance of mechanization for various farm operations for agricultural output, selection of appropriate machines, maintenance and the management of farm machineries.

**Course Outcome:**

1. Ability to analyze the basic understanding of machinery for different crops and livestock
2. Ability to justify the construction and working principle of different machineries.
3. Ability to demonstrate to appropriate machinery in farming applications
4. Ability to organise an agro machinery service centre that comprises machinery for agricultural applications based on societal, health, safety, legal and cultural issues

**MMK45103 PENGURUSAN SISA PERTANIAN DAN KEJURUTERAAN KEPENGGUNAAN [AGRICULTURAL WASTE MANAGEMENT AND UTILIZATION ENGINEERING]****No Of Credits: 3****Course Synopsis:**

This course covers the agricultural sources of pollution (pesticides, commercial fertilizer, on-farm food processing wastes and animal manure) and their effect on the environment. Physical, chemical and biological properties of agricultural waste materials, treatment processes of agricultural wastes, methods of land application of agricultural wastes, and technologies for utilization of agricultural wastes for biogas production and animal feed.

**Course Outcome:**

1. Ability to recommend systems for the collection, handling, treatment and utilization of wastes.
2. Ability to practice the suitable physical, chemical and/or biological treatment of industrial and agricultural organic wastes.
3. Ability to construct the suitable utilization technique for agricultural waste and wastewater to sustain an environmental
4. Ability to demonstrate the impact of agricultural waste management and Utilization problems in the societal and environmental context.

**MMK45203 PERSEKITARAN TERKAWAL DALAM PERTANIAN [CONTROLLED ENVIRONMENT IN AGRICULTURE]****No Of Credits: 3****Course Synopsis:**

The course covers design of controlled environment of agricultural structures which include thermal and environmental engineering analyses appropriate for controlled environment of agricultural production facilities for plants and animals. Major topics include psychrometrics, heat transfer, ventilation and heating, air distribution within buildings, and control systems.

**Course Outcome:**

1. Ability to analyze heat and mass transfer in natural and forced cooling and heating in controlled environmental system.
2. Ability to evaluate mechanical and natural ventilation in controlled environmental system.
3. Ability to perform mechanical and natural system for plants and animal structure in controlled environmental system.

**MMK45303 KEJURUTERAAN PEMROSESAN MAKANAN [FOOD PROCESSING ENGINEERING]****No Of Credits: 3****Course Synopsis:**

This course covers multidisciplinary field of applied physical sciences that combines science and engineering education for food and related industries. Topics covered include introduction to food engineering, fluid flow theory, heating and cooling processes for foods, thermal processes, food freezing and freeze concentration, evaporation and freeze concentration, food dehydration, extrusion, cleaning and sanitation, elements of food plant design and food safety systems.

**Course Outcome:**

1. Ability to categorize the mechanisms involved in unit operations of food processing in optimizing food quality and extend the shelf life of foods.
2. Ability to differentiate the principles and current practices of food processing techniques
3. Ability to propose food processing flow to attain specific process strategies.
4. Ability to demonstrate the effects of processing parameters on product quality

**MMK17003 ASAS REKA BENTUK INDUSTRI [BASIC INDUSTRIAL DESIGN]****No of Credits: 3****Course synopsis:**

The course introduces students to the philosophy of art and design, theory and practice of art and design including of exploration of art elements (line, colour, shape/ form, space, value, and texture) and the principles of art (balance, harmony, unity, emphasis, repetition, rhythm, contrast, and composition). In addition, this course will expose the student in practicality and developing skills regarding conventional techniques 2 dimensional and 3-dimensional manual sketching and rendering, design processes and manual mock-up/ model making. Hence, topics will also be focusing on concepts and methods in designing; elements of good quality product; included concepts sketching and presentation drawing; model making; and design portfolio/ documentation for final design project. The course also provides an understanding student to the basic industrial design and methods for solving design problems. At the end of this course, students are expected to be able to produce a design project for final task by utilizing knowledge and skills gained.

**Course Outcomes:**

1. Ability to APPLY the philosophy of Industrial Design and the elements of art in relation to culture, compositions, environment, technology, manufacturing, and practice in industrial design
2. Ability to REPRODUCES techniques, skills, methods, and theories of design practice into industrial design work
3. Ability to BUILD design ideas via 2-Dimensional and 3-Dimensional illustration approach to the relevant stakeholders

**MMK17102 ASAS REKA BENTUK VISUAL [DESIGN VISUALIZATION]****No of Credits: 2****Course synopsis:**

This course aims to introduce design skills and knowledge in presenting the idea or design concept. The course will cover fundamental design concepts in a logical sequence which will provide students with good visual design. The most important topic in this course is visual language, which comprises exploration towards visual elements and design concept. In addition, the student will learn about image editing, photo-realistic for 3D design objects, and animation skill. The student also will undergo discussion on related topics and experience some design visualization projects including presentations and critique sessions. This course covers the use of various computer software in studying graphics illustration and technical design skills for visualization presentation purposes significantly.

**Course outcomes:**

1. Ability to CONSTRUCT basic image editing skill, colouring skill and printing skill
2. Ability to COMPOSE Photo Realistic modelling and rendering skill
3. Ability to BUILD 3D object animation skill
4. Ability to COMPOSE Video editing skill

**MMK26003 REKA BENTUK BERBANTU KOMPUTER II [COMPUTER AIDED DESIGN II (CAD)]****No of Credits: 3****Course synopsis:**

This course focuses on giving exposure and skill to students about the advance of 3D and geometry modelling and its application in the design and engineering field by using 3D modelling software. This course includes details on basic surface modelling, advanced surface modelling, rendering and animation. All this skill will help students to produce external and internal surfacing with complex shapes for virtual prototypes or models which suit manufacturing processes. This skill is very demanding in industry.

**Course Outcomes:**

1. Ability to IDENTIFY the principles and tools to develop surface modelling in computer aided design
2. Ability to CONSTRUCT surface modelling data by using tools effectively in computer aided design
3. Ability to ORGANIZE complete CAD data output formally along with rendering work



**MMK26103 PROTOTAIP DAN PEMBUATAN MODEL [REVERSE ENGINEERING & ADDITIVE MANUFACTURING]****No of Credits: 3****Course synopsis:**

This course provides the knowledge and skills regarding reverse engineering and additive manufacturing for product design development. Students will be exposed to emerging technologies in Additive Manufacturing such as FDM, SLA, SLS, DLP and Polyjet. Besides that, students will experience performing 3D scanning operations as one of the processes in Reverse Engineering. At the end of the courses, students can apply various methods and techniques to construct prototypes and models based on these technologies. The course outlines opportunities to value add to professional skills developed during the course.

**Course outcomes:**

1. Ability to INTEGRATE fundamental knowledge in Reverse Engineering and Additive Manufacturing in parts fabrication.
2. Ability to CONSTRUCT parts or components by implementing Reverse Engineering and selected Additive Manufacturing technologies.
3. Ability to ORGANIZE the project based on timeline, rules and regulations with understanding of professional ethics.

**MMK26203 PROTOTAIP DAN PEMBUATAN MODEL [PROTOTYPING AND MODEL MAKING]****No of Credits: 3****Course synopsis:**

This course provides the knowledge and skills regarding prototyping and model making for product design development. From this course, students enable to apply various methods and techniques in constructing prototype and model based on technical specification that has been given. The course outlines opportunities to value add to professional skills developed during the course.

**Course outcomes:**

1. Ability to INTEGRATE fundamental knowledge of prototyping and model making in product design development.
2. Ability to CONSTRUCT 3-Dimensional physical model or prototype based on 2-Dimensional data using suitable tools, equipment's, and materials.
3. Ability to ORGANIZES systematic workflow and process in completing the task that have been given.

**MMK27203 REKA BENTUK INTEGRASI [DESIGN INTEGRATION]****No of Credits: 3****Course synopsis:**

This course will introduce to the student about the integration of other disciplines within a product design and development at early stage from a point of view of a design engineering technologist. Students will be guided to collaborate in a team consists of appointed elements such as industrial design, mechanical, electric/electronic engineering and material/manufacturing selection process. This course will enable the student to apply the skill of industrial design within integration of other elements to a product. In the end, the student will be able to deliver a functional product with several combination aspects as well as product design and development documentation required.

**Course outcomes:**

1. Ability to INTEGRATE the inter-disciplinary aspect into product design and development concept.
2. Ability to FABRICATE a functional product with necessary product design development requirements and documentations.
3. Ability to work as an individual and teamwork to ORGANIZE a collaborative work and able to communicate effectively on engineering activities.

**MMK27303 REKA BENTUK STUDIO I [DESIGN STUDIO I]****No of Credits: 3****Course synopsis:**

Design Studio I aim to develop an understanding of customers and product marketability by using appropriate engineering methods to analyze user needs and formulate solutions to the design problems. Students will generate and develop ideas through sketching and express the idea with mock-up construction. Students are also required to apply 3D CAD software in detailing product specification then transform to technical drawing and animation. Prototype making process is essential for students to simulate the real and future product.

**Course outcomes:**

1. Ability to analyse user's needs and formulate solution to the design problem based on product design and development process.
2. Ability to construct two dimensional visual and three-dimensional object using various visualization and modelling techniques with appropriate tools, equipment's, and technologies.
3. Ability to discuss the proposal and results of the project effectively using visual, oral, or written format.

**MMK37403 INNOVATION MANAGEMENT & PRODUCT DEVELOPMENT****No of Credits: 3****Course synopsis:**

Innovation Management & Product Development is an essential foundation of project planning and management for Engineering Technology (Product Design) Program. The knowledge throughout this course is important to help the student understand the importance of comprehensive management in product innovation and technology development. The student will learn the appropriate fundamentals, basic principle of planning and management approach applied in the industries.

**Course outcomes:**

1. Ability to APPLY the basic concepts and principles of innovation management and product development.
2. Ability to ANALYSE the fundamental, principles and approach of product innovation technology development.
3. Ability to manage and CREATE a novel innovation design concept using appropriate approach and technique.

**MMK36503 REVOLUSI INDUSTRI [INDUSTRIAL REVOLUTION]****No of Credits: 3****Course synopsis:**

In this course, the students will discuss about recent or trend issues/topics regarding product design and development. The student will prepare a report of the issues/policy/agenda in group and present them. There will be invited speakers to close the gap between the student and the industry by organising a seminar/talk/conference offering two-way communication.

**Course outcomes:**

1. Ability to ANALYSE issues/topics/policies/agenda related to product design and development.
2. Ability to DEMONSTRATE impact of product design and development solutions in societal and environment context.
3. Ability to PRESENT a collaborative work and process necessary.

**MMK36403 STUDIO REKA BENTUK II [DESIGN STUDIO II]****No of Credits: 3****Course synopsis:**

The student will apply and analyse their knowledge on design activities method throughout the course. The students shall be able to analyze advanced product architecture and product design specification. User interaction in relation to the user needs and design concepts is the second topic to be discussed in this course. The course will enhance student in designing skill and communication by combining advanced technology and design elements in the project.

**Course outcomes:**

1. Ability to ANALYZE product part and function in relation to user need using suitable methods and techniques and appropriate design method in design activities.
2. Ability to CONSTRUCT investigations and product testing to provide valid product function and usability.
3. Ability to work as an individual and teamwork to COMPLETE a project and able to communicate effectively on broadly defined-engineering activities.

**MMK37503 PENGURUSAN PRODUK BAGI PEREKA BENTUK [PRODUCTION MANAGEMENT FOR DESIGNERS]****No of Credits: 3****Course synopsis:**

Students will learn this course through some case studies where the product and its system development are analyzed in the aspect of design, function and usability based on design guidelines. Students also will be exposed to professional approaches practiced in industry and consulting including project organization and management. Student will learn the professional and ethical responsibilities, corporate identity, branding, and design portfolio concept.

**Course outcomes:**

1. To DEMONSTRATE the corporate identity in the product design.
2. Ability to ANALYZE in the aspect of design, usability and function.
3. Ability to EVALUATE the product based on design guidelines.

**MMK37603 PENGKAJIAN PRODUK DAN AMALAN PROFESIONAL [PRODUCT STUDY & PROFESSIONAL PRACTICE]****No of Credits: 3****Course synopsis:**

Students will learn this course through some case studies where the product and its system development are analyzed in the aspect of design, function and usability based on design guidelines. Students also will be exposed to professional approaches practiced in industry and consulting including project organization and management. Student will learn the professional and ethical responsibilities, corporate identity, branding, and design portfolio concept.

**Course outcomes:**

1. To demonstrate the corporate identity in the product design
2. Ability to analyze in the aspect of design, usability and function
3. Ability to evaluate the product based on design guidelines

**MMK37703 PERSEMBAHAN DIGITAL [DIGITAL RENDERING]****No of Credits: 3****Course synopsis:**

This course aims to introduce skills and knowledge related to computer graphics and work that can be implemented in the field of artificial product design. Students will be able to understand of computer hardware technology, software phenomena as well as creative field majors. This course covers personal computer construction work and the configuration, installation and implementation of software compatibility testing.

**Course outcomes:**

1. Ability to construct basic hardwares and softwares assembly and installation.
2. Ability to build computer graphics geometry data using CSG and NURBS.
3. Ability to compose still images and motions sequences output.
4. Ability to COMPOSE Virtual Reality geometry codes and Augmented Reality coding.

**MMK37803 REKA BENTUK UNTUK PERANTI PERUBATAN [DESIGN FOR MEDICAL DEVICE]****No of Credits: 3****Course synopsis:**

This course addresses major concepts, research and applications based on orthopaedic and joint implants/prosthetics design and development. The theory of bone growth and fracture provides the students with a fundamental understanding of bone behaviour. The course also exposes students to understand the major joint biomechanics and kinematics. Nevertheless, the regulations and medical device standards are also covered in this course to provide a broader picture to the authority bodies.

**Course outcomes:**

1. Ability to understand bone and major joints behaviour, biomechanics, and fracture
2. Ability to evaluate implant design problems from relevant data or literature to propose a valid design solution
3. Ability to evaluate customer needs with consideration to patents/ codes/ standards/ for a design safety/ cultural/ societal/ environmental and human.

**MMK47703 REKA BENTUK UNTUK PEMBUATAN DAN PEMASANGAN [DESIGN FOR MANUFACTURE AND ASSEMBLY]****No of Credits: 3****Course synopsis:**

This course introduces methods and tools that is used in the design process to ease the manufacture and assembly of the part. The term "Design for Manufacture (DFM)" means design for ease of manufacture of the parts or component that will form the product, and "Design for Assembly (DFA)" means to design the part/component for ease of assembly. Thus, in general "Design for Manufacture and Assembly (DFMA)" is the combination of DFA and DFM which directly purposed for (1) Simplify the structure of a product (2) Provide correct, good, and efficient design practices for designer and (3) Reduce the overall product development cost. Student will learn the design guidelines and rules in DFMA to develop suitable component design according to the Boothroyd Dewhurst DFA Methodology and do the assembly analysis based on handling and insertion time to determine Assembly Efficiency (AE). Student will also learn how to select the appropriate material and manufacturing process of each part or components based on the DFMA concept. Student will have a group project to analyse existing product then propose a better design in manufacturing and assembly aspect.

**Course outcomes:**

1. Ability to ANALYSE the existing design for part reduction process based on the concepts and principles of Design for Manufacturing and Assembly (DFMA) using Boothroyd Dewhurst DFA Method.
2. Ability to RECOMMEND the suitable materials and manufacturing process based of DFMA method to optimize the process selection.
3. Ability to ANALYSE the manufacturing processes such as casting, sheet metal working, and die casting to select the correct process parameters.
4. Ability to PROPOSE new design and/or simplify the existing components for products studied in the "Mini Project" based on the DFMA concept.

**MMK28203 PENCIRIAN BAHAN [MATERIALS CHARACTERIZATION]****No Of Credits: 3****Course Synopsis:**

This course is designed to expose students the basic principles of materials characterization. The materials characterization are divided into several sections, including Surface or Topography examination (LM,SEM,SPM), Thermal Analysis (TGA,DSC,DTA), Phase Analysis (XRD) as well as Spectroscopy Analysis (FTIR, AAS).

**Course Outcome:**

1. Ability to select suitable characterization technique to characterize the materials.
2. Ability to determine a materials characterization concept and method.
3. Ability to categorise a material via various characterization techniques.
4. Ability to elaborate physical properties of materials through various characterization technique for materials selection purposes.

**MMK28303 PEMROSESAN SERAMIK TEMBIKAR PUTIH [WHITEWARE CERAMICS PROCESSING]****No Of Credits: 3****Course Synopsis:**

Whiteware refers to ceramic ware that is white, ivory, or light gray in color after firing. Student will be exposed to introduction to the traditional whiteware ceramics materials including types, properties and their applications. Moreover, traditional ceramics processing methods including different shaping techniques, drying, firing and glazing processes are conducted.

**Course Outcome:**

1. Ability to examine the fundamental concept in whiteware ceramic

- processing including raw materials used, properties, preparation technique.
2. Ability to compare different types of shaping technique in whiteware ceramic processing.
3. Ability to analyze the detail process of drying, firing and glazing in fabrication of whiteware ceramic materials
4. Ability to operate the equipment and instrument used in whiteware ceramic processing.

**MMK28403 TEKNOLOGI PENGEKSTRAKAN LOGAM [METAL EXTRACTION TECHNOLOGY]****No Of Credits: 3****Course Synopsis:**

This course will introduce students to mineral processing and general principle in extracting metal from ore by using metal extraction methods; hydrometallurgy, electrometallurgy and pyrometallurgy. This course will expose students to the advantages of mineral processing and other mineral separation process, leaching technique, electro-recovery and electro-purification of the ore and ore treatment at high temperatures.

**Course Outcome:**

1. Ability to explain the principle and process involved in mineral processing.
2. Ability to analyse the theory in hydrometallurgy, electrometallurgy and pyrometallurgy.
3. Able to practice the principle and processes involved in mineral processing.
4. Ability to demonstrate mineral or metal extraction process from its ore using hydrometallurgy, electrometallurgy and pyrometallurgy.

**MMK28503 PEMROSESAN PLASTIK [PLASTIC PROCESSING]****No Of Credits: 3****Course Synopsis:**

This course is designed to provide students with a broad knowledge on the aspect of properties and physical basis of plastic processing, thermoplastic and thermoset processing methods, processing parameters, knowledge on the thermoplastic and thermoset compounding and additives. This also introduces the finishing and assembly of plastic end product and expose students to the impact of solid waste plastic to environment.

**Course Outcome:**

1. Able to examine the concept of plastic materials and the physical basis of plastic processing.
2. Able to prepare plastic products via different techniques parameter for thermoplastic and thermoset processing.
3. Able to propose the finishing and assembly of plastic processing end products.
4. Able to relate the environmental aspect of plastic products.

**MMK38103 KAWALAN PROSES [PROCESS CONTROL]****No Of Credits: 3****Course Synopsis:**

This course introduces basic knowledge of process control such as application of process control in daily life and in industry, principle of process control and the importance of learning this course. Students will learn to solve control system problem through simplification of block diagram, laplace transformation and stability. Lab session using Matlab enhanced the students understanding of this course.

**Course Outcome:**

1. Ability to DETERMINE types and essential features of process control, simplify block diagram and solve differential equation
2. Ability to FORMULATE different types of analysis to explain the nature of stability of the system.
3. Ability to CONSTRUCT coding to solve mathematical problems, matrix operations and transfer function using Matlab software

**MMK38303 TEKNOLOGI FABRIKASI LOGAM [METAL FABRICATION TECHNOLOGY]****No Of Credits: 3****Course Synopsis:**

This course provides knowledge and practice focusing on developing and improving technical skills and knowledge student on different types of metal fabrication techniques such as welding, fitting and cutting. Through this course, advanced concepts and technical skills related to various metal fabrication techniques able to be developed through applications and comprehensive practical skills. Students will have opportunities to reinforce, apply and transfer knowledge and skills to a variety of setting and problems. This helps the student in comprehensive problem solving which related to metal fabrication technology.

**Course Outcome:**

1. Ability to analyse the basic process, concepts, tool and techniques in angular measurement, fitting, and metal forming.
2. Ability to evaluate the joining process and the different types of cutting process
3. Ability to manipulate the apparatus and equipment of fitting process in the laboratory.
4. Ability to perform joining process and cutting process such its type, process, mechanism, and application.

**MMK38403 PEMROSESAN BAHAN KOMPOSIT [COMPOSITES MATERIALS PROCESSING]****No Of Credits: 3****Course Synopsis:**

This course is designed to provide the students fundamental knowledge and the important concepts in composite material classification such as metal matrix composites, ceramic matrix composites, polymer matrix composites. Besides that, processing techniques, physical and mechanical properties and limitation of each type of the composites need to be focused. Moreover, students are able to analysis and solve the problems present in the composites system by applying the formulations and calculations. The students are also able to elaborate the fabrication of each composite materials using conventional and advanced processing.

**Course Outcome:**

1. Ability to analyse and relate the knowledge of science and engineering specialisation to the solution of composite materials processing problems.
2. Ability to appraise science and engineering technology principle to the solution of composite materials
3. Ability to indicate problems and follow a suitable fabrication technique of composite materials to develop better composite system.
4. Ability to perform failure test of behavior and strengthening mechanism of composite materials.

**MMK38503 PEMILIHAN BAHAN DAN REKA BENTUK [MATERIAL SELECTION AND DESIGN]****No Of Credits: 3****Course Synopsis:**

This course builds an understanding of the inter-relationship between selection, materials processing, product design (material, design, and processing), and product performance to develop a holistic approach to the optimum selection of materials for engineering and industrial applications. The focuses of this course are fundamentals of the design process, specifications, decision-making, materials selection, materials process, experimental design, statistical process control, and preliminary design. The course integrates vertically and horizontally concepts from all areas of engineering technology and material processing and into a practical design project designed to train the students in the design practice

**Course Outcome:**

1. Able to relate the fundamental of materials selection and design.
2. Able to evaluate materials knowledge, processing, microstructure, and performance and their implication with materials design
3. Able to design and make a selection material using a method: performance index and efficiency of materials, Weibull modulus, based on mechanical factors, semi-quantitative, and others
4. Ability to communicate with team members and public during gaining solution to problem and to make effective presentation to convince the solution provided.
5. Ability to work with team members effectively in carrying out and complete tasks assigned.

**MMK48103 BAHAN UNTUK TENAGA DAN KEMAMPAKAN ALAM SEKITAR [MATERIAL FOR ENERGY AND ENVIRONMENTAL SUSTAINABILITY]****No Of Credits: 3****Course Synopsis:**

This course builds an understanding of critical relationship between the environment, energy and sustainability. It will exposed the student to the development and application of materials in sustainable energy production. In this subject, while chemistry is the underlying scientific basis, materials are vital in enabling technologies that can offer promising solutions for sustainable energy future. Materials with new properties and improved functionalities are needed for boosting the performance and efficiency of the different types of processing thus the end product at lower cost.

**Course Outcome:**

1. Ability to examine the relationship between energy, environment and sustainability
2. Ability to demonstrate materials knowledge and processing on non-renewable and renewable energy.
3. Ability to evaluate the industrial case study in energy efficiency.
4. Ability to evaluate the green processing and recycling process.



## UR6521006

### Bachelor of Technology in Industrial Machining with Honours

#### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

##### PEO 1

To produce machining technologist that perform related work including machinist, design, manufacturer, maintenance, facility manager and production manager.

##### PEO 2

To produce technopreneurs in machining related technology.

##### PEO 3

To produce relevant, respected and referred professionals in machining technology

## PROGRAMME OUTCOMES (PO)

### P01

**Knowledge:** Apply knowledge of technology fundamentals to broadly-defined procedures processes, systems and methodologies in machining technology.

### P02

**Practical Skills and High Technology:** Able to suggest and apply latest tools and techniques to solve broadly-defined problems.

### P03

**Analytical, Critical Thinking and Scientific Approach:** Demonstrate strong analytical and critical thinking skills to solve broadly-defined problems in machining technology.

### P04

**Communication Skills:** Able to communicate and articulate effectively in both verbal and written among technologist communities and society at large.

### P05

**Social Responsibility in Society and Technologist Community:** Demonstrate understanding of the societal related issues and the consequent responsibilities relevant to broadly-defined technology practices.

### P06

**Lifelong Learning and Information Management:** Recognize the needs for professional development and to engage independent lifelong learning in specialist technologists.

### P07

**Technopreneurship and Management Skills:** Demonstrate an awareness of management and technopreneurship practices in real perspective.

### P08

**Ethics and Professionalism:** Demonstrate professionalism and social and ethical consideration.

### P09

**Teamwork and Leadership:** Demonstrate leadership quality, mentoring and work effectively in diverse teams

| CURRICULUM STRUCTURE                                                                   |                                                              |                                                                 |                                                                          |                                                        |                                                                      |                                                                        |          |                                 |
|----------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------------------|----------|---------------------------------|
| UR6521006 BACHELOR OF TECHNOLOGY IN INDUSTRIAL MACHINING WITH HONOURS INTAKE 2024/2025 |                                                              |                                                                 |                                                                          |                                                        |                                                                      |                                                                        |          |                                 |
| YEAR                                                                                   | FIRST                                                        |                                                                 | SECOND                                                                   |                                                        | THIRD                                                                |                                                                        |          | FOURTH                          |
| SEMESTER                                                                               | 1                                                            | 2                                                               | 3                                                                        | 4                                                      | 5                                                                    | 6                                                                      | BREAK    | 7                               |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES</b><br>(104 CREDITS)                 | MMT15003<br>Product Drafting and<br>Specification            | MMT15404<br>Tool Setup and<br>Refurbishment                     | MMT25004<br>Precision and<br>Finishing in CNC<br>Technology              | MMT25404<br>Multi Axis Machining                       | MMT35004<br>Assembly Method                                          | MMT31510<br>Final Year Project                                         |          | MMT49912<br>Industrial Training |
|                                                                                        | MMT15103<br>Standard Product<br>Precision                    | MMT15503<br>Sustainable<br>Machining                            | MMT25103<br>Precision and<br>Finishing in EDM and<br>Grinding Technology | MMT25503<br>Complex CAD/CAM<br>Product                 | **MMTXXX04<br>Electives                                              | MMT35304<br>Project<br>Management and<br>Supervision                   |          |                                 |
|                                                                                        | MMT15203<br>Workpiece and Cutting<br>Tool Properties         | MMT15603<br>Assessment of<br>Machinability                      | MMT25204<br>Prismatic CAD/CAM<br>Product                                 | MMT25603<br>Heat Treatment of<br>Machined<br>Component | MMT35104<br>Rework and<br>Rehabilitation of<br>Machined<br>Component | MMT35404<br>Acts and Risks<br>Assessment in<br>Machining<br>Production |          |                                 |
|                                                                                        | MMT15303<br>Jig and Fixture                                  | MMT15703<br>Condition Monitoring<br>in Machining                | MMT25304<br>Surface Aesthetics of<br>Machined<br>Component               | MMT25804<br>Technopreneur<br>Project 1                 | MMT35204<br>Technopreneur<br>Project 2                               | MMT35504<br>Machine<br>Maintenance                                     |          |                                 |
| <b>UNIVERSITY<br/>REQUIREMENT COURSES</b><br>(16 CREDITS)                              | SMZ1XX01<br>Co-Curriculum I                                  | SMZ2XX01<br>Co-Curriculum II                                    | SMB1XX02<br>Third Language <sup>[5]</sup>                                | SMU22402<br>Engineering<br>Entrepreneurship            | SMU13102<br>Appreciation of<br>Ethics and Civilization               |                                                                        |          |                                 |
|                                                                                        | SMB41002<br>University Malay<br>Language <sup>[3]</sup>      | SMU13002<br>Philosophy and Current<br>Issues                    | SMB31202<br>English for Technical<br>Communication                       |                                                        |                                                                      |                                                                        |          |                                 |
|                                                                                        | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup> | SMB20102<br>English for General<br>Communication <sup>[2]</sup> |                                                                          |                                                        |                                                                      |                                                                        |          |                                 |
| <b>TOTAL CREDITS</b><br>(124 CREDITS)                                                  | <b>17</b>                                                    | <b>18</b>                                                       | <b>19</b>                                                                | <b>16</b>                                              | <b>18</b>                                                            | <b>16</b>                                                              | <b>6</b> | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                                   | SMB10102<br>Preparatory English <sup>[1]</sup>               |                                                                 |                                                                          |                                                        |                                                                      |                                                                        |          |                                 |

**Elective courses:** MMT35604 Tool and Die Making, MMT35704 Aerospace Machining, MMT35804 Rapid Machining, MMT35903 Human Factor Technology, MMT36004 Production Planning in Machining.

- [1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.  
 [2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.  
 [3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.  
 [4] International students should register SMU13202 Malaysian Studies.  
 [5] SMB1XX02: Germany, Mandarin or Japanese

## UR6525001 Bachelor of Technology in Automotive with Honours

### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

#### PEO 1

To produce automotive technologists that perform automotive related work including diagnostic specialist and retrofit specialist

#### PEO 2

To produce technopreneurs in automotive related technology

#### PEO 3

To produce relevant respected referred professionals in automotive technology.

## PROGRAMME OUTCOMES (PO)

### P01

Knowledge: Apply knowledge of technology fundamentals to broadly-defined procedures, processes, systems, and methodologies in the field of automotive study.

### P02

Practical Skills/ Modern Tools Usage: Able to suggest and apply latest tools and techniques to solve broadly-defined problems.

### P03

Analytical, Critical Thinking and Scientific Approach: Demonstrate strong analytical and critical thinking skills to solve broadly-defined problems in automotive study.

### P04

Communication Skills: Able to communicate and articulate effectively in both verbal and written among technologist communities and society at large.

### P05

Social and responsibility in society and Technologist community: Demonstrate understanding of the societal related issues and the consequent responsibilities relevant to broadly-defined technology practices

### P06

Life Long Learning and Information Management: Recognize the needs for professional development and to engage independent lifelong learning in specialist technologists.

### P07

Entrepreneurs and Management skills: Demonstrate an awareness of management and technopreneurship practices in real perspective.

### P08

Ethics and Professionalism: Demonstrate professionalism and social and ethical consideration.

### P09

Team work and Leadership: Demonstrate leadership quality, mentoring and work effectively in diverse teams.



| CURRICULUM STRUCTURE                                                         |                                                          |                                                              |                                                 |                                          |                                                     |                                          |          |                                 |
|------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------|------------------------------------------|-----------------------------------------------------|------------------------------------------|----------|---------------------------------|
| UR6525001 BACHELOR OF TECHNOLOGY IN AUTOMOTIVE WITH HONOURS INTAKE 2024/2025 |                                                          |                                                              |                                                 |                                          |                                                     |                                          |          |                                 |
| YEAR                                                                         | FIRST                                                    |                                                              | SECOND                                          |                                          | THIRD                                               |                                          |          | FOURTH                          |
| SEMESTER                                                                     | 1                                                        | 2                                                            | 3                                               | 4                                        | 5                                                   | 6                                        | BREAK    | 7                               |
| <b>DISCIPLINE CORE &amp; ELECTIVE COURSES</b><br>(104 CREDITS)               | MMT11004<br>Automotive Industry & Technology             | MMT11303<br>Shop floor Supervision                           | MMT21003<br>Project Management                  | MMT21204<br>Powertrain System Service    | MMT31003<br>Automotive Legislation                  | MMT31510<br>Final Year Project           |          | MMT49912<br>Industrial Training |
|                                                                              | MMT11103<br>Automotive Drafting                          | MMT11404<br>Automotive Component Design & Assembly           | MMT21104<br>Autotronic System Service           | MMT21304<br>Technopreneur Project 1      | MMT31104<br>Technopreneur Project 2                 | MMT31403<br>Risk Assessment              |          |                                 |
|                                                                              | MMT11204<br>Automotive Workshop Practice                 | MMT11504<br>Automotive Component Fabrication                 | MMTXXX04<br>Elective I                          | MMTXXX04<br>Elective III                 | MMTXXX04<br>Elective V                              | MMT31306<br>Quality Management           |          |                                 |
|                                                                              |                                                          |                                                              | MMTXXX04<br>Elective II                         | MMTXXX04<br>Elective IV                  | MMTXXX04<br>Elective VI                             | MMT31603<br>Asset & Inventory Management |          |                                 |
|                                                                              |                                                          |                                                              |                                                 |                                          | MMT31202<br>Vehicle Marketing                       |                                          |          |                                 |
| <b>UNIVERSITY REQUIREMENT COURSES</b><br>(16 CREDITS)                        | SMZ1XX01<br>Co-Curriculum I                              | SMZ2XX01<br>Co-Curriculum II                                 | SMB1XX02<br>Third Language <sup>[5]</sup>       | SMU22402<br>Engineering Entrepreneurship | SMU13102<br>Appreciation of Ethics and Civilization |                                          |          |                                 |
|                                                                              | SMB41002<br>University Malay Language <sup>[3]</sup>     | SMU13002<br>Philosophy and Current Issues                    | SMB31202<br>English for Technical Communication |                                          |                                                     |                                          |          |                                 |
|                                                                              | SMU12102<br>Integrity and Anti-Corruption <sup>[4]</sup> | SMB20102<br>English for General Communication <sup>[2]</sup> |                                                 |                                          |                                                     |                                          |          |                                 |
| <b>TOTAL CREDITS</b><br>(122 CREDITS)                                        | <b>16</b>                                                | <b>16</b>                                                    | <b>19</b>                                       | <b>18</b>                                | <b>19</b>                                           | <b>16</b>                                | <b>6</b> | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                         | SMB10102<br>Preparatory English <sup>[1]</sup>           |                                                              |                                                 |                                          |                                                     |                                          |          |                                 |

**Elective I** : MMT21404 Commercial Vehicle Servicing / MMT21504 Surface Design  
**Elective II** : MMT21604 Drivetrain Maintenance / MMT21704 Automotive Modelling  
**Elective III** : MMT21804 Vehicle Performance Analysis / MMT21904 Exterior Design  
**Elective IV** : MMT22004 Vehicle Fault Diagnosis / MMT22104 Component Remanufacturing  
**Elective V** : MMT31704 Hybrid Servicing / MMT31804 Interior Design  
**Elective VI** : MMT31904 Electric Vehicle Service / MMT32004 Painting

- <sup>[1]</sup> Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.  
<sup>[2]</sup> Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.  
<sup>[3]</sup> International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.  
<sup>[4]</sup> International students should register SMU13202 Malaysian Studies.  
<sup>[5]</sup> SMB1XX02: Germany, Mandarin or Japanese



## UR6521005 Bachelor of Technology in Welding with Honours

### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

#### PEO 1

To produce welding technologist that perform related welding work including maintenance, fabricator, design, safety advisor and production manager

#### PEO 2

To produce technopreneurs in related welding technology.

#### PEO 3

To produce relevant respected referred professionals in welding technology

## PROGRAMME OUTCOMES (PO)

### P01

Knowledge: Apply knowledge of technology fundamentals to **broadly-defined** procedures processes, systems and methodologies in **welding technology**.

### P02

Practical Skills/ Modern Tools Usage: Able to suggest and apply latest tools and techniques to solve **broadly-defined** problems.

### P03

Analytical, Critical Thinking and Scientific Approach: Demonstrate strong analytical and critical thinking skills to solve broadly-defined problems in welding technology.

### P04

Communication Skills: Able to **communicate and articulate** effectively in both verbal and written among technologist communities and society **at large**.

### P05

Social and responsibility in society and Technologist community: Demonstrate understanding of the societal related issues and the consequent responsibilities relevant to **broadly-defined** technology practices

### P06

Life Long Learning and Information Management: Recognize the needs for professional development and to engage independent lifelong learning in **specialist technologists**.

### P07

Entrepreneurs and Management skills: Demonstrate an awareness of management and technopreneurship practices in real perspective

### P08

Ethics and Professionalism: Demonstrate professionalism and social and ethical consideration.

### P09

Team work and Leadership: Demonstrate leadership quality, mentoring and work effectively in diverse teams.

| CURRICULUM STRUCTURE<br>UR6521005 BACHELOR OF TECHNOLOGY IN WELDING WITH HONOURS INTAKE 2024/2025 |                                                              |                                                                 |                                              |                                                    |                                                        |                                                   |          |                                 |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------|----------------------------------------------------|--------------------------------------------------------|---------------------------------------------------|----------|---------------------------------|
| YEAR                                                                                              | FIRST                                                        |                                                                 | SECOND                                       |                                                    | THIRD                                                  |                                                   |          | FOURTH                          |
| SEMESTER                                                                                          | 1                                                            | 2                                                               | 3                                            | 4                                                  | 5                                                      | 6                                                 | BREAK    | 7                               |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES<br/>(104 CREDITS)</b>                           | MMT13004<br>CAD and Welding<br>Graphic                       | MMT13303<br>Product Design in<br>Welding                        | MMT23004<br>Material Behaviour in<br>Welding | MMT23604<br>Computer Aided<br>Analysis             | MMT33004<br>Welding Quality<br>Assurance               | MMT31510<br>Final Year Project                    |          | MMT49912<br>Industrial Training |
|                                                                                                   | MMT13104<br>Safety in Welding                                | MMT13404<br>Welding<br>Documentation                            | MMT23104<br>Safety Management                | MMT23704<br>Imperfection in<br>Welding and Testing | MMT33104<br>Economic of<br>Welding and<br>Procurement  | MMT33403<br>Cyber Physical<br>System in Welding   |          |                                 |
|                                                                                                   | MMT13204<br>Metal Fabrication<br>Process                     | MMT13504<br>Non-Conventional<br>Welding Process                 | MMT23204<br>Welding Design<br>Analysis       | MMT23804<br>Welding Electrical<br>Equipment        | MMT33204<br>Non -Destructive Test                      | MMT33504<br>Reclamation<br>Workshop               |          |                                 |
|                                                                                                   |                                                              |                                                                 | ELECTIVE*                                    | MMT23904<br>Technopreneur<br>Project 1             | MMT33304<br>Technopreneur<br>Project 2                 | MMT33604<br>Managing<br>Production<br>Supervisory |          |                                 |
| <b>UNIVERSITY REQUIREMENT<br/>COURSES<br/>(16 CREDITS)</b>                                        | SMZ1XX01<br>Co-Curriculum I                                  | SMZ2XX01<br>Co-Curriculum II                                    | SMB1XX02<br>Third Language <sup>[5]</sup>    | SMB31202<br>English for Technical<br>Communication | SMU13102<br>Appreciation of<br>Ethics and Civilization |                                                   |          |                                 |
|                                                                                                   | SMB41002<br>University Malay<br>Language <sup>[3]</sup>      | SMU13002<br>Philosophy and Current<br>Issues                    |                                              |                                                    |                                                        |                                                   |          |                                 |
|                                                                                                   | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup> | SMB20102<br>English for General<br>Communication <sup>[2]</sup> |                                              |                                                    |                                                        |                                                   |          |                                 |
|                                                                                                   |                                                              | SMU22402<br>Engineering<br>Entrepreneurship                     |                                              |                                                    |                                                        |                                                   |          |                                 |
| <b>TOTAL CREDITS<br/>(122 CREDITS)</b>                                                            | <b>16</b>                                                    | <b>16</b>                                                       | <b>19</b>                                    | <b>18</b>                                          | <b>19</b>                                              | <b>16</b>                                         | <b>6</b> | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                                              | SMB10102<br>Preparatory English <sup>[1]</sup>               |                                                                 |                                              |                                                    |                                                        |                                                   |          |                                 |

**ELECTIVE\* : MMT23304 Welding Technology / MMT23404 NDT Professional / MMT23504 Welding Inspection**

- [1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.  
 [2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.  
 [3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.  
 [4] International students should register SMU13202 Malaysian Studies.  
 [5] SMB1XX02: Germany, Mandarin or Japanese

**LIST OF COURSES:**

| COURSE CODE | COURSE NAME                                                                                                        |
|-------------|--------------------------------------------------------------------------------------------------------------------|
| MMT15003    | Lukisan Produk Dan Spesifikasi [Product Drafting And Specification]                                                |
| MMT15103    | Kepersisan Produk Piawaian [Standard Product Precision]                                                            |
| MMT15203    | Sifat-Sifat Bahan Kerja Dan Alat Pemotong [Workpiece And Cutting Tool Properties]                                  |
| MMT15303    | Jig Dan Lekapan [Jig And Fixtures]                                                                                 |
| MMT15404    | Penyediaan Dan Baik Pulih Mata Alat [Tool Setup And Refurbishment]                                                 |
| MMT15503    | Pemesinan Mapan [Sustainable Machining]                                                                            |
| MMT15603    | Taksiran Kebolehmesinan [Assessment Of Machinability]                                                              |
| MMT15703    | Pemantauan Keadaan Dalam Pemesinan [Condition Monitoring In Machining]                                             |
| MMT25004    | Kepersisan Dan Kemasan Dalam Teknologi CNC [Precision And Finishing In CNC Technologies]                           |
| MMT25103    | Kepersisan Dan Kemasan Dalam Teknologi EDM Dan Pencanaian [Precision And Finishing In EDM And Grinding Technology] |
| MMT25204    | Produk CAD/CAM Prismatic [Prismatic CAD/CAM Product]                                                               |
| MMT25304    | Estetika Permukaan Komponen Mesin [Surface Aesthetic Of Machined Component]                                        |
| MMT25404    | Pemesinan Berbilang Paksi [Multi Axis Machining]                                                                   |
| MMT25503    | Produk Cadcam Kompleks [Complex Cadcam Product]                                                                    |
| MMT25603    | Rawatan Haba Komponen Mesin [Heat Treatment Of Machined Component]                                                 |
| MMT25804    | Projek Keusahawanan Teknologi 1 [Technopreneur Project 1]                                                          |
| MMT35004    | Kaedah Pemasangan [Assembly Method]                                                                                |
| MMT35104    | Kerja Semula Dan Pemulihan Komponen Mesin [Rework And Rehabilitation Of Machined Components]                       |

| COURSE CODE | COURSE NAME                                                                                                      |
|-------------|------------------------------------------------------------------------------------------------------------------|
| MMT35204    | Projek Keusahawanan Teknologi 2 [Technopreneur Project 2]                                                        |
| MMT35704    | Pemesinan Aeroangkasa [Aerospace Machining]                                                                      |
| MMT31510    | Projek Tahun Akhir [Final Year Project]                                                                          |
| MMT35304    | Pengurusan Dan Penyeliaan Projek [Project Management And Supervision]                                            |
| MMT35404    | Taksiran Pembuatan Dan Risiko Di Dalam Pengeluaran Pemesinan [Acts And Risks Assessment In Machining Production] |
| MMT35504    | Penyenggaraan Mesin [Machine Maintenance]                                                                        |
| MMT49912    | Latihan Industri [Industrial Training]                                                                           |
| MMT11004    | Automotive Industry & Technology                                                                                 |
| MMT11103    | Automotive Drafting                                                                                              |
| MMT11204    | Automotive Workshop Practice                                                                                     |
| MMT11303    | Shopfloor Supervision                                                                                            |
| MMT11404    | Automotive Component Design and Assembly                                                                         |
| MMT11504    | Automotive Component Fabrication                                                                                 |
| MMT21003    | Project Management                                                                                               |
| MMT21104    | Autotronic System Service                                                                                        |
| MMT21404    | Commercial Vehicle Servicing                                                                                     |
| MMT21504    | Surface Design                                                                                                   |
| MMT21604    | Drivetrain Maintenance                                                                                           |

| COURSE CODE | COURSE NAME                                        |
|-------------|----------------------------------------------------|
| MMT 21704   | Automotive Modelling                               |
| MMT21204    | Powertrain System Service                          |
| MMT21304    | Technopreneur Project 1                            |
| MMT21804    | Vehicle Performance Analysis                       |
| MMT21904    | Exterior Design                                    |
| MMT22004    | Vehicle Fault Diagnosis                            |
| MMT22104    | Component Remanufacturing                          |
| MMT31003    | Automotive Legislation                             |
| MMT31104    | Technopreneur Project 2                            |
| MMT31202    | Vehicle Marketing                                  |
| MMT31704    | Hybrid Servicing                                   |
| MMT31804    | Interior Design                                    |
| MMT31904    | Electric Vehicle Service                           |
| MMT32004    | Painting                                           |
| MMT31306    | Quality Management                                 |
| MMT31403    | Risk Assessment                                    |
| MMT31603    | Asset & Inventory Management                       |
| MMT13004    | CAD dan Grafik Kimpalan [CAD And Welding Graphics] |



| COURSE CODE | COURSE NAME                                                                          |
|-------------|--------------------------------------------------------------------------------------|
| MMT13104    | Keselamatan Dalam Kimpalan [Safety In Welding]                                       |
| MMT13204    | Proses Fabrikasi Logam [Metal Fabrication Process]                                   |
| MMT13303    | Rekabentuk Produk Dalam Kimpalan [Product Design In Welding]                         |
| MMT13404    | Dokumentasi Kimpalan [Welding Documentation]                                         |
| MMT13504    | Proses Kimpalan Bukan Konvensional [Non-Conventional Welding Process]                |
| MMT23004    | Perilaku Bahan Dalam Kimpalan [Material Behaviour In Welding]                        |
| MMT23104    | Pengurusan Keselamatan [Safety Management]                                           |
| MMT23204    | Analisis Rekabentuk Kimpalan [Welding Design Analysis]                               |
| MMT23304    | Teknologi Kimpalan Untuk Profesional [Welding Technology For Professional]           |
| MMT23404    | Ujian Tanpa Musnah Untuk Profesional [NDT For Professional]                          |
| MMT23504    | Pemeriksaan Kimpalan Untuk Profesional [Welding Inspection For Professional]         |
| MMT23604    | Analisis Berbantu Komputer [Computer Aided Analysis]                                 |
| MMT23704    | Pengujian Dan Ketidaksempurnaan Dalam Kimpalan [Imperfection In Welding And Testing] |
| MMT23804    | Peralatan Kimpalan Elektrik [Welding Electrical Equipment]                           |
| MMT23904    | Projek Keusahawanan Teknologi 1 [Technopreneur Project 1]                            |
| MMT33004    | Jaminan Kualiti Kimpalan [Welding Quality Assurance]                                 |
| MMT33104    | Ekonomi Kimpalan Dan Perolehan [Economic Of Welding And Procurement]                 |
| MMT33204    | Ujian Tanpa Musnah [Non -Destructive Test]                                           |

| COURSE CODE | COURSE NAME                                                                 |
|-------------|-----------------------------------------------------------------------------|
| MMT33304    | Projek Keusahawanan Teknologi 2 [Technopreneur Project 2]                   |
| MMT33403    | Sistem Fizikal Siber Dalam Kimpalan [Cyber Physical System In Welding]      |
| MMT33504    | Bengkel Pemulihan [Reclamation Workshop]                                    |
| MMT33604    | Pengurusan Pengeluaran Dan Pengawasan [Managing Production And Supervision] |

**MMT15003 LUKISAN PRODUK DAN SPESIFIKASI [PRODUCT DRAFTING AND SPECIFICATION]****No of Credits: 3****Course Synopsis:**

This course teaches the students on product drafting and specification principles. Students are required to learn topics on part drawings such as geometries, sectional views and multi-view drawings. Students will learn to use CAD software to produce part drawings and apply the lettering functions, product tolerances and dimensions. Students will also learn the method for assembling the individual parts and generate the assembly drawing of the product. Finally, students will be taught to interpret part drawings especially from 2-dimensional industrial part drawings.

**Course Outcomes:**

1. Ability to apply knowledge required for product drafting processes based on part examination, analysis and interpretation suitable for machining processes.
2. Ability to demonstrate the ability to produce 2D and 3D part drafting complete with technical specifications suitable for machining processes.
3. Ability to justify reasons of applying the chosen drafting requirements to meet objectives of the project.

**MMT15103 KEPERSISAN PRODUK PIAWAIAN [STANDARD PRODUCT PRECISION]****No of Credits: 3****Course Synopsis:**

This course teaches the students about the principles and methods of applying product precision based on the standards for the machining of parts and product. Basically, the application involves with dimensional metrology and quality control of the machined parts and the relationship between those two fields of knowledge. Students will learn to use the dimensional metrology equipment for linear and angular measurements, surface measuring equipment and a coordinate measuring machine. Students will also learn and apply the quality control tools (7 QC Tools) and sampling method for quality control proses.

**Course Outcomes:**

1. Ability to discuss and explain knowledge required for product precision according to the standards related to industrial machining processes.
2. Demonstrate the ability to measures and constructs the required techniques for metrology and measurements using various inspection and quality control tools.

3. Able to organize a task for using selecting range of measuring tools/ equipments and FORMULATE multi-control planning charts to solve the problem gives.

**MMT15203 SIFAT-SIFAT BAHAN KERJA DAN ALAT PEMOTONG [WORKPIECE AND CUTTING TOOL PROPERTIES]****No of Credits: 3****Course Synopsis:**

This course covers types, setup, applications and specifications of common cutting tools and workpiece materials that frequently applied in industry. The course also introduces why the selection of the appropriate cutting tools and cutting fluids are essential in metal cutting operations to reduce the heat and friction produced during material removal operations and how the selection, setup and applications affect the quality, accuracy, efficiency and productivity of the workpiece produced.

**Course Outcomes:**

1. Ability to discuss the properties of common cutting tools and workpiece material that being applied in industries.
2. Ability to classify the usage of cutting tools and workpiece materials in the specific application in industry.
3. Ability to construct manufacturing process to produce cutting tool and/or workpiece materials.

**MMT15303 JIG DAN LEKAPAN [JIG AND FIXTURES]****No of Credits: 3****Course Synopsis:**

This subject introduces students to jig and fixture. It starts with types and functions of jig and fixture. In addition, students will be exposed to knowledge about classification of jig and fixture for selected operation. This course also introduces student to identify the principles and analysis of a tool design in jig and fixture application. The tool drawing is important to students in order to design the jig and fixture therefore the guideline of tool and jig design are explained.

**Course Outcomes:**

1. Ability to apply the knowledge to use the proper work holding, clamping mechanism and specialized work holding systems through effective designs of jig and fixtures.
2. Ability to follow the specific design and manufacturing process to build the jig and fixtures.
3. Ability to organize a task for integrating multi-components to fabricate the jig and fixtures.

**MMT15404 PENYEDIAAN DAN BAIK PULIH MATA ALAT [TOOL SETUP AND REFURBISHMENT]****No of Credits: 4****Course Synopsis:**

This course covers type, setup, applications and specifications of common cutting tools that frequently applied in industry. The course also introduces why the selection of the appropriate cutting tools are essential in metal cutting operations to reduce the heat and friction produced during material removal operations. In addition, how the selection, setup and applications affect the quality, accuracy, efficiency and productivity of the workpiece produced also will be covered. It also focuses on fundamentals required to refurbish cutting tools that would enable the industry to prolong the life of each cutting tools.

**Course Outcomes:**

1. Ability to analyze the difference design of cutting tools and its application in machining operations.
2. Ability to perform the cutting tool setup for turning, milling and drilling operations.
3. Ability to propose the usage of refurbished cutting tools in machining operation

**MMT15503 PEMESINAN MAPAN [SUSTAINABLE MACHINING]****No of Credits: 3****Course Synopsis:**

This subject covers the recent technologies in sustainable machining processes. It starts with principles, applications and direction of sustainable manufacturing. Furthermore, students will be exposed to knowledge related to coolant-lubricant strategies, eco-friendly metal cutting fluids and energy/power consumption in machining operations. This course also introduces students to machining cost, design of experiments and life cycle assessments in the machining processes.

**Course Outcomes:**

1. Ability to apply knowledge to illustrate sustainable concepts appropriate to the machining processes.
2. Ability to follow the concepts and techniques in responding the output/data of the machining.
3. Ability to organize a task that integrates methods and justify reasons for application in machining processes.

**MMT15603 TAKSIRAN KEBOLEHMESINAN [ASSESSMENT OF MACHINABILITY]****No of Credits: 3****Course Synopsis:**

This course provides students with the measurement of machining performances i.e. machinability. Machinability is an indicator of one engineering material on how easy or difficult to be machined to achieve acceptable performances. Engineers are often challenged to find ways to improve machinability without harming material performance, which are focused on the machining efficiency and productivity. However, unlike most material properties, machinability cannot be simplified into a unique work material property, but rather considering as a resultant property of the machining system which is mainly affected by work material as well as physical properties, heat treatment processes, and work-hardening behavior, cutting tool materials, tool geometry, machining operation type, cutting conditions and cutting fluids. In addition factors and method for improving machinability are also covered in this course. This course covers various topics such as factors affecting machinability in surface finish, cutting force, material removal rate, tool life and wear rate, and chip formation and wear mechanism.

**Course Outcomes:**

1. Ability to define the factors that is governed or influenced on the machinability.
2. Ability to demonstrate a various type of assessment according to the standards related to assessment of machinability.
3. Ability to organize a various method of improvement for machinability.

**MMT15703 PEMANTAUAN KEADAAN DALAM PEMESINAN [CONDITION MONITORING IN MACHINING]****No of Credits: 3****Course Synopsis:**

This course teaches students the fundamental concepts of condition monitoring technique and its application in the industry. Students will also learn to utilize several tools to monitor and analyze signals from machine such as vibration, acoustic and electrical current. In addition, conventional methods such as visual inspection, machine performance and trend monitoring will also be used to examine machine condition. Basic analysis methods will also be learned in this course to identify the root problem. Finally, common types of machine maintenance such as corrective and preventive maintenances will be exposed to the students.

**Course Outcomes:**

1. Ability to explain knowledge regarding machine condition monitoring technique, its application and related tools used.
2. Ability to demonstrate and perform the required techniques and skills to be applied in machine condition monitoring.
3. Ability to formulates the systematic planning in identifying machine problem using related tools.

**MMT25004 KEPERSISAN DAN KEMASAN DALAM TEKNOLOGI CNC [PRECISION AND FINISHING IN CNC TECHNOLOGIES]****No of Credits: 4****Course Synopsis:**

This course provides student with concept and practices of CNC machining process. It emphasis on how to program and operate CNC milling and CNC turning. Students will learn to develop the CNC program base on G-Code and M-Code languages. In addition, student will acquire in specific knowledge and skill in precision and finishing processes such as drilling, tapping, boring, grooving, facing, pocketing, radius forming, angular cutting and threading.

**Course Outcomes:**

1. Ability to explain applications of 2 and 3 axis CNC Machining.
2. Ability to develop programs and conduct processes using coordinate system and ISO coding system for turning and milling processes.
3. Ability to manage CNC machining processes with a good precision and finishing requirement.

**MMT25103 KEPERSISAN DAN KEMASAN DALAM TEKNOLOGI EDM DAN PENCANAIAAN [PRECISION AND FINISHING IN EDM AND GRINDING TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This subject introduces students to Electrical Discharge Machine (EDM) and grinding technologies. In addition, students will be exposed to knowledge about classification of EDM and grinding technologies for selected operation. This course also will introduce student to identify the principles and analysis of a tool design and tool manufactured in both machine application. In this course, the tool drawing is important to students in order to operate and manage the machine in laboratory.

**Course Outcomes:**

1. Ability to analyze and differentiate the abilities and principle of EDM and grinding machine.
2. Ability to construct and creates program by using a coordinate system for EDM and grinding for machining solution.
3. Ability to organize and prepare the production by using EDM and grinding machines to produce components.

**MMT25204 PRODUK CADCAM PRISMATIK [PRISMATIC CADCAM PRODUCT]****No of Credits: 4****Course Synopsis:**

This course teaches the students on the principles and application of CADCAM system used in manufacturing industries. Students are required to learn the concepts and applications of CADCAM as used in the industries for product development and machining processes. Students will use CAD software to produce 3-dimensional (3D) models including parts and their assembly followed by generating 2-dimensional (2D) drafting. Students will also learn the CAM software that can be used to simulate the 3D machining processes of the developed parts in order to generate numerical control (NC) codes for the CNC machines. This course focuses on prismatic products that can only be machined using 3-axis milling machines and 2-axis lathe machines.

**Course Outcomes:**

1. Ability to apply knowledge required for prismatic product development that can be machined using 3-axis milling machines and 2-axis lathe machines.
2. Ability to construct 2D and 3D product drawings. Use the drawings to simulate machining processes and produce the NC programs for milling and lathe CNC machines.
3. Ability to justify reasons of applying the chosen processes to meet objectives of the project.

**MMT25304 ESTETIKA PERMUKAAN KOMPONEN MESIN [SURFACE AESTHETIC OF MACHINED COMPONENT]****No of Credits: 4****Course Synopsis:**

This course covers many types of coating methods for machined component performance and aesthetics. It explains the fundamentals of coating technologies, as well as the testing and procedures for each coating method. Physical Vapor Deposition, Chemical Vapor Deposition, Electroless Plating, Chroming, Embossing, Flame Surface Treatment, and Plasma Nitriding are some of the coating processes that will be discussed in detail.

**Course Outcomes:**

1. Ability to propose the suitable surface treatment process for suitable application.
2. Ability to organize a process to be applied to treat the surface from machining to coating.
3. Ability to present the benefit of fine surface finish of machined component to reduce operational costs.

**MMT25404 PEMESINAN BERBILANG PAKSI [MULTI AXIS MACHINING]****No of Credits: 4****Course Synopsis:**

This course gives in depth knowledge to students regarding to the multi axis machining process. This process is conducted through the additional rotary axis of A, B and C on the CNC machine, instead of the 3-axes machining at X, Y and Z. Students will be introduced to the machine configuration and machine kinematics to have better understanding of the machine tools. They will also learn about the requirements of the clamping system, tooling and NC programming in order to produce complex parts from the process.

**Course Outcomes:**

1. Ability to differentiate the configuration, kinematics and technical requirements of the multi axis machine.
2. Ability to create NC programming for multi axis machining.
3. Ability to present the effectiveness of the machining strategy and any possibility of machine collision during the process.

**MMT25503 PRODUK CADCAM KOMPLEKS [COMPLEX CADCAM PRODUCT]****No of Credits: 3****Course Synopsis:**

This course teaches the students on the principles and application of CADCAM system used in manufacturing industries specifically for development of complex products. Students will use CAD software to produce 3-dimensional (3D) complex models including parts and their assembly followed by generating 2-dimensional (2D) drafting. Students will also learn the CAM software that can be used to simulate the 3D machining processes of the developed complex parts in order to generate numerical control (NC) codes for the CNC machines. This course focuses on complex products which will be developed using wireframe and surface design application that can be manufactured using 3-axis milling machines, 2-axis lathe machines and 5-axis CNC machines.

**Course Outcomes:**

1. Ability to apply knowledge required for analyzing prismatic product development that can be machined using 3-axis milling machines and 2-axis lathe machines.
2. Ability to construct 2D and 3D complex product drawings. Use the drawings to simulate machining processes and produce the NC programs for Milling and Lathe CNC machines.
3. Ability to justify reasons of applying the chosen processes to meet objectives of the project.



**MMT25603 RAWATAN HABA KOMPONEN MESIN [HEAT TREATMENT OF MACHINED COMPONENT]****No of Credits: 3****Course Synopsis:**

This course covers types, setup, applications and specifications of common cutting tools and workpiece materials that frequently applied in industry. The course also introduces why the selection of the appropriate cutting tools and cutting fluids are essential in metal cutting operations to reduce the heat and friction produced during material removal operations and how the selection, setup and applications affect the quality, accuracy, efficiency and productivity of the workpiece produced.

**Course Outcomes:**

1. Ability to differentiate the heat treatment application to change the properties of material.
2. Ability to conduct heat treatment to alter the properties of selected steel.
3. Ability to present the capability of heat-treated steel to be applied in other application.

**MMT25804 PROJEK KEUSAHAWANAN TEKNOLOGI 1 [TECHNOPRENEUR PROJECT 1]****No of Credits: 4****Course Synopsis:**

Entrepreneurs need money to start and to grow their business. It is important to understand how revenue is generated, how to source for funds, how to control cash flow, how to assess the success of the company in monetary terms, and how to value a company for various purposes. The course exposes non-business students to the various financial aspects relating to new ventures. These include approaches to secure start-up capital and venture financing. Students learn about the basic accounting, essential financial indicators, the types of funds available, the different categories of investors, the importance of intellectual property in securing finance, the financial details to be included in a business plan required for investment purpose, valuation of company and the art of negotiation with investors.

**Course Outcomes:**

1. Ability to apply and combine/compare various financial indicators & tools to prepare for financial information for a new business venture.
2. Ability to choose and adopt effective project management and technopreneur skills in solving given problems.
3. Ability to perform effectively teamwork and leadership skills in completing the technopreneur project

**MMT35004 KAEDAH PEMASANGAN [ASSEMBLY METHOD]****No of Credits: 4****Course Synopsis:**

This course is to introduce students to a design approach that focuses on ease of manufacture and assembly. It starts with guidelines and rules in designing each component of the product based on assembly analysis. In addition, students will also be exposed to the design for manufacture regarding the selection of appropriate materials and the manufacturing process. Eventually, students will be able to analyze product designs and suggest better design to facilitate product manufacture and assembly.

**Course Outcomes:**

1. Ability to analyze assembly efficiency to illustrate better product design.
2. Ability to revise the existing product design responding the assembly efficiency method.
3. Ability to organize a task that integrates methods and justify reasons for application in assembly method.

**MMT35104 KERJA SEMULA DAN PEMULIHAN KOMPONEN MESIN [REWORK AND REHABILITATION OF MACHINED COMPONENTS]****No of Credits: 4****Course Synopsis:**

This subject will teach students how to identify defects in machine components that can be reworked or rehabilitated. Students will learn about methods and processes for reworking and rehabilitating parts that are out of specification or tolerance. Students will also learn that rework is necessary when parts are out of tolerance due to machinability issues and machine faults during machining process. Whereas, when a part is out of tolerance due to wear and tear from prolonged use, a rehabilitation process is required. Students will be able to verify that the finished parts are within the specified tolerance at the end of this course, as well as gain an understanding of the effects of the rework and rehabilitation processes on the environment and their impact on the society.

**Course Outcomes:**

1. Ability to identify parts that can be reworked or rehabilitated.
2. Ability to propose methods or procedures for rework and rehabilitation process.
3. Ability to choose a method or process that has the least amount of impact on the environment and society.

**MMT35204 PROJEK KEUSAHAWANAN TEKNOLOGI 2 [TECHNOPRENEUR PROJECT 2]****No of Credits: 4****Course Synopsis:**

The start-up and growth of an enterprise invariably involves both human and financial capital. To manage the increasing pool of human resources and to convince venture capitalists to invest become two main issues especially for growing venture. This course consists of two parts;

- 1) Organization and human resource management are introduced
- 2) Focus on writing a convincing business plan to attract venture capital investment

When enterprise starts to take shape and grow, more people will be hired, proper organization, team building and human resource management will become important issues. In this course, students will be exposed to the various organizational aspects relevant to new ventures and established companies. These include the pros and cons of the different organization structure, conflicts that may arise among employees, and approaches to building strong teams. Human resource management techniques will also be introduced and discussed. In the second part of the course, the business model canvas will be described listing the connections among the different companies of a business. The value of a business plan and the techniques of writing a business plan will be introduced.

**Course Outcomes:**

1. Ability to design vital organizational behaviors necessary to grow a new venture.
2. Ability to arrange the business model canvas incorporating human and financial elements.
3. Ability to influence and motivate all stakeholders to build a cohesive venture team.

**MMT35704 PEMESINAN AEROANGKASA [AEROSPACE MACHINING]****No of Credits: 4****Course Synopsis:**

This course provides students with advanced concepts and practices in CNC machining that are advanced computer programming of CNC drilling, milling and turning specific for different aerospace materials. Emphasis is on programming and production of complex aerospace parts including developing in 3, 4 and 5-axis programming techniques. The uses of CAM and CNC machining in producing complex and efficient programming techniques are utilized to product the aerospace component.

**Course Outcomes:**

1. Ability to demonstrate the professional concept of design, process, and inspection in the manufacturing field of aerospace industry.
2. Ability to integrate the machining principle and technology in the project management to improve machinability of aerospace materials.
3. Ability to perform effective work in team to accomplish the project of machining characteristics that can be adapted in the aerospace industry.

**MMT31510 PROJEK TAHUN AKHIR [FINAL YEAR PROJECT]****No of Credits: 10****Course Synopsis:**

This course is designed to introduce an investigation for a small-scale project - based to solve a problem related in industry. Students must identify the problems, develop techniques for information gathering, conduct a literature review and select proper methodology related to the industry process. In addition, students must deliver individual analysis and judgment and utilize appropriate modern technology/tools to conduct the projector task and be assessed independently. Students will have to prepare a written progress report and oral presentations using computers and multimedia technology at the end of the semester.

**Course Outcomes:**

1. Ability to DEMONSTRATE strong analytical and critical thinking skills to solve broadly- defined problem.
2. Ability to EMPLOY suitable tools and technique to resolve broadly defined problem in related technical tasks in industry.
3. Ability to COMMUNICATE effectively related to the proposed outcomes.
4. Ability to ENGAGE independent lifelong learning in a specialist technology project.

**MMT35304 PENGURUSAN DAN PENYELIAAN PROJEK [PROJECT MANAGEMENT AND SUPERVISION]****No of Credits: 4****Course Synopsis:**

The course will teach students project management techniques and the application of machining concepts, as well as other aspects such as company operation, department function, work procedure, safety procedure, management, and communication. Students must also learn about troubleshooting in project management and apply their knowledge and skills in the workplace. Overall, the course is practical in nature and will assist students in gaining an effective understanding of project management and supervision.

**Course Outcomes:**

1. Ability to demonstrate knowledge, basic concepts and principles of project management in the case study industry.
2. Ability to explain the main factors influencing project management outcome with consideration of professionalism and ethics.
3. Ability to perform effective teamwork in order to complete a project using management skills gained through theoretical understanding and practical application of project management principles.

**MMT35404 TAKSIRAN PEMBUATAN DAN RISIKO DI DALAM PENGELUARAN PEMESINAN [ACTS AND RISKS ASSESSMENT IN MACHINING PRODUCTION]****No of Credits: 4****Course Synopsis:**

This subject teaches students about health and safety and work in safer and healthier ways. Students will be exposed with the related act in the industry. The student also will learn project management techniques such as work procedure, safety procedure, management and communication related to acts and risks assessment in machining production practice. Overall, the course is practical in nature and will assist students in gaining an effective understanding of project management and supervision.

**Course Outcomes:**

1. Ability to interpret risks to the health and safety with related to management skills.
2. Ability to review the preventive and protective measures with consideration of professionalism and ethics.
3. Ability to implement effective teamwork in order to complete the operational risk management skills gained through theoretical understanding and practical application of project management principles.

**MMT35504 PENYENGKARAAN MESIN [MACHINE MAINTENANCE]****No of Credits: 4****Course Synopsis:**

The student will be exposed to the maintenance techniques, troubleshooting and fault diagnosis for mechanical and electrical equipment. It also includes the basic maintenance methods of condition-based monitoring, vibration analysis, alignment dynamic balancing and essential steps of troubleshooting and repair of machine equipment. Furthermore, the preventive maintenance and Total Productive Maintenance (TPM) will be also stressed in this course.

**Course Outcomes:**

1. Ability to demonstrate knowledge of management in machine maintenance.
2. Ability to propose suitable maintenance techniques with consideration of professionalism and ethics.
3. Ability to practice effectively in a team to complete a project task.

**MMT49912 LATIHAN INDUSTRI [INDUSTRIAL TRAINING]****No of Credits: 12****Course Synopsis:**

Industrial training is one of the components under the Work Based Learning (WBL) for Bachelor of Technology in Automotive, Industrial Machining and Welding programme. The purpose of this course is to provide students with practical and technical knowledge and skills. In addition, they will gain knowledge and understanding of the company's operations, work culture, safety procedures, project management, communication, technical skills, and presentation skills. This exposure helps the students to appreciate and develop the capability to perform complex technological tasks. Throughout the course, the students will apply the knowledge and skills they have acquired at the university to enhance their skills and prepare for their future careers.

**Course Outcomes:**

1. Ability to demonstrate technical expertise that is relevant to an industrial environment while undergoing industrial training.
2. Ability to present effective presentations pertaining to industrial training related aspects like work responsibilities and improvement.
3. Ability to practice knowledge and skills during industrial training as a means of fulfilling social responsibility towards the community.
4. Ability to practice ethical principles when dealing with issues and challenges associated with industrial training.
5. Ability to practice effective teamwork to accomplish industrial training related tasks

**MMT11004****AUTOMOTIVE INDUSTRY AND TECHNOLOGY****No of Credits: 4****Course Synopsis:**

This course is relevant to expose the students about the knowledge of automotive industry and technology revolutions that happened in global. It's also included the knowledge of automotive industrial revolutions, national automotive policy and automotive ecosystem in general. Students will be exposed with current automotive activity process, able to view clearly the latest technology involve and responsible agency in automotive sector monitoring this industry.

**Course Outcomes:**

1. Ability to relate the emerging of smartness technology in automotive industry
2. Ability to demonstrate knowledge on various systems used and their role in the automotive industrial world
3. Ability to justify the opportunities, challenges brought about by Industry and how organisations and individuals

**MMT11103****AUTOMOTIVE DRAFTING****No of Credits: 3****Course Synopsis:**

This course introduces a method that is used to generate the 2D drawing which is usually applied by industries. The suitable view and method in generating dimension on the selected view will be applied. It also introduces the geometric dimensioning and tolerancing along with manufacturing processes symbols in the drafting process which helps to produce technical drawing correctly and efficiently for technical communication. Students will have a mini project to re-create the existing automotive component CAD data and propose the 2D drafting drawings with respect to the manufacturing aspect. His course intends to give students fair knowledge of power system engineering which covers the topics of generation, transmission, and distribution systems. The subtopics that will be emphasized are such as the per-unit system, transmission line parameters and models, load characteristics, fault, and protection system.

**Course Outcomes:**

1. Ability to APPLY knowledge and comprehension in generating 2D drafting for technical communication purpose.
2. Ability to CONSTRUCT 2D view and 2D drafting with correct dimensions, tolerances, and symbols.
3. Ability to DEMONSTRATES automotive components drafting with correct dimensions, tolerances, and symbols.

**MMT11204****AUTOMOTIVE WORKSHOP PRACTICE****No of Credits: 4****Course Synopsis:**

This course aims to expose students to the operation of the general vehicle servicing internal combustion engine technology. The course also discusses how the service, repair, maintenance, design and test the performance of conventional internal combustion engines. In addition, students have to solve engineering problems in real time by leveraging their knowledge and learn new information to solve problems of related engines.

**Course Outcomes:**

1. Ability to APPLY the knowledge on essential components in the automotive systems.
2. Ability to FOLLOW the basic routine maintenance to the major automotive components.
3. Ability to DEMONSTRATE the work productively on diagnostic procedures and resources to the workshop safety regulation

**MMT11303****SHOPFLOOR SUPERVISION****No of Credits: 3****Course Synopsis:**

Shop Floor Supervision is the system by which standards for running the day-to-day business are established, maintained, controlled, and improved. This approach is to continuously improve daily operation to gain better achievement in safety, quality, cost, delivery, and morale of the business operation, as well as for the workers. This contributes to waste elimination at all levels throughout the manufacturing system. This module reviews the skills and techniques required to analyze manufacturing systems and to design improved methods and layouts. The focus of this module will be on the application of the technique through studies and industrial experiences.

**Course Outcomes:**

1. Ability to DETERMINE the philosophy and foundation of shopfloor supervision.
2. Ability to ASSEMBLE the shopfloor operation using related tools.
3. Ability to EXPLAIN a good leadership and teamwork in shopfloor supervision

**MMT11404      AUTOMOTIVE COMPONENT DESIGN & ASSEMBLY****No of Credits: 4****Course Synopsis:**

This course introduces a method that is used to construct the 3D CAD data, which is usually applied in industries. Suitable features in constructing 3D CAD data will be applied, which helps to produce a correct 3D CAD data for technical communication purpose. Students will be given a mini project to construct the 3D CAD data of an automotive component with the consideration of relevant manufacturing processes.

**Course Outcomes:**

1. Ability to APPLY knowledge and comprehension in constructing 3D CAD data for technical communication purpose.
2. Ability to CONSTRUCT 3D CAD data based on the manufacturing process aspect using proper tool features.
3. Ability to DEMONSTRATES 3D CAD data of automotive components and generate the complete assembly and exploded drawings

**MMT11504      AUTOMOTIVE COMPONENT FABRICATION****No of Credits: 4****Course Synopsis:**

Automotive manufacturing processes play a major role in deciding on the vehicles' design characteristics and the overall cost. This course covers the topics to identify the suitable manufacturing process to fabricate automotive components and differentiate the capabilities and limitations of each process in order to fabricate part according to the specified design tolerances.

**Course Outcomes:**

1. Ability to determine the fundamental concepts of manufacturing processes in automotive.
2. Able to construct various skills of manufacturing techniques as an individual or a group.
3. Ability to explain the manufacturing process according to detail drawing or Standard Operating Procedure (SOP).

**MMT 21003      PROJECT MANAGEMENT****No of Credits: 3****Course Synopsis:**

This subject focuses on the principles of project management including the importance and interrelationship of all its components. Students will be familiarized with the Project Management process group functions (initiating, planning, executing, controlling, and closing) and project knowledge areas (integration, scope, time, cost, quality, human resources, communications, risks and procurement). Various tools for supporting the analysis of works in engineering project management will be introduced. Topics including initiating and planning the project, working with the management, project appraisal & sensitivity, creating budget and work breakdown structure, managing uncertainty & risk, building project plan, implementing, and revising project plan, completing the project and contract laws.

**Course Outcomes:**

1. Ability to analyse the core concepts and principles, functions, and process in project management.
2. Ability to organise project proposal until closing out the project
3. Ability to integrate as members or group leader and achieving project goal

**MMT21104      AUTOTRONIC SYSTEM SERVICE****No of Credits: 4****Course Synopsis:**

This course focuses on theory, operation and application of automotive electrical and electronic systems. Topics covered include vehicle electrical wiring systems, sensors and actuators, charging system, ignition system, starting system, lighting system, chassis electrical system, auxiliary systems, mechatronics, automotive networking, bus systems.

**Course Outcomes:**

1. Ability to IDENTIFY the components of the electrical and electronics in automotive.
2. Ability to PERFORM the functions and operations of automotive electrical and electronic system.
3. Ability to EXPLAIN automotive electrical and electronic system.

**MMT21204 POWERTRAIN SYSTEM SERVICE****No of Credits: 4****Course Synopsis:**

This course focuses on powertrain system services for light/heavy vehicle which mainly include the vehicle engine and transmission systems. Topics covered are automotive engine designs, engine cleaning, lower & upper end service, intake & exhaust system, manual & automatic transmission, transaxle service and powertrain lubrication system.

**Course Outcomes:**

1. Ability to DESCRIBE the principle and design of the powertrain system components
2. Ability to DEMONSTRATE services on engine and transmission system components.
3. Ability to SOLVE various problems related to the powertrain system.

**MMT21304 TECHNOPRENEUR PROJECT 1****No of Credits: 4****Course Synopsis:**

Entrepreneurs need money to start and to grow their business. It is important to understand how revenue is generated, how to source for funds, how to control cash flow, how to assess the success of the company in monetary terms, and how to value a company for various purposes. The course exposes students to the various financial aspects relating to new ventures. These include approaches to secure start-up capital and venture financing. Students learn about the basic accounting, essential financial indicators, the types of funds available, the different categories of investors, the importance of intellectual property in securing finance, the financial details to be included in a business plan required for investment purpose, valuation of company and the art of negotiation with investors.

**Course Outcomes:**

1. Ability to APPLY various financial indicators & tools to prepare for financial information for a new business venture.
2. Ability to EXPLAIN effective project management and technopreneur skills in solving given problems.
3. Ability to DEMONSTRATE effectively teamwork and leadership skills in completing the technopreneur project

**MMT21404 COMMERCIAL VEHICLE SERVICING****No of Credits: 4****Course Synopsis:**

A commercial vehicle is any type of motor vehicle used for transporting goods or paying passengers. The European Union defines a "commercial motor vehicle" as any motorized road vehicle, that by its type of construction and equipment is designed for, and capable of transporting, whether for payment or not. In this course, student will learn the rules and regulations service, maintenance and repair or commercial vehicles system and the engine.

**Course Outcomes:**

1. Ability to IDENTIFY the rules, regulation and commercial vehicle system
2. Ability to PERFORM various skills of servicing and repair as an individual or a group.
3. Ability to EXPLAIN the servicing and maintenance according to Standard Operating Procedure (SOP)

**MMT21504 SURFACE DESIGN****No of Credits: 4****Course Synopsis:**

This course introduced surfacing method that is used to construct the 3D CAD data which usually applied in industrial field. The suitable features in constructing industrial design surfacing will be applied which helps producing the quality and efficiently surfaces data for technical communication purpose. Students will have a mini project to construct the 3D CAD data of automotive vehicle or component using surfacing module with quality verification.

**Course Outcomes:**

1. Ability to ILLUSTRATE surfacing data for technical communication purpose.
2. Ability to CONSTRUCT surfacing data which emphasize the quality aspect using proper tools and features.
3. Ability to EXPLAIN surfacing data from the scanning data of automotive vehicles or components



**MMT21604      DRIVETRAIN MAINTENANCE****No of Credits: 4****Course Synopsis:**

This course introduces the drivetrain system including transmission, drive shaft, differential and driven wheels. Upon the completion of this course, students would be able to analyse problems and propose solutions related to faults in the drivetrain systems. Students will be also exposed to the latest technology in the drivetrain system.

**Course Outcomes:**

1. Ability to ANALYSE the function, concept and the working principles of drivetrain systems.
2. Ability to PERFORM tests on drivetrain components.
3. Ability to ORGANISE project on drivetrain maintenance using various tools and methods.

**MMT 21704      AUTOMOTIVE MODELLING****No of Credits: 4****Course Synopsis:**

This course provides the knowledge and skills regarding modelling process in automotive design development. From this course, students enable to apply various method and technique in modelling scale vehicle model, automotive component and fabricate working parts for automotive purposes. The course outlines opportunities to value add to professional skills developed during the course.

**Course Outcomes:**

1. Ability to INTEGRATE of relevant materials, technology, and processes
2. Ability to CONSTRUCT 3-Dimensional physical model based on 2-Dimensional data using suitable tools, equipment's, and materials.
3. Ability to ORGANIZES systematic workflow and process in completing the task that have been given

**MMT21804      VEHICLE PERFORMANCE ANALYSIS****No of Credits: 4****Course Synopsis:**

This course introduces the method for analyzing vehicle performance. The objectives of the subject are to distinguish vehicle performance analysis method and performance parameters, analyze the vehicle performance based on analytical and measurement method, and adapt the engine and chassis dynamometer for engine performance test. The topics covered are the method of performance analysis, engine performance parameters, engine testing and test facilities, torque and power measurement and analysis, emission testing and analysis, fuel consumption testing and analysis, and other vehicle testing in industry. The course assesses the cognitive, psychomotor, and affective domain of teaching.

**Course Outcomes:**

1. Ability to DETERMINE vehicle performance analysis method and performance parameters
2. Ability to DEMONSTRATES the engine and chassis dynamometer for engine performance test and tuning
3. Ability to INTERPRETS the vehicle performance based on measurement and data analysis.

**MMT21904      EXTERIOR DESIGN****No of Credits: 4****Course Synopsis:**

This course provides the knowledge and skills regarding vehicle exterior design and development process. From this course, students enable to apply various methods and techniques in developing ideas, constructing vehicle exterior design illustration, and translate the 2D idea into 3D physical form. The course outlines opportunities to value add to professional skills developed during the course.

**Course Outcomes:**

1. Ability to EVALUATE vehicle exterior design based on fundamental principle and technical knowledge.
2. Ability to CONSTRUCT two-dimensional and three-dimensional exterior design using suitable tools and techniques.
3. Ability to PROPOSE and convey their idea to the audience by using various tools and method.

**MMT22004****VEHICLE FAULT DIAGNOSIS****No of Credits: 4****Course Synopsis:**

This course introduces the diagnostic equipment, tools, engine diagnostic and general electrical system diagnostics. Students are required to describe the various diagnostic tools and method used to check vehicle performance systems such as drivetrain, powertrain and electrical components. Demonstration of the proper method is necessary to diagnose the above vehicle system. During diagnostic of the vehicle system, the students will as well present the relevant precaution and methodology.

**Course Outcomes:**

1. Ability to DESCRIBE the various diagnostic tools and method used to check vehicle performance systems (drivetrain, powertrain and electrical components).
2. Ability to DEMONSTRATE the proper method to diagnose vehicle system (drivetrain, powertrain and electrical components).
3. Ability to PROPOSE the precaution and methodology during diagnostic the vehicle system (drivetrain, powertrain and electrical components).

**MMT22104****COMPONENT REMANUFACTURING****No of Credits: 4****Course Synopsis:**

This course aims to implement additive manufacturing and reverse engineering in retrofitting process. Student will be exposed with process in 3D Scanning until fabrication process by using Additive Manufacturing Technology. At the end of this course, student will be able to redesign and reconstruct automotive component by using selected tools and process.

**Course Outcomes:**

1. Ability to COMBINE the broad range of additive manufacturing process, parameter, devices, capabilities, and materials that available in remanufacture quality automotive component.
2. Ability to CONSTRUCT parts and components by using selected additive manufacturing process and materials.
3. Ability to PERFORM systematic workflow and process in component remanufacturing process.

**MMT31003****AUTOMOTIVE LEGISLATION****No of Credits: 3****Course Synopsis:**

This course provides the students with the basic knowledge and theory regarding legislative on every aspect related to automotive. The students can apply the obtained theory to the practical activities involving inspection for many aspects in automotive parts. This subject exposed the students to handle the project related to inspection for lamp, wheel, noise and emission level, the safety features and the automotive homologation. Every inspection activity requires the students to present the technical report according to the universal standard.

**Course Outcomes:**

1. Ability to JUSTIFY the Automotive Standards available in the world and National Automotive Policy.
2. Ability to INTERPRET vehicle safety requirement related to Malaysian Road Safety.
3. Ability to PROPOSE the vehicle inspection requirement.

**MMT31104****TECHNOPRENEUR PROJECT 2****No of Credits: 4****Course Synopsis:**

The start-up and growth of an enterprise invariably involves both human and financial capital. To manage the increasing pool of human resources and to convince venture capitalists to invest become two main issues especially for growing venture. This course consists of two parts: in the first part, organization and human resource management are introduced; in the second part, the focus is on writing a convincing business plan to attract venture capital investment. When enterprise starts to take shape and grow, more people will be hired, proper organization, team building, and human resource management will become important issues. In this course, students will be exposed to the various organizational aspects relevant to new ventures and established companies. These include the pros and cons of the different organization structures, conflicts that may arise among employees, and approaches to building strong teams. Human resource management techniques will also be introduced and discussed. In the second part of the course, the business model canvas will be described listing the connections among the different components of a business. The value of a business plan and the techniques of writing a business plan will be introduced

**Course Outcomes:**

1. Ability to design vital organizational behaviours necessary to grow a new venture.
2. Ability to arrange the business model canvas incorporating human and financial elements.
3. Ability to influence and motivate all stakeholders to build a cohesive venture team

**MMT31202****VEHICLE MARKETING****No of Credits: 2****Course Synopsis:**

This course will explain about the characteristics of the marketing, how to understand the marketing, how consumer behaviour is related on the vehicle selling and how to market the vehicle. This course will facilitate understanding to learn about marketing and also how one can be a part of a successful vehicle marketer. The course will also cover on the development of the concept and value of market, also explain about the products, distribution, pricing and communication strategies necessary to develop a successful business model

**Course Outcomes:**

1. Identify the technology relates to strategic marketing to help entrepreneurs develop new business prospects
2. Ability to explain the 4Ps of marketing to services and identify the role of marketing communication
3. Analyse the various marketing management activities and their roles in enhancing entrepreneur technology-based industry competitiveness, as well as produce a marketing plan report

**MMT31306****QUALITY MANAGEMENT (WBL)****No of Credits: 6****Course Synopsis:**

This course provides a useful insight into concepts, theories and application of quality management in an organization. The course objectives are to explain the basic quality principles and practices, quality solving techniques and product reliability related to the automotive industry process. Using appropriate quality problem solving techniques and applying the quality control tools. The course covers the concept of total quality management, control plan and failure mode analysis, implementation of quality tools and techniques in organizations.

**Course Outcomes:**

1. Ability to ADAPT quality principles and techniques in quality processes in ethically and professionally way.
2. Ability to SOLVE quality problems using appropriate quality tools and techniques.
3. Ability to ORGANIZE the implementation of Quality Management in the automotive industry.

**MMT31403****RISK ASSESSMENT (WBL)****No of Credits: 3****Course Synopsis:**

This course covers introduction to risk management, risk identification, risk analysis, risk prioritization, and risk treatment. Students will be exposed to identify risk hazards, differentiate the type of risk presented in the workplace, demonstrate suitable and effective risk control measures, display leadership quality and work effectively in a diverse team. Students will be able to explain effectively in written or verbal form in the risk management scope.

**Course Outcomes:**

1. Ability to identify risk hazards presented in the workplace.
2. Ability to demonstrate suitable and effective risk control measures.
3. Ability to propose suitable risk treatment in the workplace.

**MMT31603****ASSET & INVENTORY MANAGEMENT (WBL)****No of Credits: 3****Course Synopsis:**

To provide students with the knowledge of managing inventory and better understanding of assets. This is to develop the need to be a good technologist upon graduation in response to having a proper inventory management system in the automotive industry.

**Course Outcomes:**

1. Ability to IDENTIFY the types of assets and inventory management system ethically & professionally.
2. Ability to COORDINATE asset and inventory management system.
3. Ability to PROPOSE the required inventory system.

**MMT31704      HYBRID SERVICING****No of Credits: 4****Course Synopsis:**

This course introduces the knowledge and skills in hybrid vehicle services and maintenance. Topics covered are introduction to hybrid electric vehicle, safe working, tools and hazard management, hybrid vehicle powertrain, hybrid energy storage system and hybrid electrical and electronic systems.

**Course Outcomes:**

1. Ability to describe the functions, operations and designs of the hybrid vehicle components.
2. Ability to demonstrate services and maintenances on hybrid vehicles.
3. Ability to solve various problems related to the hybrid vehicles.

**MMT 31804      INTERIOR DESIGN****No of Credits: 4****Course Synopsis:**

This courses aims to introduce interior components. Important concept consideration of safe environment for the occupants. Active and passive safety system will be introduced. Location, shape, surface hardness and supporting structures have to be carefully designed to protect the occupants.

**Course Outcomes:**

1. Ability to DECIDE the vehicle interior design concept that meet specific preferences.
2. Ability to CONSTRUCT vehicle interior space based on standard requirements and regulations.
3. Ability to COMMUNICATE the idea and insight rationally.

**MMT31904      ELECTRIC VEHICLE SERVICE****No of Credits: 4****Course Synopsis:**

This course introduce the fundamentals of electric vehicle components, systems and its general services. The objective of this course are to analyse the electric vehicle's system and functions, demonstrate the fault diagnosis and service skills and preparing EV standard servicing procedure. The students will be introduced to the EV safety standard practice, drive system, energy storage, EV faults and

diagnosis, service and maintenance, and standard servicing procedure. The course will assess the cognitive, psychomotor and affective domain of the students.

**Course Outcomes:**

1. Ability to DETERMINE the function of each component in the system on Electric Vehicle(EV).
2. Ability to INTERPRET the system diagnosis on EV and perform a service measurement.
3. Ability to COORDINATE the EV services and maintenance according to the Standard of Operating Procedures (SOP).

**MMT32004      PAINTING****No of Credits: 4****Course Synopsis:**

This courses aims to introduce the process and technique of automotive painting. Students will be exposed with detailing of works on spray painting process, including its quality control during and after finishing process.

**Course Outcomes:**

1. Ability to DESCRIBE concepts and methodologies of automotive painting process, technology and materials in industrial practice.
2. Ability to DEMONSTRATE painting process from surface preparation until finishing process.
3. Ability to SOLVE systematic workflow and process in completing the task that have been given

**MMT13004 CAD DAN GRAFIK KIMPALAN [CAD AND WELDING GRAPHICS]****No of Credits: 4****Course Synopsis:**

The course will provide students with an understanding of the importance of engineering graphics as a communication tool, especially for welding applications. Student will be exposed to the geometry drawing, dimensions and tolerance drawings, orthographic drawing, isometric drawing sectioning and assembly drawings and also welding symbol and standard codes using manual sketches and computer aided design (CAD) software.

**Course Outcomes:**

1. Construct technical drawing using manual sketching and computer aided design.
2. Analyze engineering drawings, including welding symbols and standard codes.
3. Communicate by using engineering drawings for welding applications.

**MMT13104 KESELAMATAN DALAM KIMPALAN [SAFETY IN WELDING]****No of Credits: 4****Course Synopsis:**

The aim of this course is to expose students on safety practices and procedures. The students are required to identify types of hazards that may occur in industries especially related to welding processes. The students are required to understand equipment, and instruction and carefully review the material safety data sheets.

**Course Outcomes:**

1. Examining welding hazards that impact the safety, health, and environment at working area
2. Explain the welding risk control by various procedures in the working environment
3. Identifies control method or procedure to minimize or remove the impact of possible hazard in the working environment

**MMT13204 PROSES FABRIKASI LOGAM [METAL FABRICATION PROCESS]****No of Credits: 4****Course Synopsis:**

This course is to equip students with the knowledge of metal fabrication and welding technology to improve manufacturing expertise in providing human capital development at par with global technological developments.

**Course Outcomes:**

1. Organising themselves either its individuals or in groups during project generating process.
2. Manipulating the basic principles and scientific processes and materials to produce products with reasonable judgment.
3. Demonstrate understanding of the concept and use of the terms contained in metal

**MMT13303 REKABENTUK PRODUK DALAM KIMPALAN [PRODUCT DESIGN IN WELDING]****No of Credits: 3****Course Synopsis:**

This course covers product design problems, formulation design problems, concept design, configuration design, parametric design, product costing, project and teamwork especially for welding product application.

**Course Outcomes:**

1. Ability to apply an appropriate design method of developing a practical solution of product design problem
2. Ability to display welding product as a practical design solution through a systematic investigation of the product design problem
3. Ability to communicate effectively in written, oral, and visual including teamwork

**MMT13404 DOKUMENTASI KIMPALAN [WELDING DOCUMENTATION]****No of Credits: 4****Course Synopsis:**

The job of welding inspection requires that the inspector possess or have access to a great deal of information and guidance. Welding inspectors cannot evaluate a welded structure without information from the designer or the welding engineer regarding weld quality. The inspector also needs to know when and how to evaluate the welding. To satisfy this need, there are documents available to be performed. Many of these documents also include acceptance criteria with codes and standards. The course identifies the competence required in welding design, welding joint detail and welding symbol according to AWS/BS/ISO standard.

**Course Outcomes:**

1. Ability to manipulate types of joining processes applied in the manufacturing sector.
2. Ability to appreciate the characteristics of joining in terms of process, equipment, and setup.
3. Ability to practice the joining processes using certain equipment to make variety of joints.

**MMT13504 PROSES KIMPALAN BUKAN KONVENSIONAL [NON-CONVENTIONAL WELDING PROCESS]****No of Credits: 4****Course Synopsis:**

This course is to provide students with welding processes that are not commonly used in the current industries that can be categories as new or advanced welding technology. Students will be exposed to all welding processes and required should be able to perform process selection when dealing with the special and complex demand of welding work.

**Course Outcomes:**

1. Ability to manipulate types of joining processes applied in the manufacturing sector.
2. Ability to appreciate the characteristics of joining in terms of process, equipment, and setup.
3. Ability to practice the joining processes using certain equipment to make variety of joints.

**MMT23004 PERILAKU BAHAN DALAM KIMPALAN [MATERIAL BEHAVIOUR IN WELDING]****No of Credits: 4****Course Synopsis:**

This course describes the materials used in engineering. Scope covers engineering materials, latest development in materials. Metal classification and its structure, physical metallurgy includes solidification, recovery, recrystallization and grain growth. This course also provide the students with understanding of the microstructure development with phase diagram and relations to mechanical properties. This course emphasis on steels especially structural and high strength steels, metallurgy of welding. This course also covers the knowledge of ceramics, polymers and composites on microstructure relationship and mechanical properties.

**Course Outcomes:**

1. Ability to classify metals based on generic properties, structural relationships with properties, especially the emergence of microstructure by heat treatment methods for the metal class.
2. Ability to understand the behaviour of structure in fusion welding and testing of materials welded joints.
3. Ability to identify the classification of ceramics, polymers and composites based on testing and microstructures.

**MMT23104 PENGURUSAN KESELAMATAN [SAFETY MANAGEMENT]****No of Credits: 4****Course Synopsis:**

Safety management is a course that is designed to provide knowledge for managing activities in the business workplace that applies comprehensive management system design to manage safety elements in the workplace. It includes acts, policy, objectives, plans, risk assessment, procedures, organization responsibilities and other measures. This is important to prevent accidents, injuries and other impact on organization that show the role of management that focus deter such catastrophic.

**Course Outcomes:**

1. Ability to explain the different requirements and regulations of Factory and Machinery Act and Occupational Safety and Health Act.
2. Ability to conduct hazard identification and risk assessment in workplace.
3. Ability to construct preventive and control technique according the acts pertinent to the acts pertinent to the Occupational Safety and Health.



**MMT23204 ANALISIS REKABENTUK KIMPALAN [WELDING DESIGN ANALYSIS]****No of Credits: 4****Course Synopsis:**

This course covers the design of welded joints requirements according to the mechanical and physical properties of the service application and environment. Also, evaluating the effects these properties may have on the design of weldments. Such properties can include strength, ductility, toughness, fatigue resistance, and corrosion resistance, among others.

**Course Outcomes:**

1. Ability to describe basic concepts and fundamental principles of mechanical applications.
2. Ability to apply basic concepts and fundamental principles to solve design for welding applications.
3. Ability to analyse basic problems in design considerations for welding.

**MMT23304 TEKNOLOGI KIMPALAN UNTUK PROFESIONAL [WELDING TECHNOLOGY FOR PROFESSIONAL]****No of Credits: 4****Course Synopsis:**

This subject provides students with knowledges and skills related with welding technology. They will be taught with various topics covering Introduction to Welder Certification Scheme, Welding Processes and Procedures, Welding Codes and Standards, Welding Procedure specification (WPS), Welding Procedure Qualification Test (WPQT), Pre and Post-weld Inspection, Reports and Documentations and Welder Qualification Training and Testing (WQT).

**Course Outcomes:**

1. Ability to design a WPS and WPQT using according to specifications and standards.
2. Ability to develop the welding procedure based on knowledge related to weld techniques and position.
3. Ability to apply creative thinking in problem solving to solve the problems associated with welding qualification.

**MMT23404 UJIAN TANPA MUSNAH UNTUK PROFESIONAL [NDT FOR PROFESSIONAL]****No of Credits: 4****Course Synopsis:**

This subject covers the preparation for the certification in the selected NDT technology. Certification is important because NDT personnel need to make critical judgments that can have safety and/or significant financial consequences. Therefore, in this subject element of technology preparation, operation, planning, data collection and interpretation, and maintenance are being provided.

**Course Outcomes:**

1. Ability to construct testing instruction and work planning.
2. Ability to analyze the NDT data for evaluating the condition of the tested materials.
3. Ability to recommend the maintenance and calibration of the NDT equipment.

**MMT23504 PEMERIKSAAN KIMPALAN UNTUK PROFESIONAL [WELDING INSPECTION FOR PROFESSIONAL]****No of Credits: 4****Course Synopsis:**

This course describes the professional practices in welding inspection. The content of the course covers welding inspection and certification, standards and terminology, visual inspection, welding metallurgy, materials and their weldability, welding processes inspection, residual stress and distortion, fracture modes and welding defects, destructive and non-destructive testing, welding equation and calibration.

**Course Outcomes:**

1. Describe basic concepts and fundamental principles of welding inspection processes.
2. Perform visual inspection, the testing of parent metals and welds, and destructive and non-destructive test techniques.
3. Practice procedure approval based on codes and standards, and an outline of safe working practices.

**MMT23604 ANALISIS BERBANTU KOMPUTER [COMPUTER AIDED ANALYSIS]****No of Credits: 4****Course Synopsis:**

This course will empower the students with the different techniques for creating solid models and surface with emphasis on design intent. The students also will be exposed to the introduction to Finite Element Analysis, structural stress analysis, modelling of the assembly and dynamic response analysis. The course includes hands-on exercises and practice methods about weld products for students during drafting stage, part, assembly, Finite Element Analysis and modelling.

**Course Outcomes:**

1. Ability to carry out structural stress analysis of welded joints.
2. Ability to model the parts and assemblies.
3. Ability to produce document design intent of parts and assemblies.

**MMT23704 PENGUJIAN DAN KETIDAKSEMPURNAAN DALAM KIMPALAN [IMPERFECTION IN WELDING AND TESTING]****No of Credits: 4****Course Synopsis:**

This course is designed to bridge the gap between theory and practice of testing to analyze the imperfection of welding. It is presented in a highly practical manner to encourage students to grasp the techniques for testing and analyzing welding imperfections to improve better quality productions.

**Course Outcomes:**

1. Ability to apply critical testing and inspection methods to examine the welding integrity.
2. Ability to conduct general procedures, techniques, and precautions in root cause analysis of welding imperfection.
3. Ability to recommend preventative and corrective actions to eliminate welding imperfections.

**MMT23804 PERALATAN KIMPALAN ELEKTRIK [WELDING ELECTRICAL EQUIPMENT]****No of Credits: 4****Course Synopsis:**

This course provides the students with an understanding of the characteristics of electric arc welding and its associated power characteristics. Students will learn

the knowledge of basic principles, methods and circuit components that control operating power, operating principles of alternators, D.C. generators and the volt-ampere characteristics in arc welding.

**Course Outcomes:**

1. Ability to examine the physical phenomena occurring in the arc and the types of forces and metal transfer in the arc based on measurements of power sources characteristics.
2. Ability to demonstrate the right choice of diode material, thyristors and inverters based on the understanding of the basic principles and methods for controlling the volt-ampere characteristics of the electric welding machines.
3. Ability to integrate the welding current, voltage, temperature, load, and displacement using equipment such as clamp meter, linear variable differential transformer (LVDT), arc welding analyser, and resistance for welding quality monitoring.

**MMT23904 PROJEK KEUSAHAWANAN TEKNOLOGI 1 [TECHNOPRENEUR PROJECT 1]****No of Credits: 4****Course Synopsis:**

Entrepreneurs need money to start and to grow their business. It is important to understand how revenue is generated, how to source for funds, how to control cash flow, how to assess the success of the company in monetary terms, and how to value a company for various purposes. The course exposes students to the various financial aspects relating to new ventures. These include approaches to secure start-up capital and venture financing. Students learn about the basic accounting, essential financial indicators, the types of funds available, the different categories of investors, the importance of intellectual property in securing finance, the financial details to be included in a business plan required for investment purpose, valuation of company and the art of negotiation with investors.

**Course Outcomes:**

1. Ability to apply various financial indicators & tools to prepare for financial information for a new business.
2. Ability to integrate effective project management and technopreneur skills in solving given problems.
3. Ability to perform effectively teamwork and leadership skills in completing the technopreneur project

**MMT33004 JAMINAN KUALITI KIMPALAN [WELDING QUALITY ASSURANCE]****No of Credits: 4****Course Synopsis:**

This course provides students with knowledge related to welding quality assurance. They will be taught various topics covering Introduction to Welding Quality Assurance, Quality System Management and Responsibilities, Quality Assurance Planning, Welding Quality Standards, Inspections and Tests, Statistical Process Control, Nonconformances, and Corrective Actions, Preventive Actions, Quality Audits, Records and Documents Control.

**Course Outcomes:**

1. Ability to propose a plan for quality assurance and control in welding manufacturing process using according to specifications and standards.
2. Ability to demonstrate the procedure and inspection techniques related to welding assurance and control.
3. Ability to apply creative thinking in problem solving to solve the problems associated with welding assurance and control.

**MMT33104 EKONOMI KIMPALAN DAN PEROLEHAN [ECONOMIC OF WELDING AND PROCUREMENT]****No of Credits: 4****Course Synopsis:**

The aim of this course is to provide students with a clear understanding of the principles of effective procurement by utilizing the capabilities to plan, implement, and evaluate a sourcing process appropriate to the value/ risk of the joining technology, materials/ part/ equipment being procured, communication and negotiation skills, and capacity to manage strategic supply, services, and consultancy contracts. Besides acquiring knowledge in welding economics in the selection of process, consumables, and workpiece materials.

**Course Outcomes:**

1. Ability to explain the importance of effective costing and the factors influencing welding costs.
2. Ability to calculate welding costs that include machine, material and labour.
3. Ability to record of transactions in journals and ledgers, trial-balance and preparation of final account.

**MMT33204 UJIAN TANPA MUSNAH [NON -DESTRUCTIVE TEST]****No of Credits: 4****Course Synopsis:**

This course introduces the basic principles of non-destructive testing and the methods of non-destructive testing that are widely use in the industry, which are Visual Inspection, Penetrant Test, Magnetic Particle Testing, Eddy Current Testing, Ultrasonic Testing and Radiographic Testing. This course also covers each NDT technique's execution, evaluation, and interpretation. The advantages, limitations and main application of each NDT techniques are also provided.

**Course Outcomes:**

1. Ability to explain the current basic and some advanced principles of Non-Destructive Testing (NDT) techniques to satisfy complex engineering problems.
2. Ability to perform suitable NDT techniques based on their analysis of engineering problems that fulfill the standard practice.
3. Ability to communicate effectively using available resources to disseminate knowledge of NDT techniques in relation to industrial problems.

**MMT33304 PROJEK KEUSAHAWANAN TEKNOLOGI 2 [TECHNOPRENEUR PROJECT 2]****No of Credits: 4****Course Synopsis:**

This course consists of two parts: in the first part, organization and human resource management are introduced; in the second part, the focus is on writing an effective business plan to attract venture capital investment. When an enterprise starts to take shape and grow, more people will be hired, and proper organization, team building, and human resource management will become important issues. In this course, students will be exposed to the various organizational aspects relevant to new ventures and established companies. These include the pros and cons of the different organization structures, conflicts among employees, and approaches to building strong teams. Human resource management techniques will also be introduced and discussed. In the second part of the course, the business model canvas will be described listing the connections among the different components of a business. The value of a business plan and the techniques of writing a business plan will be introduced.

**Course Outcomes:**

1. Ability to design vital organizational behaviours necessary to grow a new venture.
2. Ability to arrange the business model canvas incorporating human and financial elements.
3. Ability to influence and motivate all stakeholders to build a cohesive venture team.

**MMT33403 SISTEM FIZIKAL SIBER DALAM KIMPALAN [CYBER PHYSICAL SYSTEM IN WELDING]****No of Credits: 3****Course Synopsis:**

This course aims to provide participants with a clear understanding of the potential application of cyber-physical systems (CPS) in the welding industry. Competency in applying CPS technology, both with standalone and built-in CPS in the analysis of welding parameters (e.g. current, temperature) and welding outputs (e.g. fume composition, welding bead) is thought for improving the marketability of the graduates in the era of the industrial revolution 4.0.

**Course Outcomes:**

1. Ability to explain the added value that can be achieved through application of CPS in welding process.
2. Ability to demonstrate effectively the appropriate CPS tools in acquiring process variables in real time.
3. Ability to verify the logged data acquired from variable welding techniques.

**MMT33504 BENGKEL PEMULIHAN [RECLAMATION WORKSHOP]****No of Credits: 4****Course Synopsis:**

The aim of this subject is to acquire knowledge and solve problems associated with failure and to update personal on the latest technology to ensure welded subject would be maintained in good operating condition and at low maintenance cost.

**Course Outcomes:**

1. Ability to extrapolate the repair welding skill and apply techno-economics for practical problems.
2. Ability to demonstrate high quality of repair welding techniques.
3. Ability to display feasible welding repair techniques.

**MMT33604 PENGURUSAN PENGELUARAN DAN PENGAWASAN [MANAGING PRODUCTION AND SUPERVISION]****No of Credits: 4****Course Synopsis:**

Welding production planning is another very important element in manager's responsibility to allocate the resources required to achieve cost-effectiveness in welding processes. Furthermore, this subject shall cover managers responsibility to maintain equipment and consistently meet throughput requirements with a level of quality that conforms to the required standards.

**Course Outcomes:**

1. Ability to identify the standardize the welding procedure.
2. Ability to identify required maintenance of equipment and record.
3. Ability to display competency in managing and developing industrial environment maintenance activities.

# FACULTY OF CHEMICAL ENGINEERING & TECHNOLOGY (FKTK)

## Programmes Offered:

1. Bachelor of Materials Engineering with Honours
2. Bachelor of Chemical Engineering with Honours
3. Bachelor of Polymer Engineering with Honours
4. Bachelor of Chemical Engineering Technology (Food Technology) with Honours
5. Bachelor of Chemical Engineering Technology (Industrial Chemical Process) with Honours
6. Bachelor of Chemical Engineering Technology (Industrial Biotechnology) with Honours
7. Diploma in Materials Engineering

## Address:

FACULTY OF CHEMICAL ENGINEERING & TECHNOLOGY  
Universiti Malaysia Perlis  
Kompleks Pusat Pengajian Jejawi 3,  
Kawasan Perindustrian Jejawi,  
02600 Arau Perlis  
Tel: 04-979 8751/8753

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**PROGRAMME CHAIRPERSON FOR POLYMER ENGINEERING**  
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**PROGRAMME CHAIRPERSON FOR DIPLOMA IN MATERIALS ENGINEERING**

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## UR6527001 *Shadal* Bachelor of Materials Engineering with Honours

### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

#### PEO 1

Graduates who have demonstrated career advancement in the field of Materials Engineering or related engineering field

#### PEO 2

Graduates who are involved in a professional body or society

#### PEO 3

Graduates who pursue life-long learning.



## PROGRAMME OUTCOMES (PO)

### P01

**Knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

### P02

**Problem analysis:** Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

### P03

**Design/development of solutions:** Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

### P04

**Investigation:** Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### P05

**Modern Tool Usage:** Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations.

### P06

**The Engineer and Society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems.

### P07

**Environment and Sustainability:** Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts including ability to have entrepreneurship skills.

### P08

**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

### P09

**Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

### P010

**Communications:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

### P012

**Life-Long Learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

| CURRICULUM STRUCTURE<br>UR6527001 BACHELOR OF MATERIALS ENGINEERING WITH HONOURS INTAKE 2024/2025 |                                                              |                                                         |                                                                 |                                                                |                                                    |                                                    |                                 |                                                  |                                        |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------|---------------------------------|--------------------------------------------------|----------------------------------------|
| YEAR                                                                                              | FIRST                                                        |                                                         | SECOND                                                          |                                                                | THIRD                                              |                                                    |                                 | FOURTH                                           |                                        |
| SEMESTER                                                                                          | 1                                                            | 2                                                       | 3                                                               | 4                                                              | 5                                                  | 6                                                  | BREAK                           | 7                                                | 8                                      |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES</b><br>(102 CREDITS)                            | KMJ15603<br>Engineering<br>Drawing                           | KMJ10003<br>Engineering Skills                          | KMJ20003<br>Materials Physical<br>Chemistry                     | KMJ20103<br>Analytical Chemistry                               | KMJ30303<br>Surface<br>Engineering                 | KMJ30002<br>Materials Selection and<br>Design I    | KMJ39905<br>Industrial Training | KMJ40003<br>Materials Selection and<br>Design II | KMJ40103<br>Corrosion Engineering      |
|                                                                                                   | KMJ15303<br>Electrical<br>Technology                         | KMJ16203<br>Statics                                     | KMJ20303<br>Strength of<br>Materials                            | KMJ20203<br>Dynamics                                           | KMJ30203<br>Fluid Mechanics                        | KMJ4XXX03<br>Elective I                            |                                 | KMJ4XXX03<br>Elective II                         | KMJ40203<br>Non Destructive<br>Testing |
|                                                                                                   | KMJ16803<br>Introduction to<br>Computer<br>Programming       | KMJ10103<br>Engineering<br>Quality Control              | KMJ20004<br>Materials Structure<br>& Properties                 | KMJ20403<br>Transport Phenomena<br>in Materials<br>Engineering | KMJ30004<br>Polymer Properties                     | KMJ30003<br>Polymer Processing                     |                                 | KMJ49802<br>Final Year<br>Project I              | KMJ49904<br>Final Year<br>Project II   |
|                                                                                                   |                                                              |                                                         | KMJ20104<br>Physical<br>Metallurgy                              | KMJ20204<br>Whiteware, Glass and<br>Glass-Ceramic              | KMJ30104<br>Materials<br>Characterization          | KMJ30103<br>Process Control                        |                                 | KMJ40303<br>Technical Ceramic                    |                                        |
|                                                                                                   |                                                              |                                                         |                                                                 |                                                                | KMJ30503<br>Electronic<br>Materials<br>Engineering | KMJ30403<br>Materials<br>Thermodynamics            |                                 |                                                  |                                        |
| <b>COMMON<br/>CORE COURSES</b><br>(17 CREDITS)                                                    | QMQ10103<br>Engineering<br>Mathematics I                     | QMQ10203<br>Engineering<br>Mathematics II               | QMQ20303<br>Engineering<br>Mathematics III                      | QMQ27103<br>Engineering<br>Statistics                          |                                                    | KMJ45802<br>Professional<br>Engineers              |                                 |                                                  |                                        |
|                                                                                                   |                                                              |                                                         |                                                                 | KMJ42403<br>Engineering<br>Management                          |                                                    |                                                    |                                 |                                                  |                                        |
| <b>UNIVERSITY<br/>REQUIREMENT<br/>COURSES</b><br>(16 CREDITS)                                     | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup> | SMU13102<br>Appreciation of<br>Ethics &<br>Civilization | SMB20102<br>English for General<br>Communication <sup>[2]</sup> |                                                                | SMU22402<br>Engineering<br>Entrepreneurship        | SMB31202<br>English for Technical<br>Communication |                                 |                                                  |                                        |
|                                                                                                   | SMU13002<br>Philosophy and<br>Current Issues                 | SMZ2XX01<br>Co-Curriculum II                            |                                                                 |                                                                |                                                    |                                                    |                                 |                                                  |                                        |
|                                                                                                   | SMZ1XX01<br>Co-Curriculum I                                  | SMB41002<br>University Malay<br>Language <sup>[3]</sup> |                                                                 |                                                                |                                                    |                                                    |                                 |                                                  |                                        |
| <b>TOTAL CREDITS</b><br>(135 CREDITS)                                                             | <b>17</b>                                                    | <b>17</b>                                               | <b>19</b>                                                       | <b>19</b>                                                      | <b>19</b>                                          | <b>18</b>                                          | <b>5</b>                        | <b>11</b>                                        | <b>12</b>                              |
| <b>AUDIT COURSES</b>                                                                              |                                                              | SMB10102<br>Preparatory<br>English <sup>[1]</sup>       |                                                                 |                                                                |                                                    |                                                    |                                 |                                                  |                                        |

Elective I : KMJ40403 Composite Materials, KMJ40503 Construction Materials, KMJ40603 Joining of Materials and Structures.

Elective II : KMJ40703 Advanced Material Engineering, KMJ40803 Advanced Electronic Packaging, KMJ40903 Materials for Energy Application, KMJ41003 Materials Failure Analysis.

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

## UR6524001 Bachelor of Chemical Engineering with Honours

### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

#### PEO 1

Graduates who have demonstrate career advancement in the field of Chemical Engineering or related engineering field.

#### PEO 2

Graduates who are involved in a professional body or society

#### PEO 3

Graduates who pursue life-long learning..

## PROGRAMME OUTCOMES (PO)

### P01

**Knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

### P02

**Problem analysis:** Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

### P03

**Design/development of solutions:** Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

### P04

**Investigation:** Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### P05

**Modern Tool Usage:** Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations.

### P06

**The Engineer and Society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems.

### P07

**Environment and Sustainability:** Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts including ability to have entrepreneurship skills.

### P08

**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

### P09

**Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

### P010

**Communications:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

### P012

**Life-Long Learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



| CURRICULUM STRUCTURE<br>UR6524001 BACHELOR OF CHEMICAL ENGINEERING WITH HONOURS INTAKE 2024/2025 |                                                                        |                                                              |                                                 |                                                          |                                                   |                                          |                                 |                                         |                                   |
|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|------------------------------------------|---------------------------------|-----------------------------------------|-----------------------------------|
| YEAR                                                                                             | FIRST                                                                  |                                                              | SECOND                                          |                                                          | THIRD                                             |                                          |                                 | FOURTH                                  |                                   |
| SEMESTER                                                                                         | 1                                                                      | 2                                                            | 3                                               | 4                                                        | 5                                                 | 6                                        | BREAK                           | 7                                       | 8                                 |
| DISCIPLINE<br>CORE & ELECTIVE<br>COURSES<br>(102 CREDITS)                                        | KMJ12303<br>Introduction to Sustainability                             | KMJ12703<br>Biochemical Engineering                          | KMJ22003<br>Chemical Eng. Thermodynamics        | KMJ22503<br>Mass Transfer                                | KMJ32003<br>Reaction Engineering                  | KMJ32803<br>Engineering Economics        | KMJ39905<br>Industrial Training | KMJ42704<br>Chemical Plant Design II    | KMJ49904<br>Final Year Project II |
|                                                                                                  | KMJ12503<br>Mass and Energy Balance                                    | KMJ16803<br>Introduction to Computer Programming             | KMJ22103<br>Fluid Mechanics                     | KMJ22503<br>Bioreactor System                            | KMJ32104<br>Process Dynamics & Control            | KMJ42003<br>Chemical Plant Design I      |                                 | KMJ49802<br>Final Year Project I        | KMJ4XXX3<br>Elective II           |
|                                                                                                  | KMJ12203<br>Introduction to Biological and Chemical Science Principles | KMJ1XXX3<br>Thermodynamics                                   | KMJ2XXX2<br>Material Science Engineering        | KMJ22403<br>Heat Transfer                                | KMJ32203<br>Separation process                    | KMJ32603<br>Safety & Loss Prevention     |                                 | KMJ42203<br>Good Manufacturing Practice | KMJ4XXX3<br>Free Elective         |
|                                                                                                  | KMJ12103<br>Organic Chemistry                                          | KMJ1XXX3<br>Process Instrumentations                         | KMJ22303<br>Analytical Chemistry                | KMJ22601<br>Transport Phenomena Application              | KMJ3XXX3<br>Simulation for Chemical Engineering   | KMJ32301<br>Skills in Separation Process |                                 | KMJ4XXX3<br>Elective I                  | KMJ4XXX3<br>Elective III          |
|                                                                                                  |                                                                        | KMJ12501<br>Biochemical Science                              |                                                 |                                                          |                                                   | KMJ42303<br>Industrial Waste Treatment   |                                 |                                         |                                   |
| COMMON<br>CORE COURSES<br>(17 CREDITS)                                                           |                                                                        |                                                              |                                                 |                                                          | KMJ42403<br>Engineering Management                | KMJ45802<br>Professional Engineers       |                                 |                                         |                                   |
|                                                                                                  | QMQ10103<br>Engineering Mathematics I                                  | QMQ10203<br>Engineering Mathematics II                       | QMQ20303<br>Engineering Mathematics III         | QMQ27103<br>Engineering Statistics                       |                                                   |                                          |                                 |                                         |                                   |
| UNIVERSITY<br>REQUIREMENT<br>COURSES<br>(16 CREDITS)                                             | SMZ1XX01<br>Co-Curriculum I                                            | SMZ2XX01<br>Co-Curriculum II                                 | SMU13002<br>Philosophy and Current Issues       | SMB31202<br>English for Technical Communication          |                                                   | SMU22402<br>Engineering Entrepreneurship |                                 |                                         |                                   |
|                                                                                                  | SMB41002<br>University Malay Language <sup>[3]</sup>                   | SMB20102<br>English for General Communication <sup>[2]</sup> |                                                 | SMU12102<br>Integrity and Anti-Corruption <sup>[4]</sup> | SMU13102<br>Appreciation of Ethics & Civilization |                                          |                                 |                                         |                                   |
| TOTAL CREDITS<br>(135 CREDITS)                                                                   | 18                                                                     | 19                                                           | 16                                              | 17                                                       | 18                                                | 17                                       | 5                               | 12                                      | 13                                |
| AUDIT COURSES                                                                                    | SMB10102<br>Preparatory English <sup>[1]</sup>                         |                                                              |                                                 |                                                          |                                                   |                                          |                                 |                                         |                                   |
| * Please refer to additional NOTE.                                                               |                                                                        |                                                              |                                                 |                                                          |                                                   |                                          |                                 |                                         |                                   |
| PROCESS ENGINEERING                                                                              |                                                                        |                                                              | BIOCHEMICAL ENGINEERING                         |                                                          |                                                   | SUSTAINABILITY                           |                                 |                                         |                                   |
| Elective I                                                                                       |                                                                        |                                                              | KMJ32903 Colloidal and Biomaterials Processing  |                                                          |                                                   | KMJ33103 Sustainable Energy              |                                 |                                         |                                   |
| Elective II                                                                                      |                                                                        |                                                              | KMJ43203 Energy and Process Utility Engineering |                                                          |                                                   | KMJ42603 Biomass Utilization             |                                 |                                         |                                   |
| Elective III                                                                                     |                                                                        |                                                              | KMJ42903 Petrochemical Process                  |                                                          |                                                   | KMJ43103 Fuel Cells                      |                                 |                                         |                                   |

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

## UR6524002

### Bachelor of Polymer Engineering with Honours

#### PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

##### PEO 1

To raise graduates who are competent in their respective engineering fields as exhibited through career development.

##### PEO 2

To raise graduates who are involved and contribute to society.

##### PEO 3

To raise graduates who pursue education opportunities continually.



## PROGRAMME OUTCOMES (PO)

### P01

Knowledge: Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

### P02

Problem analysis: Identify, formulate, conduct research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

### P03

Design/development of solutions: Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.

### P04

Investigation: Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### P05

Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling to complex engineering problems, with an understanding of the limitations.

### P06

The Engineer and Society: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems.

### P07

Environment and Sustainability: Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts including ability to have entrepreneurship skills.

### P08

Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

### P09

Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

### P010

Communications: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

Project Management and Finance: Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

### P012

Life-Long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

| CURRICULUM STRUCTURE<br>UR6524002 BACHELOR OF POLYMER ENGINEERING WITH HONOURS INTAKE 2024/2025 |                                                          |                                                      |                                                              |                                                    |                                                 |                                                          |                                 |                                                           |                                               |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------|----------------------------------------------------------|---------------------------------|-----------------------------------------------------------|-----------------------------------------------|
| YEAR                                                                                            | FIRST                                                    |                                                      | SECOND                                                       |                                                    | THIRD                                           |                                                          |                                 | FOURTH                                                    |                                               |
| SEMESTER                                                                                        | 1                                                        | 2                                                    | 3                                                            | 4                                                  | 5                                               | 6                                                        | BREAK                           | 7                                                         | 8                                             |
| <b>DICIPLINE CORE &amp; ELECTIVE</b><br>(102 CREDITS)                                           | KMJ15204<br>Organic Chemistry                            | KMJ10003<br>Engineering Skills                       | KMJ25203<br>Physical Chemistry                               | KMJ10103<br>Engineering Quality Control            | KMJ30203<br>Fluid Mechanics                     | KMJ30103<br>Process Control                              | KMJ39905<br>Industrial Training | KMJ45203<br>Polymer Engineering Integrated Design Project | KMJ45XX3<br>Elective II                       |
|                                                                                                 | KMJ15303<br>Electrical Technology                        | KMJ15403<br>Engineering Mechanics                    | KMJ24003<br>Plastic Materials                                | KMJ25304<br>Polymer Synthesis                      | KMJ34803<br>Polymer Testing & Characterization  | KMJ35203<br>Polymer Engineering Design                   |                                 | KMJ44003<br>Polymer Composites                            | KMJ45603<br>Polymer in Electronic Application |
|                                                                                                 | KMJ16803<br>Introduction to Computer Programming         | KMJ15503<br>Introduction to Polymer                  | KMJ24403<br>Elastomeric Materials                            | KMJ25404<br>Structure & Polymer Properties         | KMJ34404<br>Rubber Processing                   | KMJ35304<br>Mass & Heat Transfer for Polymer Engineering |                                 | KMJ44104<br>Polymer Blends                                | KMJ49904<br>Final Year Project II             |
|                                                                                                 |                                                          | KMJ15603<br>Engineering Drawing                      |                                                              | KMJ25503<br>Thermodynamics for Polymer Engineering | KMJ34004<br>Plastic Processing                  | KMJ34504<br>Latex Processing                             |                                 | KMJ49802<br>Final Year Project I                          |                                               |
|                                                                                                 |                                                          |                                                      |                                                              |                                                    |                                                 | KMJ35XX2<br>Elective I                                   |                                 |                                                           |                                               |
| <b>COMMON CORE COURSES</b><br>(17 CREDITS)                                                      | QMQ10103<br>Engineering Mathematics I                    | QMQ10203<br>Engineering Mathematics II               | QMQ20303<br>Engineering Mathematics III                      | QMQ27103<br>Engineering Statistics                 |                                                 | KMJ42403<br>Engineering Management                       |                                 |                                                           | KMJ45802<br>Professional Engineer             |
| <b>UNIVERSITY REQUIREMENT COURSES</b><br>(16 CREDITS)                                           | SMU12102<br>Integrity and Anti-Corruption <sup>[4]</sup> | SMB41002<br>University Malay Language <sup>[3]</sup> | SMU13102<br>Appreciation of Ethics & Civilization            |                                                    |                                                 |                                                          |                                 | SMU13002<br>Philosophy & Current Issues                   |                                               |
|                                                                                                 | SMZXXX01<br>Co-Curriculum I                              | SMZXXX01<br>Co-Curriculum II                         | SMB20102<br>English for General Communication <sup>[2]</sup> |                                                    | SMB31202<br>English for Technical Communication |                                                          |                                 | SMU22402<br>Engineering Entrepreneurship                  |                                               |
| <b>TOTAL CREDIT</b><br>(135 CREDITS)                                                            | <b>16</b>                                                | <b>18</b>                                            | <b>16</b>                                                    | <b>17</b>                                          | <b>16</b>                                       | <b>19</b>                                                | <b>5</b>                        | <b>16</b>                                                 | <b>12</b>                                     |
| <b>AUDIT COURSES</b>                                                                            |                                                          | SMB10102<br>Preparatory English <sup>[1]</sup>       |                                                              |                                                    |                                                 |                                                          |                                 |                                                           |                                               |

Elective I : KMJ35402 Polymers in Biomedical Applications OR KMJ35502 Photoluminescent Polymers

Elective II : KMJ45403 Polymer Adhesive & Coating OR KMJ45503 Environmental Friendly Polymer

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

**LIST OF COURSES**

| COURSE CODE | COURSE NAME                                                                                   |
|-------------|-----------------------------------------------------------------------------------------------|
| KMJ10103    | Kawalan Mutu Kejuruteraan (Engineering Quality Control)                                       |
| KMJ16203    | Statik (Statics)                                                                              |
| KMJ15303    | Teknologi Elektrik (Electrical Technology)                                                    |
| KMJ15603    | Lukisan Kejuruteraan (Engineering Drawing)                                                    |
| KMJ10003    | Kemahiran Kejuruteraan (Engineering Skills)                                                   |
| KMJ16803    | Pengenalan Kepada Pengaturcaraan Komputer (Introduction To Computer Programming)              |
| KMJ20004    | Struktur & Sifat-sifat Bahan (Materials Structure & Properties)                               |
| KMJ20104    | Metalurgi Fizikal (Physical Metallurgy)                                                       |
| KMJ20203    | Dinamik (Dynamics)                                                                            |
| KMJ20204    | Tembikar Putih, Kaca dan Kaca-Seramik (Whiteware, Glass and Glass-Ceramic)                    |
| KMJ20003    | Kimia Fizikal Bahan (Materials Physical Chemistry)                                            |
| KMJ20303    | Kekuatan Bahan (Strength Of Materials)                                                        |
| KMJ20103    | Kimia Analitik (Analytical Chemistry)                                                         |
| KMJ20403    | Fenomena Pengangkutan dalam Kejuruteraan Bahan (Transport Phenomena in Materials Engineering) |
| KMJ30103    | Kawalan Proses (Process Control)                                                              |
| KMJ30203    | Mekanik Bendalir (Fluid Mechanics)                                                            |
| KMJ30303    | Kejuruteraan Permukaan (Surface Engineering)                                                  |
| KMJ30104    | Pencirian Bahan (Materials Characterization)                                                  |
| KMJ30403    | Termodinamik Bahan (Materials Thermodynamics)                                                 |

| COURSE CODE | COURSE NAME                                                           |
|-------------|-----------------------------------------------------------------------|
| KMJ30004    | Sifat-sifat Polimer (Polymer Properties)                              |
| KMJ30003    | Pemrosesan Polimer (Polymer Processing)                               |
| KMJ30503    | Bahan Elektronik Kejuruteraan (Electronic Materials Engineering)      |
| KMJ30002    | Pemilihan Bahan dan Reka Bentuk I (Materials Selection & Design I)    |
| KMJ40103    | Kejuruteraan Kakisan (Corrosion Engineering)                          |
| KMJ40203    | Ujian Tanpa Musnah (Non Destructive Testing)                          |
| KMJ40703    | Kejuruteraan Bahan Termaju (Advanced Material Engineering)            |
| KMJ40503    | Bahan Binaan (Construction Materials)                                 |
| KMJ40303    | Seramik Teknikal (Technical Ceramic)                                  |
| KMJ40403    | Bahan Komposit (Composite Materials)                                  |
| KMJ41003    | Analisis Kegagalan Bahan (Materials Failure Analysis)                 |
| KMJ40903    | Bahan Untuk Aplikasi Tenaga (Materials For Energy Application)        |
| KMJ40803    | Pembungkusan Elektronik Termaju (Advanced Electronic Packaging)       |
| KMJ40603    | Penyambungan Bahan dan Struktur (Joining of Materials and Structures) |
| KMJ49802    | Projek Tahun Akhir I (Final Year Project I)                           |
| KMJ49904    | Projek Tahun Akhir II (Final Year Project II)                         |
| KMJ40003    | Pemilihan Bahan dan Reka Bentuk II (Materials Selection & Design II)  |
| KMJ39905    | Latihan Industri (Industrial Training)                                |
| KMJ45802    | Jurutera Profesional (Professional Engineers)                         |

| COURSE CODE | COURSE NAME                                                                                       |
|-------------|---------------------------------------------------------------------------------------------------|
| KMJ42403    | Pengurusan Kejuruteraan (Engineering Management)                                                  |
| KMJ15204    | Kimia Organik (Organic Chemistry)                                                                 |
| KMJ15403    | Mekanik Kejuruteraan (Engineering Mechanics)                                                      |
| KMJ15503    | Pengenalan Kepada Polimer (Introduction To Polymer)                                               |
| KMJ24003    | Bahan-Bahan Plastik (Plastic Materials)                                                           |
| KMJ24403    | Bahan-Bahan Elastomerik (Elastomeric Materials)                                                   |
| KMJ25203    | Kimia Fizikal (Physical Chemistry)                                                                |
| KMJ25304    | Sintesis Polimer (Polymer Synthesis)                                                              |
| KMJ25404    | Struktur & Sifat-Sifat Polimer (Structure & Polymer Properties)                                   |
| KMJ25503    | Termodinamik Untuk Kejuruteraan Polimer (Thermodynamics For Polymer Engineering)                  |
| KMJ34004    | Pemprosesan Plastik (Plastic Processing)                                                          |
| KMJ34404    | Pemprosesan Getah (Rubber Processing)                                                             |
| KMJ34504    | Pemprosesan Lateks (Latex Processing)                                                             |
| KMJ34803    | Pengujian & Pencirian Polimer (Polymer Testing & Characterization)                                |
| KMJ35203    | Reka Bentuk Kejuruteraan Polimer (Polymer Engineering Design)                                     |
| KMJ35304    | Pemindahan Jisim & Haba Untuk Kejuruteraan Polimer (Mass & Heat Transfer For Polymer Engineering) |
| KMJ35402    | Polimer Dalam Aplikasi Bioperubatan (Polymers In Biomedical Applications)                         |
| KMJ35502    | Polimer Pemancar Cahaya & Aplikasinya (Photoluminescent Polymers & Their Applications)            |
| KMJ44003    | Komposit Polimer (Polymer Composites)                                                             |

| COURSE CODE | COURSE NAME                                                                                       |
|-------------|---------------------------------------------------------------------------------------------------|
| KMJ44104    | Adunan-Adunan Polimer (Polymer Blends)                                                            |
| KMJ45203    | Projek Reka Bentuk Bersepadu Kejuruteraan Polimer (Polymer Engineering Integrated Design Project) |
| KMJ45403    | Perekat Polimer & Penglitup (Polymer Adhesive & Coating)                                          |
| KMJ45503    | Polimer Mesra Alam (Environmental Friendly Polymer)                                               |
| KMJ45603    | Polimer Dalam Aplikasi Elektronik (Polymer In Electronic Application)                             |
| KMJ12303    | Introduction to Sustainability                                                                    |
| KMJ12503    | Mass and Energy Balance                                                                           |
| KMJ12203    | Introduction to Biological and Chemical Science Principles                                        |
| KMJ12103    | Organic Chemistry                                                                                 |
| KMJ12501    | Biochemical Science                                                                               |
| KMJ22003    | Chemical Eng. Thermodynamics                                                                      |
| KMJ22103    | Fluid Mechanics                                                                                   |
| KMJ22303    | Analytical Chemistry                                                                              |
| KMJ22503    | Mass Transfer                                                                                     |
| KMJ22403    | Heat Transfer                                                                                     |
| KMJ22601    | Transport Phenomena Application                                                                   |
| KMJ32003    | Reaction Engineering                                                                              |
| KMJ32104    | Process Dynamics & Control                                                                        |
| KMJ32203    | Separation process                                                                                |



| COURSE CODE | COURSE NAME                            |
|-------------|----------------------------------------|
| KMJ32803    | Engineering Economics                  |
| KMJ42003    | Chemical Plant Design I                |
| KMJ32603    | Safety & Loss Prevention               |
| KMJ32301    | Skills in Separation Process           |
| KMJ42303    | Industrial Waste Treatment             |
| KMJ42704    | Chemical Plant Design II               |
| KMJ42203    | Good Manufacturing Practice            |
| KMJ32903    | Colloidal and Biomaterials Processing  |
| KMJ33003    | Halal Processing                       |
| KMJ33103    | Sustainable Energy                     |
| KMJ43203    | Energy and Process Utility Engineering |
| KMJ42503    | Food Engineering                       |
| KMJ42603    | Biomass Utilization                    |
| KMJ42903    | Petrochemical Process                  |
| KMJ43003    | Pharma and Nutraceutical Engineering   |
| KMJ43103    | Fuel Cells                             |
| KMJXXXX3    | Biochemical Engineering                |
| KMJXXXX3    | Thermodynamics                         |
| KMJ1XXX3    | Process Instrumentations               |

| COURSE CODE | COURSE NAME                         |
|-------------|-------------------------------------|
| KMJ2XXX2    | Material Science Engineering        |
| KMJ2XXX3    | Bioreactor System                   |
| KMJ3XXX3    | Simulation for Chemical Engineering |
| KMJ1XXX3    | Process Instrumentations            |

**KMJ10103 KAWALAN MUTU KEJURUTERAAN [ENGINEERING QUALITY CONTROL]****No of Credits: 3****Course Synopsis:**

This course is an overview of quality studies that take into account the philosophical, managerial and technical issues of quality. The managerial aspects include TQM, ISO 9000. The technical aspects include statistical tools and techniques used in many industrial applications. Topics covered include: Introduction to Quality, TQM, ISO standard, design of experiment, six sigma, basic statistics, fundamentals of probability, control charts for variable and attribute, process capability, acceptance sampling plan, acceptance sampling system and reliability.

**Course Outcomes:**

1. Ability to analyse engineering fundamentals to solve problems related to quality management systems, quality management tools and quality management philosophy.
2. Ability to evaluate engineering problems related to quality management systems and quality control tools.
3. Ability to perform the appropriate modern engineering quality control tool to the solution of complex engineering quality control problems.

**KMJ16203 STATIK (STATICS)****No of Credits: 3****Course Synopsis:**

The course exposes the students about basic concepts of forces and resultant force through the concepts of free body diagram in two and three dimensions and apply the knowledge to solve problems related to the concepts of equilibrium, the concepts of a particle and rigid body. Students also will be exposed on the concepts of the moment of a force in two and three dimensions. Friction, concepts of center of gravity and center of mass and moment inertia will also be discussed to understand the overall basic statics.

**Course Outcomes:**

1. Ability to analyse the properties (components, resultants and moments) of a force system in 2-dimension and 3-dimension.
2. Ability to solve equilibrium problems of various types of rigid bodies, structures and trusses using FBDs and equations of equilibrium.
3. Ability to evaluate the properties (centroid, center of gravity and moment of inertia) of areas, lines and volumes and apply these properties in equilibrium problems.
4. Ability to evaluate various types of friction problems using FBDs and equations of equilibrium.

**KMJ15303 TEKNOLOGI ELEKTRIK (ELECTRICAL TECHNOLOGY)****No of Credits: 3**

This course is intended to provide students with knowledge and ability to apply, analyze as well as to evaluate basic electrical technology for materials such as basic DC and AC circuits, i.e. Ohm's law, Kirchhoff's current and voltage law and basic principles of 3-phase AC circuits, basic electromagnetism and magnetic circuits i.e. Faraday's law, Lenz's law, LC circuits and transformer, and basic electric machines i.e. dc machines and induction motors.

**Course Outcomes:**

1. Ability to analyse the DC and AC circuits by using Ohm's law, Kirchhoff's current law, Kirchhoff's voltage law and Thevenin's theorem.
2. Ability to calculate and evaluate properties of magnetic materials such as magnetic field, magnetic induction, eddy current etc. Using basic electromagnetic principles.
3. Ability to evaluate and design dc and ac machines such as transformer, induction motors etc using properties of suitable magnetic materials.

**KMJ15603 LUKISAN KEJURUTERAAN (ENGINEERING DRAWING)****No of Credits: 3****Course Synopsis:**

This course will introduce student to Engineering Drawing including; Basic Drafting Skills - Lines and Lettering, Circles and Arcs, Basic Dimensioning, Dimensioning Circular and Common Features, Dimensioning Methods, Limits and Tolerances. Geometry - Beginning Geometry: Straight Lines, Polygons, Ellipse, Helix and Parabola, Geometric Symbols. Orthographic - Orthographic Representation, Methods of Representation, Orthographic Projection - First angle projection, Orthographic Projection - Third angle projection, Reference Arrows Layout, Identifying Symbols, Hidden Surface and Edges, Inclined Surface, Circular Features, Oblique Surface. Pictorial Drawing - Isometric Drawing, Nonisometric Drawing, Dimensioning isometric Drawing. Auxiliary - Primary Auxiliary View, Secondary Auxiliary View. Sections - Sectional Views, Cutting-Plane Lines, Full Sections, Section Lining, Half Sectioning. Computer-Aided Drawing (CAD) - AutoCAD, IronCAD, CAD Mould, Plotting/Printing

**Course Outcomes:**

1. Able to examine and explain the basic of engineering drawings and CAD software
2. Able to distinguish common terms used in drawing and design
3. Able to interpret the elements of engineering drawings
4. Able to design the required engineering drawing based on industrial needs

**KMJ10003****KEMAHIRAN KEJURUTERAAN [ENGINEERING SKILLS]****No of Credits: 5****Course Synopsis:**

This subject is 100 % practical coursework and carries out 3 units credit hours. This course contains basic practical works for engineers which are Mechanical Workshop Practice, Welding, Domestic Electrical Wiring, Basic Electronic, Simulation/ Analysis Software, Technical Drawing and AutoCAD that are specifically planned for non-electronic based programs.

**Course Outcomes:**

1. Ability to demonstrate effectively the skills and standard practice of mechanical machining process, equipment and tools.
2. Ability to perform the skills and standard practice of domestic electrical wiring and explain the theoretical approach when resolving physical issues.
3. Ability to construct the electronic circuit based on schematic circuit diagram and demonstrate basic knowledge of electronic components.
4. Ability to perform modern engineering and IT tools /software to analyse the data for engineering problem solving.
5. Ability to perform standard practice of engineering drawing to design a product using common drawing tools or software.
6. Ability to communicate effectively on laboratory/ workshop activities, make effective explanations, and give and receive clear.

**KMJ16803 PENGENALAN KEPADA PENGATURCARAAN KOMPUTER (INTRODUCTION TO COMPUTER PROGRAMMING)****No of Credits: 3****Course Synopsis:**

In this course, students will be introduced to computer systems, problem solving analysis and programming concepts including variables, operators, control structures, functions, arrays and pointers. These crucial knowledge and skills allow students to innovate, create solutions for the global problems, automate, collect, manage, calculate, analyse processing of data and information accurately.

**Course Outcomes:**

1. Ability to apply computer programming concepts and principles.
2. Ability to use C/C++ coding editor for coding, compiling, executing and debugging computer programs.
3. Ability to formulate solution for engineering related problems using computer programming techniques.
4. Ability to design computer programs to solve engineering related problem.

**KMJ20004 STRUKTUR & SIFAT-SIFAT BAHAN (MATERIALS STRUCTURE & PROPERTIES)****No of Credits: 4****Course Synopsis:**

This course is designed to introduce some fundamentals of materials engineering, materials structure, solid defects and basic theory of diffusion. Introduction to mechanical and physical properties for various types of engineering materials, how these properties are measured and what these properties represent.

**Course Outcomes:**

1. Ability to analyse the properties (components, resultants and moments) of a force system in 2-dimension and 3-dimension.
2. Ability to solve equilibrium problems of various types of rigid bodies, structures and trusses using FBDs and equations of equilibrium.
3. Ability to evaluate the properties (centroid, center of gravity and moment of inertia) of areas, lines and volumes and apply these properties in equilibrium problems.
4. Ability to evaluate various types of friction problems using FBDs and equations of equilibrium.

**KMJ20104 METALURGI FIZIKAL (PHYSICAL METALLURGY)****No of Credits: 4****Course Synopsis:**

This course is focused more on metallographic study, the relation between microstructure and properties of steels and nonferrous alloys. The subtopic in this subject are: introduction to physical metallurgy, solidification process, imperfections in solid, slip mechanism, metallography quantitative, non-ferrous alloys, strengthening mechanism, introduction to phase diagram, iron-iron carbide phase diagram, recovery, recrystallization and grain growth, procedure of steel heat treatment, surface of heat treatment, introduction to isothermal transformation (IT) and continuous cooling transformation (CCT) diagrams, hardenability and cast iron.

**Course Outcomes:**

1. Ability to apply knowledge of physical metallurgy, phase diagrams and their relationship with the microstructures.
2. Ability to design heat treatment processes to achieve the required properties for required application.
3. Ability to investigate and analyse the microstructures and properties from different heat treatment processes.
4. Ability to diagnose and engage in independent and life-long learning in the physical metallurgy concept.

**KMJ20203 DINAMIK (DYNAMICS)****No of Credits: 3****Course synopsis:**

In this course, students use the concepts of mechanics in dynamics conditions. This course will be presented in two parts: kinematics, which treats only the geometric aspects of motion, and kinetics, which is the analysis of the forces causing the motion. To develop these principles, students learn the dynamics of a particle first, followed by topics in rigid-body dynamics in two dimensions. Emphasis will be given on the kinematics and kinetics of a particle and planar kinematics and kinetics of a rigid body.

**Course Outcomes**

1. Ability to apply knowledge of mathematics and engineering fundamentals in the solution of complex 2-dimensional kinematics and kinetics of a particle/ rigid body.
2. Ability to evaluate complex problems of 2-dimensional kinematics and kinetics of a particle/ rigid body using principles of mathematics and engineering sciences.

**KMJ20204 TEMBIKAR PUTIH, KACA DAN KACA-SERAMIK (WHITEWARE, GLASS AND GLASS-CERAMIC)****No of Credits: 4****Course Synopsis:**

This course presents the essential knowledge on the production of whitewares, glasses and glass-ceramic from raw materials to the final product. Topic covers under whitewares including processing/recovery of the raw materials from mineral sources e.g. crushing, milling, purification, sieving, filter pressing. Preparation of feedstock materials and related testing: granulated powder, ceramic slurry for slip casting process. Testing for quality control purposes (flowability, plasticity, thixotropy, viscosity, specific gravity, particle size of powder). Production and properties of plaster mould. Compositions and batch recipe. Type of additives and the scientific basis for their use in optimizing the processing processes. Various shaping techniques e.g powder pressing, slip casting, tape casting, extrusion, jiggering, jollying. Drying and firing process. Sintering mechanism: solid state and liquid phase sintering. Topics in glasses include different types of glass, glass constituents and batch ingredients, decolourises and refining agents, batch calculation, Glass melting: Fundamental of glass formation, factors that influence glass formation, Zachariasen's rules, kinetic & thermodynamic criteria for glass formation, nucleation and crystal growth, structural models of silicate and non-silicate glasses, bridging and non-bridging oxygen, melting process, refining of glass, electric heating, cold top furnace, pot melting, viscosity, liquid immiscibility

and phase separation in glasses. Theories and thermodynamics of liquid immiscibility, mechanism of phase separation and chemical durability of glass. different methods of producing glasses (pressed and blown wares, flat glass, tubing and bulbs, fibre glass raw materials), Heat treatment of glass and defect in glass. Technology of making radiation shielding glasses, optical glass, photosensitive glasses, heat absorbing glasses, solder glasses. Optical properties of glass, coating of glass, colour glass including photochromic and electrochromic glass. Topics in glass-ceramics included production of glass-ceramics, description & application of various glass-ceramics, types of glass-ceramic. Viscous sintering mechanism. Various types of glaze and decoration techniques.

**Course Outcomes:**

1. Ability to explain the basics of various types of ceramics materials including whiteware, ceramic mold, glass, glass-ceramic and glaze.
2. Ability to formulate, evaluate, analyse, solve, and propose designed solutions to problems related to producing the crystalline and non-crystalline ceramics.
3. Ability to work effectively in a team to make plaster mould and ceramic products.

**KMJ20003 KIMIA FIZIKAL BAHAN (MATERIALS PHYSICAL CHEMISTRY)****No of Credits: 3****Course Synopsis:**

This course is designed to introduce the students on the aspect of thermodynamics including first law and second law of thermodynamics, reaction kinetics such as effect of reactants and products concentration, effect of temperature, determination of order and velocity constant of reaction, electrochemistry and interface phenomenon.

**Course Outcomes:**

1. Ability to explain the knowledge and fundamentals of materials physical chemistry
2. Ability to evaluate problem of materials physical chemistry
3. Ability to conduct the experiments associated with materials physical chemistry
4. Ability to commit and function effectively as an individual, and as a member or leader in diverse form

**KMJ20303 KEKUATAN BAHAN (STRENGTH OF MATERIALS)****No of Credits: 3****Course Synopsis:**

Strength of Materials course introduces the concepts and principles in engineering mechanics of materials (statics) and behaviour of the materials and structures under external loadings. The fundamental knowledge on the mechanics of solids incorporating static equilibrium, materials geometry, deformations under applied loads are basics for solving numerous engineering problems involving materials and various structural members subjected to axial load, torsion, bending, transverse shear and combined loadings in engineering applications.

**Course Outcomes:**

1. Ability to apply knowledge of mathematics, science and engineering fundamentals to solve problems of various types and conditions of stresses and mechanical properties of materials involving behaviour of different material structures (shaft, beams, column, rivets, joints, etc.) and loading or combined loadings.
2. Ability to evaluate complex/applied material or structural engineering problems related to various types and conditions of stresses and mechanical properties of materials involving behaviour of different material structures (shaft, beams, column, rivets, joints, etc.) and loading or combined loadings and design formulas.

**KMJ20103 KIMIA ANALITIK (ANALYTICAL CHEMISTRY)****No of Credits: 3****Course Synopsis:**

This course is designed to introduce the students about the nature and scope of analytical chemistry, analytical reaction in the solution, separation technique using precipitation, solvent extraction, solid phase extraction, ion exchange, complexometric methods and chromatographic technique. Instrumental analysis of thermal, spectrochemical, atomic spectrometric analysis, sensor, automation and computing. And evaluation of analytical data with statistical treatment.

**Course Outcome:**

1. Ability to apply the knowledge and fundamentals of analytical chemistry to the solution of the problem.
2. Ability to evaluate the solution to solve the calculation and the analytical chemistry **problem**

**KMJ20403 FENOMENA PENGANGKUTAN DALAM KEJURUTERAAN BAHAN (TRANSPORT PHENOMENA IN MATERIALS PROCESSING)****No of Credits: 3****Course Synopsis:**

This course is divided into three (3) main topics: momentum transfer, heat transfer and mass transfer. In momentum transfer, students will learn the basic concept of fluid behaviour in static, fluid dynamics, 1-D solutions to Navier-Stokes equations and energy equations. While heat transfer deals with the transfers of heat through conduction, convection and radiation. In mass transfer, students will learn about Fick's Law and diffusion in materials, mass transfer in fluid systems and interphase mass transfer.

**Course Outcomes:**

1. Ability to apply knowledge of science and analyse the engineering fundamentals to the solution of complex problems in momentum, heat and mass transfer.
2. Ability to evaluate the complex momentum, heat and mass transfer problems reaching substantiated conclusions using principles of engineering sciences in materials engineering transport phenomena.

**KMJ30103 KAWALAN PROSES (PROCESS CONTROL)****No of Credits: 3****Course Synopsis:**

The aim of this course is to introduce the principle of process control system, including continuous and batch control approaches; knowledge of control algorithm implementation for selected processes; capability of selecting instrumentation for process control; proficiency of managing and handling projects from designing to applying the process control approach into the system.

**Course Outcomes:**

1. Ability to analyse the essential features of process control.
2. Ability to evaluate the dynamic process by constructing balance equation, differential equation, and transfer function for open and closed loop.
3. Ability to design a suitable controller by analysing the stability and comparing different responses from the control system.
4. Ability to perform the behaviour of dynamic processes using modern tools.



**KMJ30203 MEKANIK BENDALIR (FLUID MECHANICS)****No of Credits: 3****Course Synopsis:**

Course will be concentrated with fluid properties, fluid classification and force types in fluids. Thus, students will be learning about fluid properties in two different conditions: static and dynamic conditions. Students also will learn momentum principles including basic equations for controlled system and volume, and then basic equations in differential form. The students will see fluid application in flow topics in pipes and turbomachine. The course also concentrates flow measurement aspects, like tools and procedures which are used in flow measurement.

**Course Outcomes:**

1. Ability to solve common fluid problems by using the concepts of static, dynamic and kinematic.
2. Ability to evaluate the pipe flow problems involving turbulent and laminar flows.
3. Ability to design the suitable pump for pipe flow.
4. Ability to perform a simple simulation for pipe flow behaviour analysis.

**KMJ30303 KEJURUTERAAN PERMUKAAN (SURFACE ENGINEERING)****No of Credits: 3****Course Synopsis:**

This course provides the fundamentals of thin film and processing for various industrial applications. Thin film science and technology have gone through a thorough development which results in numerous new devices (e.g., Light Emitting Diodes (LED), fuel cell and solar cell) and new materials with fundamentally new properties. Topics include, but are not limited to, fundamentals on crystal structures and defects in thin films, the basic nucleation and growth mechanisms of thin films (growth models, lattice matching epitaxy and domain matching epitaxy), thin film processing techniques (CVD, MOCVD, PVD, PLD, Laser-MBE, sputtering, sol-gel, electrochemical and evaporation etc.), thin film growth instrumentation aspect (energy source, chamber configurations, vacuum systems). This course also includes the characterizations and applications which are related for surface coating/thin films.

**Course Outcomes:**

1. Ability to apply knowledge of science and to analyse the concepts fundamental and mechanism for surface engineering problem.
2. Ability to evaluate the thin film in terms of its optical, electrical and mechanical properties using principles of engineering science and the applications in surface engineering.

3. Ability to evaluate the sustainability impact of thin film in the solution of complex engineering problem.
4. Ability to propose the significance new methods or technique of coating/ thin film and engage in life- long learning in the broadest context of surface engineering applications/problems

**KMJ30104 PENCIRIAN BAHAN (MATERIALS CHARACTERIZATION)****No of Credits: 4****Course Synopsis:**

This course is an overview of the basic principles of materials characterization involving crystallography, thermal, microscopy and related spectroscopy. The basic and working principles of the instrument are reviewed where several methods, factors and errors related to measurements are introduced to assist in the analysis of materials characterization. At the end of the course, the students are expected to be able to investigate and perform engineering problems related to materials characterization.

**Course Outcomes:**

1. Ability to apply science, mathematics and engineering fundamentals knowledge to explain or describe the basic and working principles of various kinds of materials characterization tools and consequently choose appropriate tools for testing and measurements.
2. Ability to conduct investigations using research-based knowledge and research methods including analysis, interpretation and evaluation of data, and synthesis of the information to provide valid conclusions.
3. Ability to perform the appropriate technique and modern engineering tools to analyse the testing data for engineering problems solving related to materials.

**KMJ30403 TERMODINAMIK BAHAN (MATERIALS THERMODYNAMICS)****No of Credits: 3****Course Synopsis:**

Materials thermodynamics introduces the laws of thermodynamics including first law of thermodynamics, second law of thermodynamics and the combined law. The concept of thermodynamic variables and relations as well as equilibrium in thermodynamic system and statistical thermodynamics are introduced to assist in its application towards unary heterogeneous systems and multicomponent homogeneous nonreacting systems. From thermodynamic properties analysis, students are expected to be able to develop phase diagrams.

**Course Outcomes:**

1. Ability to derive the knowledge of mathematics, science, engineering fundamentals and engineering application to the solution of complex materials thermodynamic problems.
2. Ability to assess complex materials thermodynamic problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
3. Ability to assess complex materials thermodynamic properties by applying appropriate numerical modelling.

**KMJ30004 SIFAT-SIFAT POLIMER (POLYMER PROPERTIES)****No of Credits: 4****Course Synopsis:**

This course introduces the fundamental aspects of polymeric materials including their type of matrix as well as reinforcements. In addition, the students may also be exposed to several testing and characterization including physical, mechanical, thermal and chemical properties. Students may also be exposed to fundamental concepts, sample preparation, standard procedures, etc for all related testing and characterizations. At the end of the course, the students are expected to be able to relate various aspects of polymer properties by using numerous characterizations and testing equipment.

**Course Outcomes:**

1. Able to analyse the knowledge and concepts in fundamentals of polymer to access the solution of engineering problems.
2. Able to evaluate complex problems in polymers properties to reach substantiated conclusions by using engineering science.
3. Able to investigate polymer properties problems through experiments, analysis, interpret data and provide valid conclusions.

**KMJ30003 PEMROSESAN POLIMER (POLYMER PROCESSING)****No of Credits: 3****Course Synopsis:**

This course is aimed to equip students with knowledge and basic concepts of polymer processing for thermoplastic, thermoset and rubber materials. Particular emphasis will be given on the principle of the related processing techniques and rheological behaviour of polymer melt during processing. The influence of processing variables or parameters on the final products such as the existence of product defects and solutions to overcome the processing issues will also be

introduced. Several readily available techniques namely injection moulding, compression moulding, extrusion, gelling time and casting of thermoset will be explored, and students will gain the knowledge and ability to compare and evaluate the advantages and disadvantages of these processing techniques respectively. The students will be also introduced to sustainable concepts in polymer processing and their applications towards environmental and global needs within this course.

**Course Outcomes:**

1. Ability to apply the knowledge of engineering specialisation/fundamentals to develop and propose solutions to complex polymer processing problems.
2. Ability to assess complex polymer processing problems using research-based knowledge and research methods including analysis, interpretation and evaluation of data, and synthesis of information to provide valid conclusions.
3. Ability to propose solutions to the sustainability and impact of professional engineering work for complex polymer processing problems in societal and environmental contexts.

**KMJ30503 BAHAN ELEKTRONIK KEJURUTERAAN (ELECTRONIC MATERIALS ENGINEERING)****No of Credits: 3****Course Synopsis:**

This course is designed to introduce the students' various aspects of Electronic Materials such elementary materials science concepts, electrical and thermal conduction in solids, elementary quantum physics, the modern theory of solids, semiconductors and devices, dielectric materials and insulators, the magnetic properties of materials, superconductivity and the optical properties of materials.

**Course Outcome:**

1. Ability to apply knowledge of engineering fundamentals (materials science) and engineering specialisation (materials engineering) to the solution of engineering problems in semiconductor and any electronic devices.
2. Ability to evaluate engineering problems using principles of mathematics, materials science and/or engineering materials.
3. Ability to use computer software to perform electronic structure calculations

**KMJ30002 PEMILIHAN BAHAN DAN REKA BENTUK I (MATERIALS SELECTION AND DESIGN I)****No of Credits: 2****Course Synopsis:**

This course contains a foundation of knowledge on engineering design and the role of materials in it. Knowledge and understanding of engineering materials and their properties, material property charts, principles of materials and processing selection, and sustainability of material are required to reinforce the foundation of knowledge. Practical knowledge in understanding engineering design and selection of material will be assessed through integrated design capstone-project.

**Course Outcomes:**

1. Ability to analyse complex engineering problems reaching substantiated conclusions in the concept of materials selection and design
2. Ability to design solutions for materials selection and designing complex engineering problems for systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.
3. Ability to investigate materials engineering complex problems using research-based knowledge and research methods including analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
4. Ability to create reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems in selecting and designing materials.
5. Ability to assess the sustainability and impact of professional engineering work in the solution of complex materials engineering problems in societal and environmental contexts including the ability to have entrepreneurship skills.
6. Ability to contribute effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings
7. Ability to communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend, justify and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
8. Ability to analyse engineering management principles and economic decision-making and assess these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**KMJ40103 KEJURUTERAAN KAKISAN (CORROSION ENGINEERING)****No of Credits: 3****Course Synopsis:**

Student will learn corrosion and surface engineering principles. Therefore, in this subject, the student will learn electrochemistry, corrosion type, and corrosion problems in industries. Electrochemistry principles, corrosion types, Pourbaix Diagram, Corrosion mechanism, kinetic and corrosion rate. Corrosion prevention methods, inhibitors, anodic and cathodic prevention, coating, stress corrosion cracking, selection and design, corrosion problems in industry and its solution.

**Course Outcomes:**

1. Ability to ASSESS the value of materials for corrosion engineering through the knowledge of mathematics, science and engineering specialization to find the solution for complex materials engineering problems.
2. Ability to DESIGN solutions for complex corrosion engineering problems and design systems that meet specific needs with appropriate consideration for public health and safety, through the understanding in mechanism, thermodynamics and kinetic of corrosion.
3. Ability to FACILITATE, judge and conduct investigations of complex corrosion engineering problems using research methods including design of experiments, analysis and interpretation of data to provide valid conclusions.
4. Ability to EVALUATE knowledge on the impact of professional engineering solutions in societal and environmental contexts and the need for sustainable development.

**KMJ40203 UJIAN TANPA MUSNAH (NON DESTRUCTIVE TESTING)****No of Credits: 3****Course Synopsis:**

Non-destructive testing (NDT) is a method used for inspection of a materials surface and internal part. Testing implies for finding defective parts inside or on the surface of a material and does not damage or ruined tested part/specimen. Identifying defects and flaws in material which could not be seen using our naked eyes is absolutely important in determining the material life span and the material performance. The effective method of NDT is almost depending on the knowledge and skill of the person in charge. Because of that reason, this course offered several topics which is covering the general NDT methods that are normally used in engineering field such as visual testing, liquid penetrant, magnetic particle, eddy current, ultrasonic, and radiography technique. This course also introduces to other NDT techniques such as optical inspection probes, neutron radiography, laser-induced ultrasonics, acoustic emission inspection gauges and thermograph.

**Course Outcomes:**

1. Ability to demonstrate engineering knowledge of science and engineering specialization of NDT.
2. Ability to evaluate engineering problems/defects and propose NDT tools for inspection.

**KMJ40703 KEJURUTERAAN BAHAN TERMAJU (ADVANCED MATERIALS ENGINEERING)****No of Credits: 3****Course Synopsis:**

This course introduces the principles, fabrications and characterization of nanomaterials with emphasis to Quantum Dots (QDs), and Carbon-based Nanomaterials; Carbon Nanotubes (CNT) and graphene. In the meantime, materials that exhibits extraordinary properties and able to overcome the existing limit in engineering such as Advanced Alloys, Advanced Coatings, Advanced Polymers and Smart Materials also will be discussed. Therefore, students will be familiar with the recent advancement in the field of Materials Science and Engineering that revolutionized the world.

**Course Outcomes:**

1. Ability to apply knowledge of engineering fundamentals/specialization to develop and solve engineering problems in advanced materials.
2. Ability to propose the solution to overcome the existing limit for the current applications using the principle of Materials Science and Engineering.

**KMJ40503 BAHAN BINAAN (CONSTRUCTION MATERIALS)****No of Credits: 3****Course Synopsis:**

The subject provides a clear and comprehensive perspective on the range of materials used in the construction. It will cover the production, types, uses in construction, properties and related tests for the construction materials which includes concrete, masonry, plastic, glass, timber and bituminous materials. The concrete mix design calculations will also be covered. The critical factors affecting in situ materials are examined, such as deterioration, behaviour and durability of materials under performances. The role and involvement of various organizations in the construction industry will be discussed.

**Course Outcomes:**

1. Ability to analyse the theory and knowledge of science and engineering specialization to the solution of construction materials problems
2. Ability to propose new construction materials from existing knowledge of different types of construction materials by understanding the impact of the materials on the engineering solutions in societal and demonstrate knowledge of and need for sustainable development.
3. Ability to design the solution of construction materials problems in relation to science and engineering principles.

**KMJ40303 SERAMIK TEKNIKAL (TECHNICAL CERAMIC)****No of Credits: 3****Course Synopsis:**

The content of this course covers several important topics related with advanced ceramics materials in modern science and engineering perspectives. This course covers from initial concept and basic principles, functions and properties, synthesis route and processing method until current and potential applications for wide ranges of advanced ceramics including electroceramics (ionic conductivity, superconductor, dielectric, ferroelectric, piezoelectric, magnetic and photonic ceramic), refractories, structural and biocompatible (bio-ceramic) ceramics utilized in biomedical applications. Discussion in the fundamental issues and related problems involving different areas of advanced ceramics materials will be carried out. Overall, this course emphasizes on the relation between the materials-structure-properties and characteristics.

**Course Outcomes:**

1. Able to apply the knowledge of engineering specialization to assess materials in technical ceramics
2. Able to identify technical ceramics problems to develop new structures from existing knowledge using engineering sciences
3. Able to create and propose solutions for complex technical ceramics problems

**KMJ40403 BAHAN KOMPOSIT (COMPOSITE MATERIALS)****No of Credits: 3****Course Synopsis:**

The course is focusing on the three major type of composite materials which are ceramic matrix composite (CMC), metal matrix composite (MMC) and polymer matrix composite (PMC). Lecture cover on several important aspects of composite materials. This includes the introductions, classifications, properties, application and characterizations of composite materials, matrix and reinforcements phase. Also, the manufacturing and processing methods, types and influence of different reinforcement, inter-phase properties, mechanical and failure behavior, current and future pointed applications of composites products. At the end of the course, students will have a comprehensive knowledge and well understanding regarding composite materials.

**Course Outcomes:**

1. Ability to apply, analyze, categorize and relate the knowledge of science and engineering specialization to the solution of composite materials problems
2. Ability to design solution of composite materials problem in relation to science and engineering principle
3. Ability to evaluate the solutions from existing knowledge of composite by understanding the impact of composite materials on the engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development

**KMJ41003 ANALISIS KEGAGALAN BAHAN (MATERIALS FAILURE ANALYSIS)****No of Credits: 2****Course synopsis:**

This course is designed to bridge the gap between theory and practice of failure analysis in terms of materials aspect. It presents a very practical approach to failure analysis for materials engineering students who are interested in understanding how knowledge of failure analysis can lead to better productivity,

safety and/ or cost saving. A comprehensive overview of the field, this course covers four principal areas of interest, which are procedures for forensic analysis, root-causes of failure, failure mechanisms and recommendation to prevent future failure. The forensic analysis of product/component failures is also studied from beginning to end for certain case studies that normally happen in industries. Students will also be exposed to technical report writing techniques.

**Course Outcomes:**

1. Ability to apply the knowledge and fundamentals of materials science & engineering to investigate and overcome the complex materials component failure problems.
2. Ability to develop corrective and preventive actions based on analysis of complex engineering problems in material failure analysis finding.

**KMJ40903 BAHAN UNTUK APLIKASI TENAGA (MATERIALS FOR ENERGY APPLICATION)****No of Credits: 3****Course synopsis:**

In this course, students will be exposed to several materials associated with energy conversion and energy storage. The overview of current global energy needs and challenges, as well as types of energy conversion and storage will be introduced to students. Applicable materials for energy application, the properties of materials, fundamental of reactions involved, exploration of advanced materials, the vital criteria in selection of materials, extended issues and challenges towards green technology and how to solve the related issue are discussed. Materials for energy applications in lithium-ion battery, supercapacitor, fuel cell, photo-sensitive and thermoelectric materials will be highlighted. The importance role of advanced materials in these energy applications towards high performance and efficient-energy conversion and storage will be discussed.

**Course Outcomes:**

1. Able to APPLY knowledge to identify the fundamental reaction and materials in energy conversion and storage.
2. Able to ANALYZE properties of materials and develop materials that can optimize the performance and overcome complex engineering problems in energy application.

**KMJ40803 PEMBUNGKUSAN ELEKTRONIK TERMAJU (ADVANCED ELECTRONIC PACKAGING)****No of Credits: 3****Course Synopsis:**

This course is designed to introduce the students to various aspects of electronic packaging technology currently being used in the electronic industry. Topics such as types of electronic packages, materials involved in packing, thermal considerations, package assembly and design characteristics, fundamental and process of board and IC assembly, soldering technology, MEMS and MOEMS, thin film processing and reliability assessment techniques will be discussed.

**Course Outcomes:**

1. Ability to apply knowledge of engineering fundamentals/specialisation to develop and solve engineering problems in electronic packages and various semiconductor industries.
2. Ability to propose the solution to electronic packaging problems using principles of mathematics, materials science and/or engineering materials.

**KMJ40603 PENYAMBUNGAN BAHAN DAN STRUKTUR (JOINING OF MATERIALS AND STRUCTURES)****No of Credits: 3****Course synopsis:**

Joining is the process used to bring separate parts or components together to produce a unified whole assembly or structural entity. Joining is often one of the last processes to be used in a complex products manufacturing, following part shaping by casting, rolling, drawing, extrusion, forging, forming, machining and powder compacting. This course is comprehensive of various joining fundamental and techniques of materials. It is not only a pragmatic process for manufacturing that we need every day, but as an enabling technology for what we will need for the future of materials development. Topics includes joining conventional, advanced and emerging materials, as well as large, complex structures, primarily from the material perspective. Joining by mechanical fasteners, integral designed-or formed-in features, adhesives, welding, brazing, soldering, thermal spraying, and hybrid processes are addressed as processes and technologies, as are issues associated with the joining of metals, ceramics, glass, plastics, and composites. While focused on materials issues, issues related to joint design, production processing, quality assurance, process economics, and joint performance in service are not ignored.

**Course Outcomes:**

1. Ability to analyse the knowledge of science and materials engineering to join various materials and structures.
2. Ability to evaluate suitable joining processes to various types of materials and structures by understanding the impact of the materials and process to the societal and environmental context for sustainable development.
3. Ability to design the solution of materials joining and structures in relation to science and engineering principles.

**KMJ49802 PROJEK TAHUN AKHIR I [FINAL YEAR PROJECT I]****No of Credits: 2****Course Synopsis:**

Students are expected to apply their knowledge on conducting research. In this course, students are to carry out independent studies on a selected research topic. The topic chosen is supposed to be within the scope of Materials Engineering practice. Each student is assigned with a supervisor. The supervisor will assist students in planning and conducting their research. For this stage, students are required to attend seminars, prepare Introductory Chapter, Literature Review and proposed method of study and report preliminary results.

**Course Outcomes:**

1. Ability to identify engineering problems and compose research literature to reach substantiated conclusions for research projects.
2. Ability to propose research methodology incorporating clear fundamentals, theories and benchmarked against standard practices governing the research project.
3. Ability to apply health, safety and the consequence responsibilities relevant to professional engineering practice and solutions.
4. Ability to value the ethical principle to professional ethics and show responsibilities in research projects.
5. Ability to perform communication effectively on research activities with the engineering community and with society at large, make effective presentations, and give and receive clear instructions.
6. Ability to demonstrate clear project management in research activities planning to meet the required research objectives and deadlines.
7. Ability to perform research independently and engage in long-life learning in the broadest context of technological change



**KMJ49904 PROJEK TAHUN AKHIR II [FINAL YEAR PROJECT II]****No of Credits: 4****Course Synopsis:**

Students are expected to apply their knowledge on conducting research. In this course, students are to carry out independent studies on a selected research topic. The topic chosen is supposed to be within the scope of Materials Engineering practice. Each student is assigned with a supervisor. The supervisor will assist students in planning and conducting their research. For this stage, students are required to attend seminars, prepare Introductory Chapter, Literature Review and proposed method of study and report preliminary results.

**Course Outcomes:**

1. Ability to identify engineering problems and compose research literature to reach substantiated conclusions for research projects.
2. Ability to conduct research experiments, analyze and interpret data and synthesize the information to provide valid conclusions based on knowledge in the broadest context.
3. Ability to value the ethical principle to professional ethics and show responsibilities in research projects.
4. Ability to perform communication effectively on research activities with the engineering community and with society at large, make effective presentations, and give and receive clear instructions.
5. Ability to demonstrate clear project management in research activities execution to meet the required research objectives and deadlines.
6. Ability to perform research independently and engage in long-life learning in the broadest context of technological change.

**KMJ40003 PEMILIHAN BAHAN DAN REKA BENTUK II (MATERIALS SELECTION AND DESIGN II)****No of Credits: 3****Course Synopsis:**

This course contains a foundation of knowledge on engineering design and the role of materials in it. Knowledge and understanding of engineering materials and their properties, material property charts, principles of materials and processing selection, and sustainability of material are required to reinforce the foundation of knowledge. Practical knowledge in understanding engineering design and selection of material will be assessed through integrated design capstone-project.

**Course Outcomes:**

1. Ability to analyse complex engineering problems reaching substantiated conclusions in the concept of materials selection and design

2. Ability to design solutions for materials selection and designing complex engineering problems for systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.
3. Ability to investigate materials engineering complex problems using research-based knowledge and research methods including analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
4. Ability to create reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems in selecting and designing materials.
5. Ability to assess the sustainability and impact of professional engineering work in the solution of complex materials engineering problems in societal and environmental contexts including the ability to have entrepreneurship skills.
6. Ability to contribute effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings
7. Ability to communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend, justify and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
8. Ability to analyse engineering management principles and economic decision-making and assess these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments

**KMJ39905 LATIHAN INDUSTRI (INDUSTRIAL TRAINING)****No of Credits: 5****Course Synopsis:**

The course will expose students to technical and practical application as well as other aspects such as the company's operation, work culture, safety procedure, project management, communication, technical skills, and presentation. Students are required to submit their logbook and written report at the end of the industrial training.

**Course Outcomes:**

1. Ability to demonstrate technical knowledge and practical skills.
2. Ability to adapt to health, safety, legal and cultural requirements in working environment.
3. Ability to perform tasks with professional ethics and responsibilities.
4. Ability to work independently, interact with coworkers and work in a team.
5. Ability to report and communicate verbally and in written form.

**KMJ42403 PENGURUSAN KEJURUTERAAN (ENGINEERING MANAGEMENT)****No of Credits: 3****Course synopsis:**

This course aims to teach students on how to apply project management skills when undertaking projects and to provide basic tools of engineering economy to enable the students to carry out professional quality economic evaluations. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineers relating to project management in the current economic scenarios.

**Course Outcomes:**

1. Ability to evaluate project requirements and integrate the processes of project management like work plans, scheduling, cost estimation and perform project evaluation.
2. Ability to analyse and evaluate economic scenarios and integrate decision making process to engineering projects and business ventures.

**KMJ45802 JURUTERA PROFESIONAL (PROFESSIONAL ENGINEER)****No of Credits: 2****Course synopsis:**

This course aims to explain the main concepts in engineering ethics, risk management and occupational safety and health as well as to expose the students to basic of law in the engineering context. The materials will be of introductory nature to enable engineers to appreciate factors that have to be taken into account in decision-making. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineers relating to engineering ethics, risk management and to understand the legal requirements related to engineering field.

**Course Outcomes:**

1. Ability to understand, identify and evaluate the issues and challenges of engineering ethics.
2. Ability to understand the sustainable and impact in societal and environmental context.
3. Ability to explain and identify hazards; evaluate and review the function of risk management, occupational safety, health (OSHA) and procedures of legal on engineering issues.

**KMJ15204 KIMIA ORGANIK [ORGANIC CHEMISTRY]****No of Credits: 4****Course Synopsis:**

This course is developed to introduce the basic concepts of organic chemistry, chemical structures and reactions, to familiarize with mechanism concepts of reactions and to understand the theoretical and conceptual background of organic chemistry.

**Course Outcomes:**

1. Ability to IDENTIFY structure and bonding, nomenclature, functional groups and their physical properties and intermolecular forces.
2. Ability to RECOGNIZE and DIFFERENTIATE selected natural polymers, classification and their behaviours: carbohydrates and polysaccharides, amino acids, and protein.
3. Ability to DEMONSTRATE concepts and principles and PREDICT on major organic reactions and mechanisms.
4. Ability to ANALYSE the experimental results on purification technique, structural related properties and reactions.

**KMJ15403 MEKANIK KEJURUTERAAN [ENGINEERING MECHANICS]****No of Credits: 3****Course Synopsis:**

The main objective of this course is to expose students to the basic concepts of force and resultant force. They will also learn about friction and distributed forces. Students will apply this basic knowledge to analyse the stability and equilibrium of structures such as truss and machines. In terms of dynamics, the students will learn how to solve kinematics problems for particles and rigid bodies. They will also learn how to solve kinetics problems, which can be considered by using forces and acceleration and principle of work and energy.

**Course Outcomes:**

1. Ability to calculate the basic concepts and principles of physics related to engineering mechanics based on static or dynamic state.
2. Ability to solve static or dynamic problems through further analysis by applying concepts and principles of describing, sketching and/or drawing free body diagrams.

**KMJ15503 PENGENALAN KEPADA POLIMER [INTRODUCTION TO POLYMER]****No of Credits: 3****Course Synopsis:**

This course intends to expose the fundamentals of polymers that cover classification, introduction, characteristics and applications of polymers. There are also discussions related to the differences in polymer, metal and ceramic materials. The students will also be exposed to the applications of polymer materials and their relation with the environment.

**Course Outcomes:**

1. Ability to COMPARE the fundamental principles of the polymerization reaction and polymer identification.
2. Ability to CATEGORIZE a different material in description of the structure, mechanical properties and processing.
3. Ability to DISCUSS recyclability/disposability issues related to metals, glass, plastics and rubber and composite materials.

**KMJ24003 BAHAN-BAHAN PLASTIK [PLASTIC MATERIALS]****No of Credits: 3****Course Synopsis:**

The aim of this course is to introduce students to the concept and types of plastic materials. Students will be able to distinguish the relationship between structures and properties of different plastic materials and able to provide crucial ideas on plastic material/plastic additives selection principles and the sustainability concept of plastic materials.

**Course Outcomes:**

1. Ability to discuss the concept of plastic materials/plastic additives and differentiate the types of plastic materials/plastic additives.
2. Ability to compare the relationship between structure and properties of different plastic materials.
3. Ability to evaluate the sustainability and impact of plastic recycling in plastic engineering.

**KMJ24403 BAHAN-BAHAN ELASTOMERIK [ELASTOMERIC MATERIALS]****No of Credits: 3****Course Synopsis:**

To introduce basic knowledge on elastomeric materials based on types and classification, structure and properties relationship, additives used in elastomer and some common formulations, and use of elastomer in engineering applications. The principle of viscoelasticity is extended for rubber engineering applications. After studying this course, the students have the basic knowledge on different types of elastomers. They also learn structure properties relationship for fabricating and designing rubber engineering products.

**Course Outcomes:**

1. Ability to differentiate the classification of elastomeric materials.
2. Ability to assess the structure properties for fabricating and designing rubber engineering product.

**KMJ25203 KIMIA FIZIKAL [PHYSICAL CHEMISTRY]****No of Credits: 3****Course Synopsis:**

This course aims to introduce the knowledge of physical properties in the polymer solutions to understand the related principles and basic physical chemistry, which requires a prior mathematical background for calculating and solving a problem of the chemical and kinetic properties in the polymeric materials. The basic knowledge of electrochemistry and surface chemistry is also included.

**Course Outcomes:**

1. Ability to calculate the basic concept of concentration solution and molecular weight of polymer.
2. Ability to derive the chemical equilibrium and identify phase diagram and distribution law.
3. Ability to evaluate the surface chemistry, catalysis, rate of reaction and kinetics in a chemical process.
4. Ability to evaluate the basic knowledge of electrochemical cells, batteries and fuel cells and calculate the ions present in the electrolyte solutions and electrochemical cell system.

**KMJ25304 SINTESIS POLIMER [POLYMER SYNTHESIS]****No of Credits: 4****Course Synopsis:**

This course is developed to introduce the basic concepts of synthesis polymer involving chemical structures, reaction schemes and mechanistic aspects of polymerization. Understanding the theoretical, conceptual background and practicality of synthesis polymer.

**Course Outcomes:**

1. Ability to explain the basic concepts of polymerization and relationship toward structure and polymer properties.
2. Ability to distinguish between step polymerization and chain-growth polymerization with respect to synthesis mechanisms and kinetics.
3. Ability to evaluate the polymeric materials based on method and polymer properties.

**KMJ25404 STRUKTUR & SIFAT-SIFAT POLIMER [STRUCTURE & POLYMER PROPERTIES]****No of Credits: 4****Course Synopsis:**

This course is offered to provide knowledge on the principles and concept of structure/property relationship of polymeric materials. This includes the understanding of viscoelasticity concepts, transition phenomena, mechanical and thermal properties of polymers.

**Course Outcomes:**

1. Ability to explain the fundamental concept of polymer structures and properties.
2. Ability to relate the concepts of viscoelasticity to the transition phenomena in polymers.
3. Ability to evaluate the mechanical and thermal properties in polymeric materials.
4. Ability to conduct the experiments and analyze the results obtained to mechanical properties in polymeric materials.

**KMJ25503 TERMODINAMIK UNTUK KEJURUTERAAN POLIMER [THERMODYNAMICS FOR POLYMER ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course deals with the fundamentals of thermodynamics including thermodynamic systems and properties, the three laws of thermodynamics and chemical equilibrium. This course emphasises the use of theories in solving problems related to the basic concepts of thermodynamics.

**Course Outcomes:**

1. Ability to determine work, heat, energy and enthalpy change that are related to the formulation of the First Law.
2. Ability to calculate the thermodynamic properties related to the First Law.
3. Ability to calculate the thermodynamic properties related to the Second and Third Law of thermodynamics.
4. Ability to discuss the criteria of spontaneity and predict the direction of a reaction before reaching equilibrium.

**KMJ34004 PEMROSESAN PLASTIK [PLASTIC PROCESSING]****No of Credits: 4****Course Synopsis:**

Plastic Processing; a course that exposes students to the methods of processing related to thermoset and thermoplastics materials. To ensure an understanding of these processes, a few topics will be discussed including; rheology, appropriate tests, parameters and processing methods, troubleshooting, product characterization. Also exposed in this course are the knowledge of the compounding process and the use of additives for specific purposes.

**Course Outcomes:**

1. Ability to distinguish thermoset and thermoplastic processing techniques.
2. Ability to implement troubleshooting on various thermoset and thermoplastic processing.
3. Ability to appraise typical rheology behavior of thermoset and thermoplastic materials.
4. Ability to produce and evaluate polymer specimens made by various thermoset and thermoplastic processing techniques.

**KMJ34404 PEMROSESAN GETAH [RUBBER PROCESSING]****No of Credits: 4****Course Synopsis:**

This course is to enhance knowledge, fundamental and significant concepts of rubber processing and formulation, different processing techniques and testing of raw materials and finished products which are important in handling and controlling rubber processing machines.

**Course Outcomes:**

1. Ability to assess rubber formulation and differentiate rubber processing techniques
2. Ability to evaluate the characteristics and properties of rubber compounds for related applications.
3. Ability to conduct the experiments and analyze the results obtained associated with rubber processing.

**KMJ34504 PEMROSESAN LATEKS [LATEX PROCESSING]****No of Credits: 4****Course Synopsis:**

This course emphasizes on the fundamental characteristics of natural and synthetic lattices, latex compounding and processing, as well as their applications in latex industries and others.

**Course Outcomes:**

1. Ability to apply fundamentals of latex science and technology, to discuss and analyse characteristics, flow, behaviour, colloidal properties, and vulcanization in natural rubber and synthetic lattices.
2. Ability to formulate and produce natural rubber/synthetic latex products.
3. Ability to assess various applications and related matters and issues in natural and synthetic rubber lattices by consideration of health and safety aspects.

**KMJ34803 PENGUJIAN & PENCIRIAN POLIMER [POLYMER TESTING & CHARACTERIZATION]****No of Credits: 3****Course Synopsis:**

This course introduces the students to basic concepts of testing and characterization, explain the usage of various polymer characterization equipment, analyze the concept to identify and characterize the polymeric

materials.

**Course Outcomes:**

1. Able to explain the basic concept of polymer testing and characterization.
2. Able to interpret the obtained experimental results of polymeric materials.
3. Able to propose various testing and characterization techniques to solve problems or defects related to polymeric materials.
4. Able to conduct the experiments and analyze the results obtained associated to polymeric materials.

**KMJ35203 REKA BENTUK KEJURUTERAAN POLIMER [POLYMER ENGINEERING DESIGN]****No of Credits: 3****Course Synopsis:**

This course is to develop knowledge on the polymer engineering design specifically for plastic injection moulding cavities, dies for extrusion process using CAD software and a design consideration in plastic products. The generated knowledge will provide effective skills to counter and solve the common problem approach on the fundamental basis of polymer engineering design.

**Course Outcomes:**

1. Ability to apply basic engineering design process, the concept of mould and die Ability to design components or products that meet specific needs with appropriate consideration.
2. Ability to construct the design of plastic products, mould and die using CAD software.
3. Ability to analyze the effect of parameters on flow behavior properties in cavity and die, and failure mechanism from the simulation results.
4. Ability to function effectively as a member or a leader in multidisciplinary tasks.
5. Ability to demonstrate knowledge in evaluating the cost of a product.

**KMJ35304 PEMINDAHAN JISIM & HABA UNTUK KEJURUTERAAN POLIMER [MASS & HEAT TRANSFER FOR POLYMER ENGINEERING]****No of Credits: 4****Course Synopsis:**

The aim of this course is to provide the knowledge of mass and heat transfer in polymer engineering application. For mass transfer, students are exposed to the fundamentals and laws used during the mass transfer process. Meanwhile for heat transfer, students will learn the detailed concept of conduction, convection and radiation. At the end of the course, students are able to relate and apply the knowledge in polymer engineering applications.

**Course Outcomes:**

1. Ability to differentiate the fundamentals of mass and heat transfer.
2. Ability to calculate mass transfer in molecular diffusion, convection and mass transfer between phases.
3. Ability to calculate heat transfer for conduction, convection and radiation. Ability to calculate and evaluate the heat transfer and mass transfer in polymer processing equipment of injection molding and screw extruder.

**KMJ35402 POLIMER DALAM APLIKASI BIOPERUBATAN [POLYMERS IN BIOMEDICAL APPLICATIONS]****No of Credits: 2****Course Synopsis:**

This course introduces structure, properties and processing of polymers for biomedical applications. These include biodegradable polymers, non-biodegradable polymers, biosynthetic polymers and hybrid polymers for tissue engineering, drug delivery and implantable devices. Students are expected to understand the degradation mechanisms of polymeric materials in biological environments (such as under certain pH, ion, enzymes) and surrounding environment, the interaction between biological materials such as proteins and cells with polymeric materials and how the surface modification could affect such interaction. This course also highlights methods to produce the polymeric biomaterials and techniques to assess their biocompatibility, biostability and bioactivity.

**Course Outcomes:**

1. Ability to compare polymeric materials for biomedical applications.
2. Ability to propose the methods involved in preparing, testing and characterizing polymeric biomaterials for biomedical applications.
3. Ability to predict degradation of polymers in biological, environmental conditions and the involved mechanism.

**KMJ35502 POLIMER PEMANCAR CAHAYA & APLIKASINYA [PHOTOLUMINESCENT POLYMERS & THEIR APPLICATIONS]****No of Credits: 2****Course Synopsis:**

This course introduces a class of polymers that plays a big role in the era IR 4.0 which is the photoluminescent polymers. This course covers the basic theory about light absorption and emission, types of polymers that can emit light, characterisation methods, and their applications. This course focuses on two classes of polymers. Those are the conjugated polymers and polymer composites filled with light emitting compounds.

**Course Outcomes:**

1. issues.
2. Ability to describe the types of photoluminescent polymers and the basic theory of absorption and emission.
3. Ability to analyse the UV/Visible and photoluminescent (PL) spectra and recognise the electronic transitions.
4. Ability to propose the applications of the photoluminescent polymers in tackling environmental

**KMJ44003 KOMPOSIT POLIMER [POLYMER COMPOSITES]****No of Credits: 3****Course Synopsis:**

This course provides the concepts of polymer composites with several fabrication techniques. This course also provides knowledge on fibres reinforcement of polymer matrices and their corresponding properties. The course includes the mechanics of composites and some composite testing methods.

**Course Outcomes**

1. Ability to discuss the concepts and differentiate polymer composites.
2. Ability to propose suitable fabrication techniques and applications for polymer composites.
3. Ability to assess the mechanical properties and defects of polymer composites using destructive and non-destructive testing (NDT) techniques.
4. Ability to develop the selective polymer composite products.



**KMJ44104 ADUNAN-ADUNAN POLIMER [POLYMER BLENDS]****No of Credits: 4****Course Synopsis:**

The aim of this course is to provide knowledge of polymer blends/alloys. Understanding of their properties relationship and knowledge on testing and characterisation, the concept of reactive blending in high-performance polymer blends and alloys, and engineering application of polymer blends/alloys.

**Course Outcomes:**

1. Ability to discuss the concept of polymer blends and apply the principles of blending in polymer blends.
2. Ability to evaluate blending conditions to structure, properties, testing and characterisation of polymer blends.
3. Ability to conduct and assess the experiment associated with polymer blends according to applications.

**KMJ45203 PROJEK REKA BENTUK BERSEPADU KEJURUTERAAN POLIMER [POLYMER ENGINEERING INTEGRATED DESIGN PROJECT]****No of Credits: 3****Course Synopsis:**

This course demonstrates student's ability to apply interdisciplinary knowledge and skills related to product design and project management. The project emphasises the innovation of conceptual designs using modern tools through development of design solutions with engineering considerations.

**Course Outcomes:**

1. Ability to analyse complex engineering problems using principles of engineering sciences and survey analysis results.
2. Ability to design solutions in product design, selection of materials and processing methods that meet specific needs with appropriate consideration for public health and safety and environment.
3. Ability to apply modern tools in designing products, performing simulation and analysis.
4. Ability to solve complex engineering problems with appropriate consideration for societal, safety and health.
5. Ability to solve complex engineering problems with appropriate consideration for the environment.
6. Ability to apply ethical principles in professional writing.
7. Ability to communicate effectively in delivering concepts and ideas with the engineering community.

8. Ability to appraise economic evaluation and apply knowledge of engineering management principles.
9. Ability to organise reviewed relevant information and keep up to date with technological changes.

**KMJ45403 PEREKAT POLIMER & PENGLITUP [POLYMER ADHESIVE & COATING]****No of Credits: 3****Course Synopsis:**

This course is to introduce the basic knowledge on principles, properties of adhesion and adhesives polymer coatings. This course is focused on application of adhesives and coating products, study on working properties, characterization and also their application.

**Course Outcomes:**

1. Able to explain, apply and differentiate the concept of adhesives and coatings for certain applications.
2. Able to create, formulate and characterize different polymer adhesives and coatings systems.
3. Able to select and adapt the testing methods for adhesives and coatings, preparation and performance.
4. Able to communicate effectively in sharing information of adhesives and coatings.

**KMJ45503 POLIMER MESRA ALAM [ENVIRONMENTAL FRIENDLY POLYMER]****No of Credits: 3****Course Synopsis:**

The aim of this course is to provide the knowledge of environmentally polymer. Solve their issues and understand their future needs of environmental polymers and create alternative ways for handling polymer issues such as degradable polymer, biopolymer and polymer recycling.

**Course Outcomes:**

1. Able to apply knowledge in polymer recycling to solve environmental issues using 3R (reuse, reduce, recycling) approach.
2. Able to justify biopolymers related to its structures-properties relationship towards biodegradability and its application.
3. Able to communicate effectively in sharing information of environmental friendly polymers.

**KMJ45603 POLIMER DALAM APLIKASI ELEKTRONIK [POLYMER IN ELECTRONIC APPLICATION]****No of Credits: 3****Course Synopsis:**

This course is to provide knowledge of polymer application in electronic industries. This includes an understanding of the concepts of fabrication processes of various polymers in this application. Provide knowledge on characterization and selection principles of polymer in electronic application.

**Course Outcomes:**

1. Able to apply the basic knowledge and to categorize the materials involved in polymer in electronic application requirements.
2. Able to identify the importance of polymers and select testing and characterization of some polymers for electronic application.
3. Able to communicate effectively in sharing the information of polymers in electronic applications.

**KMJ12303 INTRODUCTION TO SUSTAINABILITY****No of Credits: 3****Course Synopsis:**

This course introduces the academic approach of sustainability and explores how today's human societies can endure in the face of global change, ecosystem degradation and resource limitations. The course focuses on key knowledge areas of sustainability theory and practice, including population, ecosystems, global change, energy, agriculture, water, and environmental economics. The course also introduces the environmental law and policy practices in Malaysia. Lastly, implementation of sustainable production and production of sustainable products based on analysis of environmental aspects of a product system, integration of significant environmental aspects into product design, and selection of the innovative methods and tools are introduced.

**Course Outcomes:**

1. Ability to understand and ANALYSE the need of the sustainability in the solutions of complex engineering problems for environmental and sustainable development.
2. Ability to APPLY contextual knowledge to assess global issues and the consequent responsibilities relevant to professional engineering practice.
3. Ability to EVALUATE a viable solution to a particular challenge to sustainability and defend a persuasive proposal that advocates this solution.

**KMJ12503 MASS AND ENERGY BALANCE****No of Credits: 3****Course Synopsis:**

The course highlights the basic concept of mass and energy balance in chemical processes. Students are taught with fundamental knowledge of engineering calculations and process variables. Exposure to concepts and understanding of mass and energy balance are emphasized which covers steady-state nonreactive and reactive processes. These concepts are then applied to analyze and solve problems in chemical systems, where applicable. Students will be taught to approach problems systematically; draw and label flowcharts, calculate the degree of freedom to ensure the problems are solvable, and formulate solution plans before any calculations.

**Course Outcomes:**

1. Ability to APPLY knowledge of mathematics and engineering fundamentals for unit conversion and process variables to solve complex mass and energy balance calculations
2. Ability to ANALYZE complex engineering problems involving mass balance in chemical processes.
3. Ability to ANALYZE complex engineering problems involving energy balance in chemical processes.

**KMJ12203 INTRODUCTION TO BIOLOGICAL AND CHEMICAL SCIENCE PRINCIPLES****No of Credits: 3****Course Synopsis:**

This course introduces the relevant fundamentals of biochemistry and microbiology, which includes important topics like microbial diversity, cell construction and nutrients, enzymes, molecular cell biology, metabolism and microbial growth. Application of these principles in chemical engineering are also featured with reference to medical, food, waste management and other related processes in chemical industries.

**Course Outcome:**

1. Ability to acquire and APPLY knowledge of biological basics, enzymes, cell function and metabolisms.
2. Ability to conduct investigations into complex problems as well as to ANALYSE and interpret data related to batch growth kinetic and alteration of cellular information
3. Ability to EVALUATE the solutions of engineering problem related to the application of biochemistry and microbiology in chemical industry

**KMJ12103 ORGANIC CHEMISTRY****No of Credits: 3****Course Synopsis:**

This course introduces the fundamental theories (atomic orbital, molecular orbital and hybridization theories) and the application of hybridization theory in reactions involving alkynes and alkenes including conformational analysis of alkanes and emphasizing on the nucleophilic substitution reactions of alkylhalides. The course also covers on physical and chemical properties, and chemical reactions involving alcohol and ester, aldehyde and ketone, carboxylic acid and aromatic compound. The application of organic chemical process is discussed in terms of biofuel and biopharmaceutical production.

**Course Outcomes:**

1. Ability to DEMONSTRATE the basic concept in chemical bonds and acid base reactions in organic chemistry
2. Ability to ANALYZE theoretical organic chemical reactions of alkenes, alkynes and alkylhalides at molecular level in complex engineering problem.
3. Ability to EVALUATE the chemistry of alcohol, ether, aldehyde, ketone, carboxylic acid, aromatic compounds and their chemical reaction in complex engineering problem

**KMJ12501 BIOCHEMICAL SCIENCE****No of Credits: 3****Course Synopsis:**

Biochemistry and microbiology are the foundation of life sciences. This course provides an opportunity for the students to develop the skills required in a biochemistry and microbiology laboratory environment while further enhancing their documentation and laboratory compliance expertise.

**Course Outcomes:**

1. Ability to DEMONSTRATE the microscopy techniques in describing and identifying the different types of cells as well as their structures
2. Ability to ORGANIZE experiments and interpret data related to alteration of cellular information, growth, and enzyme kinetics
3. Ability to EVALUATE the experimental data to solve engineering problem related to biochemistry and microbiology

**KMJ22003 CHEMICAL ENG. THERMODYNAMICS****No of Credits: 3****Course Synopsis:**

The aim of this course is to extend the understandings on classical thermodynamics to theories and applications in chemical engineering. The course begins with the concept of heat effects and volumetric properties of fluids. It also extends to thermodynamic properties of fluids, real gas mixtures and solutions. Introduction to physical and chemical equilibria are also included, which introduces students to vapor-liquid and chemical reaction equilibrium.

**Course Outcomes:**

1. Ability to analyse volumetric and thermodynamic properties at specified conditions using appropriate thermodynamic approaches.
2. Ability to evaluate complex thermodynamic problems using the thermodynamic property relations for fluids.
3. Ability to design solution for complex thermodynamic equilibria problems using chemical engineering principles.
4. Ability to communicate complex engineering problems in thermodynamics verbally and in writing.

**KMJ22103 FLUID MECHANICS****No of Credits: 3****Course Synopsis:**

This course emphasizes basic principles and equations of fluid mechanics in the context of numerous and diverse real-world engineering examples. Topics covered including fluid properties, static and kinematics, control volume analysis, momentum analysis of flow system, dimensional analysis, internal flow (pipe flows), differential analysis, and external flows (lift and drag).

**Course Outcomes:**

1. Ability to analyse the essential parameters describing a fluid system and differentiate static and kinematic system by applying mathematics and engineering principles.
2. Ability to analyse the fluid flow problems involving mass, energy, and momentum balances, dimensional analysis, and differential equations of fluid mechanics.
3. Ability to create solutions for problems and phenomena associated with internal, external, and compressible flow through case study analysis.
4. Ability to solve complex engineering activities related to fluid flow analysis tasks as an individual, leader, or team member.

**KMJ22303 ANALYTICAL CHEMISTRY****No of Credits: 3****Course Synopsis:**

This course introduces and discusses the basic principle of analytical chemistry that covers data analysis and interpretation. Basic statistics and the utilization of statistics are applied in most of the analytical methods. In this course students are able to apply classical analytical methods such as gravimetry and titrimetry as well as applying modern methods in analytical chemistry such as chromatographic and spectroscopic techniques.

**Course Outcomes:**

1. Ability to APPLY knowledge of mathematics in statistical method for data and steps in analytical analysis.
2. Ability to ASSESS complex problem regarding concentration of analytes of various classical titrimetric and gravimetric.
3. Ability to PROPOSE techniques, skills, and modern tools for complex engineering problems regarding sample concentration, complex chromatography and spectroscopic methods.
4. Ability to CONDUCT appropriate techniques for complex engineering problems and experiments involving various knowledge of analytical and organic chemistry.

**KMJ22503 MASS TRANSFER****No of Credits: 3****Course Synopsis:**

This course emphasizes the fundamental concepts and problem-solving techniques on mass transfer mechanisms. The course provides the knowledge on mass transfer operations at basic to an intermediate level. The course motivates the analogy between heat and mass transfer and perform calculation on linked heat and mass transfer. Moreover, it introduces the theoretical and analytical solutions to solve the mass transfer operation problems

**Course Outcomes:**

1. Ability to DIFFERENTIATE the mechanisms and processes of mass transfer; analyse and calculate solutions for mass transfer problems related to the diffusion and mass transfer coefficient in different systems using engineering sciences.
2. Ability to DESIGN solution for complex engineering problems involving molecular diffusion plus convection and chemical reaction as well as transport phenomena knowledge of drops and bubbles.
3. Ability to USE numerical techniques and modern engineering tools to analyse

mass transport phenomena problems.

4. Ability to INTEGRATE complex engineering activities through effective communication in the form of written reports and presentations.

**KMJ22403 HEAT TRANSFER****No of Credits: 3****Course Synopsis:**

This course covers the principles of steady-state heat transfer through three basic mechanisms, which are conduction, convection and radiation. The course introduces the methods to calculate conduction and convection heat transfer under various conditions. The course also focuses on the fundamental design and application of heat transfer such as heat exchanger, evaporator and dryer. The fundamental knowledge gained from the single heat exchanger analysis is further applied for designing a heat exchanger network for specific processes towards minimum energy requirement and rejection as well to reduce the number of heat exchangers required

**Course Outcomes:**

1. Ability to APPLY knowledge of mathematics and engineering to solve engineering problems involved in the principles of steady-state heat transfer.
2. Ability to ANALYZE and solve engineering problems involved in the steady-state heat transfer principles of conduction and convection.
3. Ability to EVALUATE the heat transfer knowledge, designing heat transfer equipment and the heat exchanger networks related to specific processes.
4. Ability to function as an individual, and a member or leader in a team to integrate heat transfer knowledge in complex engineering activities

**KMJ22601 TRANSPORT PHENOMENA APPLICATION****No of Credits: 1****Course Synopsis:**

This course provides the necessary lab for students to understand the application of transport phenomena. Transport Phenomena deals with the movement of different physical quantities such as energy and mass in any chemical or mechanical process and combines the basic principles (conservation laws) and laws of various types of transport. The labs are designed such that students will identify the heat transfer, mass transfer and fluid flow phenomena in lab, industrial and daily environments.

**Course Outcomes:**

1. Ability to apply the principles of mass/fluid to investigate the complex problems relating fluid flow/heat transfer systems.
2. Ability to analyze heat and mass transfer/fluid mechanic skills by applying the engineering knowledge.
3. Ability to develop skills in engineering experimentation and data analysis through design/development of solutions.

**KMJ32003 REACTION ENGINEERING****No of Credits: 3****Course Synopsis:**

Reaction Engineering concerns with the exploitation of reactions on a commercial scale. Its goal is to familiarize with different designs of reactors. It also emphasizes qualitative arguments, simple reactor sizing method, graphical procedures, and frequent comparison of capabilities of the major reactor types. Simple ideas are treated first, and then extended to more complex problems.

**Course Outcomes:**

1. Ability to ANALYZE knowledge of chemical reaction to solve problems regarding the rate law and rate law parameters.
2. Ability to DESIGN solutions for chemical reactors conversion & sizing and to explain steady-state isothermal reactor.
3. Ability to EVALUATE the difference of catalysis & catalytic reactions and to solve Residence Time Distribution (RTD) functions in non-ideal reactors.
4. Ability to INTEGRATE complex engineering activities through effective communication in the form of written reports and presentations

**KMJ32104 PROCESS DYNAMICS & CONTROL****No of Credits: 4****Course Synopsis:**

This course includes an introduction to process control and dynamics, theoretical models, dynamic behaviour and characteristic of first, second and higher order processes, feedback controllers, control system instrumentation, overview of control system design, stability of closed-loop control system, PID controller design, tuning and troubleshooting as well as introduction to feedforward control. The theories are supported by performing laboratory experiments.

**Course Outcomes:**

1. Ability to formulate theoretical models using Laplace transforms techniques and analyze complex control problems related to transfer functions and state space models.
2. Ability to derive empirical models from process data by applying knowledge of mathematics, science and engineering and identifying the dynamic behaviour and characteristics of first, second order and more complicated processes
3. Ability to design feedback and/or feedforward control system for complex chemical processes by evaluating control system instrumentation including its closed-loop dynamic behaviour besides being able to work in multi-disciplinary project.
4. Ability to demonstrate proper handling of control system instrumentations/modern engineering tools and evaluate experimental data in analysing control system related problems.
5. Ability to function in a group to value the Process Dynamics & Control knowledge to the given case study in the Integrated Project, as well as working effectively on complex engineering activities

**KMJ32203 SEPARATION PROCESS****No of Credits: 3****Course Synopsis:**

This course introduces different types of separation processes that can be found in chemical and bioprocessing industries. The unit operations for gas-liquid, liquid-liquid, liquid-solid separation are included such as humidification, distillation, absorption, adsorption, solvent extraction, solid leaching, crystallization, membrane separation, filtration, settling, sedimentation, and fluidization. They are designed from materials and energy balance and based on mass and heat transfer principles.

**Course Outcomes:**

1. Ability to APPLY knowledge of material and energy balance as well as heat and mass transfer for the selected unit operations for gas-liquid, liquid-liquid, and liquid-solid separation processes.
2. Ability to ANALYZE complex engineering problems related to the separation unit operations to reach substantiated conclusions.
3. Ability to DESIGN engineering solutions with proper considerations for separation unit operations.
4. Ability to WORK effectively as an individual, leader, or in a team to complete complex engineering activities related to separation unit operation.

**KMJ32803 ENGINEERING ECONOMICS****No of Credits: 3****Course Synopsis:**

This course aims to teach students the fundamentals of engineering economics, from the foundations of engineering economic based on the concept of time value of money, till utilization of analysis tools for selections and evaluations of engineering projects especially in the field of chemical engineering. This course also provides basic knowledge of entrepreneurship in engineering to inculcate their mindset with entrepreneurial mind and business acumen. At the end of the course, students will be able to identify, analyse and evaluates issues and challenges of engineering economics faced by engineers and propose solutions in the current economic scenarios.

**Course Outcomes:**

1. Ability to APPLY the concepts of entrepreneurship in engineering and the effect of time value of money in engineering economics.
2. Ability to ANALYSE the concepts of economic equivalence and comparison tools for project alternatives, and the effects of inflation and depreciation in economic evaluations.

3. Ability to PERFORM capital cost estimation of engineering project through well-organized technical reports.
4. Ability to EVALUATE the economics of engineering project using breakeven, payback and sensitivity analysis.

**KMJ42003 CHEMICAL PLANT DESIGN I****No of Credits: 3****Course Synopsis:**

Chemical Engineering Design is a two-part course covering aspects of engineering design related to open-ended design projects at professional level engineering design task in chemical engineering field. The design project is a team-based approach to provide capstone design experience emphasizing the application of sciences, mathematics and engineering science acquired in earlier course work in design of projects. The scope of the course covers the knowledge on the elements in project formulation, planning/scheduling, management and communication, engineering economics including cost-benefits analysis and budgeting, critical thinking, ethics, and safety in engineering design.

**Course Outcomes:**

1. Ability to analyze the open literature available on key issues of the project
2. Ability to develop a process simulation for the design topic using appropriate process simulator tools
3. Ability to assess market opportunities and the implications of the design project on sustainability, including societal, environmental, and economic impacts
4. Ability to evaluate professional responsibility and ethical elements in decision-making
5. Ability to practice collaborative principles within the design project.
6. Ability to deliver coherent, well-structured, and effective oral presentations, technical reports and design documentation.
7. Ability to develop the feasibility study, workflow and economics of a design project
8. Ability to generate comprehensive analysis derived from new materials utilizing diverse resources.



**KMJ32603 SAFETY & LOSS PREVENTION****No of Credits: 3****Course Synopsis:**

This course covers the fundamental of process safety specifically toxicology, industrial hygiene, sources model, fires and explosions as wells as relief concept design. The students are also exposed to hazard identification, risk assessment and accident investigation. Lastly, the course introduces biohazard and biosafety principles for chemical and biochemical industries.

**Course Outcomes:**

1. Ability to analyze the source, toxic release and dispersion models and EVALUATE the significance of the events towards the environment and society.
2. Ability to distinguish fires and explosions as well as examine ways to prevent it, and to ASSESS the impacts towards engineers and society.
3. Ability to ANALYZE relief concepts as well as calculate or sizing relief system to ensure the safety of the plant.
4. Ability to analyze problems and DEVELOP process safety to identify the hazard and risk associated with the industry.
5. Ability to function in a group to INTEGRATE process safety knowledge and identify problems related with integrated project.

**KMJ32301 SKILLS IN SEPARATION PROCESS****No of Credits: 1****Course Synopsis:**

This course introduces the typical separation processes in chemical industries such as distillation, evaporation, leaching, microfiltration, and absorption. This course provides practical skills to students via experimental and/or numerical works on a distillator, evaporator, and filtration system. This course allows students individually or in a group, to test or apply the hypotheses, collect data and take measurements accurately in the experimental tasks, analyze and interpret the results, and also evaluate and conclude the results.

**Course Outcomes:**

1. Ability to explain the separation processes in chemical industries such as distillation, evaporation, leaching, microfiltration, and absorption.
2. Ability to design and conduct experimental tasks individually or in a group with a special emphasis on the development of safe working practices during laboratory exercises.
3. Ability to write a good and effective report with appropriate data analysis and presentation.

**KMJ42303 INDUSTRIAL WASTE TREATMENT****No of Credits: 3****Course Synopsis:**

This course encompasses the physical, chemical and biological methods in the treatment of wastes especially from chemical and bioprocess industries. It includes the calculations, considerations and designs of unit operations involved in the primary, secondary and tertiary waste treatments for those three methods. The landfill and incineration waste treatment systems are introduced at the second half of the course. The course ends the overall lectures with waste management and minimization strategies as an ultimate conclusion for the waste treatments principles.

**Course Outcomes:**

1. Ability to CALCULATE the physical, chemical, and biological properties of waste materials in preserving environmental safety and sustainability
2. Ability to DESIGN solutions in the treatment methods for a particular waste as a preparation to engage in independent and life-long learning in waste management
3. Ability to PROPOSE the landfill, incineration waste treatment and waste management systems in practicing engineering ethics

**KMJ42704 CHEMICAL PLANT DESIGN II****No of Credits: 4****Course Synopsis:**

This course requires students to work in a predetermined group to solve a practical and industrially relevant design problem in the same way as might be expected in an industrial situation. The scope of the class is to develop and evaluate process design via rigorous simulation, perform equipment sizing, optimize various process units, analyse the safety and environmental impact of the process, estimate capital and operating costs, and assess plant profitability to meet desired project needs within realistic constraint. The use of modern engineering design practices, tools and product/solution development process, trouble-shooting methodology, learn and utilise a realistic simulation of the real-world design process, engineering analysis and synthesis through their projects. Knowledge integration from other Chemical Engineering courses is required to identify, solve, and design solution for complex engineering problems.

**Course Outcomes:**

1. Ability to design component, equipment, and process in chemical engineering.
2. Ability to develop the process engineering drawings using appropriate software.
3. Ability to develop a waste treatment and waste management plan to treat the waste coming out from the proposed plant.
4. Ability to assess the safety of the plan using appropriate method.
5. Ability to assemble effective, well organized oral presentation as well as effective, well organized technical report
6. Ability to execute and manage project as well as evaluate the economics feasibility of a design project.
7. Ability to manage time, adapt to unexpected challenges, and produce high quality work.
8. Ability to work independently while also developing crucial teamwork skills in the specified group to execute the design project.

**KMJ42203 GOOD MANUFACTURING PRACTICE****No of Credits: 3****Course Synopsis:**

This course gives complete overview about the production facility from start of the project up to the production process and how to carry out all project steps according to the guidelines of the GMP. Topics include the background to GMP and cGMP regulations and guidelines and their relevance in the laboratory, process development and plant.

**Course Outcomes**

1. Ability to acquire and EXAMINE the knowledge of basic concept, construction and requirements of GMP and cGMP in related industries.
2. Ability to construct and PROPOSE facility layout, production area, HVAC systems and facility equipment based on cGMP requirements.
3. Ability to solve and EVALUATE complex engineering problems related to manufacturing, GLP, process validation and biosafety in cGMP designs.

**KMJ32903 COLLOIDAL AND BIOMATERIALS PROCESSING****No of Credits: 3****Course Synopsis:**

This course brings together colloidal systems, various biomaterials production and processing aspects, including painting and printing, cosmetics, oil and gas production, plastics and polymers, tissue engineering scaffold materials, drug delivery systems, nanobiomaterials, therapeutics, pharmaceuticals, and biosensors. This course explains the fundamentals of colloidal systems and biomaterials as well as the development of new materials. The structure and properties of colloidal particles and biomaterials with their specific theoretical interactions are discussed. The use of colloidal particles and biomaterial in chemical, pharmaceutical and biomedical applications are also utterly explained in this course.

**Course Outcome:**

1. Ability to DIFFERENTIATE the non-covalent colloidal forces (Van der Waals, electrostatics, and DLVO), emulsions and adsorption adopted in colloids formation using knowledge of mathematics, engineering fundamentals and an engineering specialization for solving any given complex engineering problems.
2. Ability to PREDICT properties of colloids using Hansen solubility, and Flory-Huggins interactions effects involved in the colloidal systems and to introduce biomaterials with their surface characterizations by applying principles of mathematics, natural sciences, and engineering sciences.
3. Ability to distinguish classes of biomaterials and to DISCUSS the biological interactions of materials and identify the application of materials in medicine at the specified needs with appropriate consideration for public health and safety, and environmental considerations.

**KMJ33003 HALAL PROCESSING****No of Credits: 3****Course Synopsis:**

Halal food industries emerge as one of the important international trades in providing and supplying clean and permissible food to not only Muslim populations but also people across the globe. The requirements for producing halal food is very crucial to be upheld and becoming one of the important subjects in the food industries. Thus, this course discusses various halal requirements for the main food including meat, dairy, fish and seafood, and cereals. Some food ingredients for example gelatine, enzymes and alcoholic materials will also be examined in terms of their requirements in the food processing. Towards the end of the course, student will learn about the current trend on biotechnology-based processing food or GMO, their processing and packaging and application of modern tools for laboratory testing and halal analysis.

**Course Outcomes:**

1. Ability to **ANALYZE** the regulation and guidelines of Halal food laws to meet domestic and international requirements and comparison of kosher, halal and vegetarian
2. Ability to **DESIGN** solution or process related to halal production and halal control points of the production
3. Ability to **PROPOSE** and conduct investigation of complex problem related to halal production and requirement, halal ingredients, halal testing and analysis

**KMJ33103 SUSTAINABLE ENERGY****No of Credits: 3****Course Synopsis:**

This course introduces energy production that can be generated from bioresources or biomass which is an alternative way of producing energy from fossil-based fuels. This course emphasizes the use of more environmental-friendly technologies which can lead to reduction of pollution, thus sustaining the ecology system. The contents cover the characteristics of biofuels, bioresources suitable for conversion technologies, biological routes and chemical routes in producing fuels, and also the limitations of bioconversion processes.

**Course Outcome:**

1. Ability to **ANALYZE** and compare the characteristics of different sustainable energies and their production processes using first principles of natural sciences and engineering sciences.

2. Ability to understand and **EVALUATE** the impact of sustainable energy production on the environment and society.
3. Ability to **DESIGN** a sustainable energy production process from potential feedstocks with safety and environment considerations.

**KMJ43203 ENERGY AND PROCESS UTILITY ENGINEERING****No of Credits: 3****Course Synopsis:**

This course intends to give students fair knowledge of various chemical utilities which are required to maintain the operation of chemical plant at the desired operating conditions. The subtopics that will be covered include efficient use of utilities, fuel, inert gases, compressed air, steam system & cogeneration, cooling & refrigeration system, and water system. By the end of this course, student will be also exposed to several ways of recovering energy and heat integration technology, making the chemical processes more efficient, economic, and practicable

**Course Outcome:**

1. Ability to apply the basic knowledge of various process utilities to distinguish its working principle, efficiency and cogeneration potential.
2. Ability to analyse different functions of air and water in utility system and evaluate the performance of refrigeration cycle.
3. Ability to design heat exchanger network for maximum heat recovery and solve energy recovery problems.

**KMJ42503 FOOD ENGINEERING****No of Credits: 3****Course Synopsis:**

This course covers the application of scientific knowledge and engineering principles in food processing. This course explains the properties of food and the influence of processing parameter that changes the food properties to impart important sensory, safety, storage and handling characteristics. This course allows students to develop an understanding of key unit operations relevant to the food industry. This course also provides students with a fundamental understanding of food preservation and food packaging.

**Course Outcome :**

1. Ability to **EXAMINE** the characteristics and nutritional properties of foods by applying knowledge of natural science and engineering fundamental.
2. Ability to **DESIGN** solutions for food processes and the unit operations needed to carry them out with appropriate considerations.
3. Ability to **EVALUATE** food spoilage causes and food preservation techniques for reaching substantiated conclusions.

**KMJ42603 BIOMASS UTILIZATION****No of Credits: 3****Course Synopsis:**

This course covers all the aspects of biomass production and utilization, including fundamental principles and practical applications of biomass. The course explains the production of biomass and its extraction technology. This course also includes biomass conversion technology to solvents, enzymes and single-cell protein (SCP), chemicals, and other biomass-based products. Lastly, this course introduces the guidelines to assess the sustainability of biomass utilization with respect to environmental, economic, and social impact.

**Course Outcome:**

1. Ability to **APPLY** knowledge of natural science and engineering specialization on the properties of biomass and a solution for extraction technology in biomass production.
2. Ability to **EVALUATE** sustainable biomass-based product production in the solution of complex engineering problems with respect to the environment, and economic and social impact.
3. Ability to **DESIGN** a solution for a biomass conversion system and technology for biomass-based products that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

**KMJ42903 PETROCHEMICAL PROCESS****No of Credits: 3****Course Synopsis:**

This course provides a holistic understanding of petrochemical products manufactured from petroleum and natural gas by a variety of processes and used for a variety of commercial purposes. The natural gas processing, petroleum refinery processes, and the manufacturing principles of industrially important petrochemical products are introduced in this course. Some engineering aspects of commercial petrochemical plants are focused in this course.

**Course Outcome:**

1. Ability to **ANALYSE** chemical processes involved in natural gas processing and crude oil refineries
2. Ability to **EVALUATE** chemical processes involved in petrochemical industries
3. Ability to **ANALYSE** the characteristics and polymerization of plastics, synthetic rubber, and synthetic fibers.

**KMJ43003 PHARMA AND NUTRACEUTICAL ENGINEERING****No of Credits: 3****Course Synopsis:**

This course includes the principles of drug pharmacokinetics: absorption, distribution, metabolism and excretion of drugs. The course introduces the nutritional and nutraceutical sciences of dietary supplements and functional foods. This course also covers the scientific and technological aspects of the designing, formulating and manufacturing of pharmaceutical and nutraceutical products according to the current requirement and regulations.

**Course Outcomes :**

1. Ability to **ANALYZE** the basic concept of drug absorption and disposition, nutritional and nutraceutical sciences of dietary supplements and functional foods and the related pharmacokinetics in the body.
2. Ability to **EVALUATE** the complex engineering processes involved in the formulation and production of pharmaceutical and nutraceutical products.
3. Ability to **DESIGN** pharmaceutical and nutraceutical manufacturing facilities, based on the current requirement and regulations.

**KMJ43103 FUEL CELLS****No of Credits: 3****Synopsis:**

This course introduces students with an emerging technology which is a fuel cell system. Students will learn about the principle and variants of fuel cells including proton exchange, alkaline, liquid, and microbial fuel cells. The final section covers advanced fuel cell systems and future technological challenges of fuel cell systems.

**Course Outcomes**

1. Ability to analyze the concept, design, operations and efficiency of fuel cell system.
2. Ability to evaluate and analyze the variants of fuel cell systems, operations, and related technological problems.
3. Ability to propose the advanced fuel cell system and plan for future fuel cell technological changes and challenges.

**KMJXXXX3 BIOCHEMICAL ENGINEERING****No of Credits: 3****Course Synopsis:**

Nowadays an understanding of biological processes is becoming increasingly important in the industries that traditionally employ chemical engineers, such as the materials, chemicals, food, energy, fuels, and semiconductor processing industries. The principles of cell and molecular biology, biochemistry, and engineering to develop, design, scale-up, optimize, and operate processes that use living cells, organisms, or biological molecules for the production and purification of products for health and/or environmental monitoring or environmental improvement are essential knowledge for future chemical engineers.

**Course Outcomes:**

1. Ability to SOLVE complex engineering problems related to its enzyme kinetics study and applied catalysis by applying the fundamental knowledge of enzyme reactions.
2. Ability to identify and ANALYZE complex engineering problems in microbial system based on its stoichiometry and kinetics study in batch and continuous cultures.
3. Ability to EVALUATE complex bioprocessing problems for process improvement by designing solutions of utilizing genetically engineered organisms and bioconversion technologies for the production of value-added products.

4. Ability to design solutions and PROPOSE current trends/technologies and productions in biochemical engineering and defend it through verbal presentation in a group

**KMJXXXX3 THERMODYNAMICS****No of Credits: 3****Course Synopsis:**

This course introduces the basic concept of energy and thermodynamics as an essential part in engineering field. This course emphasizes on the basic principles of thermodynamics including the fundamental properties of pure substances, a closed system analysis, the first and second law of thermodynamics. Application of these thermodynamic principles to the operation of heat pump, refrigerator and the power generation of heat systems is also discussed in this course.

**Course Outcomes:**

1. Ability to APPLY the basic concepts of thermodynamics in property diagram, steam table and/ or Equation of State to obtain the properties of pure substances.
2. Ability to ANALYZE the energy-related problems in a closed and control volume systems based on the First Law of Thermodynamics.
3. Ability to EVALUATE the second law of thermodynamics in heat pump, refrigeration cycles for complex engineering problem.

**KMJ1XXX3 PROCESS INSTRUMENTATIONS****No of Credits: 3****Course Synopsis:**

Process Instrumentation is the basic process control in chemical industry. It is a collection of equipment that is used to make various measurements to ensure safer work procedures, cost efficiencies and long-term business growth. Therefore, it is important to understand the function of basic devices for measuring and controlling different types of variables in process control. Moreover, the introduction to the closed-loop control, PID functions, analog and digital devices, and control system applications is important for freshman. The knowledge of ISA instrumentation symbols and the interpretation and use of process diagrams, i.e. Process Flow Diagram (PFD) and Piping and Instrumentation Diagram (P&ID) are essential to taking other chemical engineering courses.

**Course Outcomes:**

1. Ability to identify different types of valves and CALCULATE the valve sizing oriented to complex engineering problems.
2. Ability to DESIGN and communicate solutions for complex engineering problems regarding various types of pumps, fans, blowers, compressors; and calculate the power input and efficiency of those instruments.
3. Ability to APPLY techniques, skills and modern engineering tools to develop PFD and P&ID for chemical processes; and utilize the skills to engage in life-long learning
4. Ability to CONDUCT experiments, identify different types of valves, develop PFDs and P&IDs for both simple and complex engineering systems

**KMJ2XXX2 MATERIAL SCIENCE ENGINEERING****No of Credits: 2****Course Synopsis:**

Material Science Engineering is a multidisciplinary field that deals with the understanding and application of materials in engineering and technology. It focuses on the study of the structure, properties, processing, and performance of materials such as metals, ceramics, polymers, and composites. The course aims to provide students with the knowledge to select appropriate materials, improve existing materials, and develop new materials for various applications in industries like chemical, automotive, electronics, and construction.

**Course Outcomes:**

1. Explain the fundamental properties of materials (metals, ceramics, polymers, and composites) and their relevance in chemical processing industries.
2. Evaluate the corrosion behavior of different materials and select appropriate ones for chemical processing environments.
3. Employ material characterization techniques like XRD and SEM to analyze the microstructure of materials exposed to harsh chemical conditions.
4. Understand the implications of emerging materials in sustainable and green chemical engineering practices.

**KMJ2XXX3 BIOREACTOR SYSTEM****No of Credits: 3****Course Synopsis:**

This course will provide an introduction to the fundamental ideas of the bioreactor design and operations. It will also develop students' knowledge and understanding of the important principles and techniques that are used in the design and analysis of various types of bioreactor systems for microbial, animal

and plant cell cultures. It also covers relevant issues in the bioreactor system such as scaling up/down, instrumentation and control of bioreactor as well as sterilization.

**Course Outcomes:**

1. Ability to design and formulate fermentation media and decide on the types of carbon and nitrogen source.
2. Ability to recognize, compare and draw the schematic diagram for specific types of bioreactors.
3. Ability to design a stirred tank bioreactor according to the specific application.
4. Ability to develop scale up based on geometric similarities or constant power number.

**KMJ3XXX3 SIMULATION CHEMICAL ENGINEERING****No of Credits: 3****Course Synopsis:**

This course will cover the use of some software packages to model chemical and biochemical processes and unit operations in batch and continuous modes. Material and energy balances, equipment sizing and costing, environmental impact assessment and process design for single and continuous processes are also introduced. Students are exposed to the usage of chemical engineering software for simulation purposes. Subsequently, sustainability assessment will be introduced, emphasizing on economic and profitability analysis.

**Course Outcomes:**

1. Ability to CONSTRUCT process and ORGANIZE unit operation in biochemical and chemical engineering related problems using computer simulation software.
2. Ability to COLLECT process data and MANAGE engineering economic evaluation from the simulation process
3. Ability to DESIGN solutions for complex engineering problems using simulation software and DEVELOP the data to meet specific needs.
4. Ability to COMMUNICATE effectively to solve complex engineering problems using simulation software.



## **UR6524004**

### **Bachelor of Chemical Engineering Technology (Food Technology) with Honours**

#### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

##### **PEO 1**

Engineering technology graduates engaged in the field of chemical engineering technology as demonstrated through career advancement.

##### **PEO 2**

Engineering technology graduates who are members and contribute to professional society.

##### **PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities.

##### **PEO 4**

Engineering technology graduates who are technopreneurs.

## PROGRAMME OUTCOMES (PO)

### P01

**Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and engineering specialisation principles to defined and applied engineering procedures, processes, systems or methodologies

### P02

**Problem analysis:** Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialization.

### P03

**Design/development of solutions:** Design solutions for broadly-defined engineering technology problems and contribute to the design of system, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

### P04

**Investigation:** Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, databases and literature, design and conduct experiments to provide valid conclusions.

### P05

**Modern Tool Usage:** Select and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modeling, to broadly-defined engineering problems, with an understanding of the limitations.

### P06

**The Engineer and Society:** Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and

solutions to broadly-defined engineering problems.

### P07

**Environment and Sustainability:** Understand the impact of engineering technology solutions of broadly-defined engineering problems in societal and environmental context and demonstrate knowledge of and need for sustainable development.

### P08

**Ethics:** Understand and commit to professional ethics and responsibilities and norms of engineering technology practice.

### P09

**Individual and Teamwork:** Function effectively as an individual, and as a member or leader in diverse technical teams.

### P010

**Communications:** Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write the effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments

### P012

**Life-Long Learning:** Recognize the need for, and have the ability to engage in independent and lifelong learning in specialist technologies.

| CURRICULUM STRUCTURE                                                                                  |                                                           |                                                             |                                                        |                                                          |                                                              |                                                                     |                                                            |                                 |
|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------------------|---------------------------------|
| UR6524004 BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (FOOD TECHNOLOGY) WITH HONOURS INTAKE 2024/2025 |                                                           |                                                             |                                                        |                                                          |                                                              |                                                                     |                                                            |                                 |
| YEAR                                                                                                  | FIRST                                                     |                                                             | SECOND                                                 |                                                          | THIRD                                                        |                                                                     | FOURTH                                                     |                                 |
| SEMESTER                                                                                              | 1                                                         | 2                                                           | 3                                                      | 4                                                        | 5                                                            | 6                                                                   | 7                                                          | 8                               |
| <b>DISCIPLINE CORE &amp; ELECTIVE COURSES</b><br>(109 CREDITS)                                        | KMK10003<br>Materials Engineering                         | KMK10502<br>Physical Chemistry                              | KMK20003<br>Thermodynamics for Chemical Engineering    | KMK20303<br>Reaction Engineering                         | KMK30002<br>Safety and Loss Prevention                       | KMK30403<br>Final Year Project I                                    | KMK40005<br>Final Year Project II                          | KMK49912<br>Industrial Training |
|                                                                                                       | KMK10103<br>Organic Chemistry                             | KMK10603<br>Analytical Chemistry                            | KMK20103<br>Fluid Mechanics                            | KMK20403<br>Mass Transfer                                | KMK30103<br>Process Control and Dynamics                     | KMK33503<br>Plant Design for Food Technology I                      | KMK43503<br>Plant Design for Food Technology II            |                                 |
|                                                                                                       | KMK10202<br>Engineering Graphics for Chemical Engineering | KMK10704<br>Principles of Chemical Process                  | KMK20203<br>Heat Transfer for Chemical Engineering     | KMK23103<br>Food Biochemistry                            | KMK30203<br>Separation Engineering                           | KMK33403<br>Food Waste Management and Utilization                   | KMK43003<br>Food Product Development and Commercialization |                                 |
|                                                                                                       | KMK10303<br>Engineering Skills                            | KMK10802<br>Introduction to Process Instrumentation         | KMK23003<br>Food Microbiology                          | KMK23203<br>Postharvest Technology                       | KMK33003<br>Analysis and Instrumentation for Food Technology | KMK33604<br>Quality and Safety Management System in Food Production |                                                            |                                 |
|                                                                                                       | KMK10403<br>Electrical Technology                         |                                                             |                                                        |                                                          | KMK33104<br>Food Processing and Preservation                 |                                                                     |                                                            |                                 |
|                                                                                                       |                                                           |                                                             |                                                        |                                                          | Elective I                                                   | Elective II                                                         | Elective III                                               |                                 |
| <b>COMMON CORE COURSES</b><br>(15 CREDITS)                                                            | QMQ11103<br>Mathematics for Engineering Technology I      | QMQ11203<br>Mathematics for Engineering Technology II       | QMQ21303<br>Mathematics for Engineering Technology III |                                                          |                                                              | KMK30303<br>Engineering Technology Management                       | KMK40103<br>Engineering Technologist in Society            |                                 |
| <b>UNIVERSITY REQUIREMENT COURSES</b><br>(16 CREDITS)                                                 | SMZXXX01<br>Co-Curriculum I                               | SMB2012<br>English for General Communication <sup>[2]</sup> | SMB31202<br>English for Technical Communication        | SMU13102<br>Appreciation of Ethics and Civilization      |                                                              |                                                                     |                                                            |                                 |
|                                                                                                       |                                                           | SMU13002<br>Philosophy and Current Issues                   | SMB41002<br>University Malay Language <sup>[3]</sup>   | SMU12102<br>Integrity and Anti-Corruption <sup>[4]</sup> |                                                              |                                                                     |                                                            |                                 |
|                                                                                                       |                                                           | SMZXXX01<br>Co-Curriculum II                                |                                                        | SMU2242<br>Engineering Entrepreneurship                  |                                                              |                                                                     |                                                            |                                 |
| <b>TOTAL CREDITS</b><br>(140 CREDITS)                                                                 | <b>18</b>                                                 | <b>19</b>                                                   | <b>19</b>                                              | <b>18</b>                                                | <b>18</b>                                                    | <b>19</b>                                                           | <b>17</b>                                                  | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                                                  | SMB10102<br>Preparatory English <sup>[1]</sup>            |                                                             |                                                        |                                                          |                                                              |                                                                     |                                                            |                                 |

Elective I : KMK33203 Fats and Oils Technology, KMK33303 Food Ingredients  
 Elective II : KMK33703 Functional Foods and Nutraceuticals, KMK33803 Dairy and Meat Technology  
 Elective III : KMK43103 Food Packaging Technology, KMK43202 Poultry and Fish Technology

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

**UR6524005**  
**Bachelor of Chemical Engineering Technology (Industrial Chemical Process)**  
**with Honours**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1**

Engineering technology graduates engaged in the field of chemical engineering technology as demonstrated through career advancement.

**PEO 2**

Engineering technology graduates who are members and contribute to professional society

**PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities.

**PEO 4**

Engineering technology graduates who are technopreneurs.



## PROGRAMME OUTCOMES (PO)

### P01

Knowledge: Apply knowledge of mathematics, science, engineering fundamentals and engineering specialisation principles to defined and applied engineering procedures, processes, systems or methodologies

### P02

Problem analysis: Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialization.

### P03

Design/development of solutions: Design solutions for broadly-defined engineering technology problems and contribute to the design of system, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

### P04

Investigation: Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, databases and literature, design and conduct experiments to provide valid conclusions.

### P05

Modern Tool Usage: Select and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modeling, to broadly-defined engineering problems, with an understanding of the limitations.

### P06

The Engineer and Society: Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and

solutions to broadly-defined engineering problems.

### P07

Environment and Sustainability: Understand the impact of engineering technology solutions of broadly-defined engineering problems in societal and environmental context and demonstrate knowledge of and need for sustainable development.

### P08

Ethics: Understand and commit to professional ethics and responsibilities and norms of engineering technology practice.

### P09

Individual and Teamwork: Function effectively as an individual, and as a member or leader in diverse technical teams.

### P010

Communications: Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write the effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

Project Management and Finance: Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments

### P012

Life-Long Learning: Recognize the need for, and have the ability to engage in independent and lifelong learning in specialist technologies.

**CURRICULUM STRUCTURE**  
**UR6524005 BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (INDUSTRIAL CHEMICAL PROCESS) WITH HONOURS INTAKE 2024/2025**

| YEAR                                                           | FIRST                                                     |                                                              | SECOND                                                |                                                     | THIRD                                                    |                                                            | FOURTH                                                          |                                 |
|----------------------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------|-----------------------------------------------------------------|---------------------------------|
| SEMESTER                                                       | 1                                                         | 2                                                            | 3                                                     | 4                                                   | 5                                                        | 6                                                          | 7                                                               | 8                               |
| <b>DISCIPLINE CORE &amp; ELECTIVE COURSES</b><br>(110 CREDITS) | KMK10303<br>Engineering Skills                            | KMK10704<br>Principles of Chemical Process                   | KMK20003<br>Thermodynamics for Chemical Engineering   | KMK20403<br>Mass Transfer for Chemical Engineering  | KMK30103<br>Process Control & Dynamics                   | KMK30403<br>Final Year Project I                           | KMK40005<br>Final Year Project II                               | KMK49912<br>Industrial Training |
|                                                                | KMK10403<br>Electrical Technology                         | KMK10802<br>Introduction to Process Instrumentation          | KMK20103<br>Fluid Mechanics                           | KMK20303<br>Reaction Engineering                    | KMK30203<br>Separation Engineering                       | KMK30002<br>Safety & Loss Prevention                       | KMK41903<br>Plant Design for Industrial Chemical Process 2      |                                 |
|                                                                | KMK10502<br>Physical Chemistry                            | KMK10103<br>Organic Chemistry                                | KMK20203<br>Heat Transfer for Chemical Engineering    | KMK21503<br>Bioresource Processing Technology       | KMK31203<br>Environmental Engineering                    | KMK31903<br>Plant Design for Industrial Chemical Process I | KMK41102<br>Quality Assurance & Control in Chemical Engineering |                                 |
|                                                                | KMK10003<br>Materials Engineering                         | KMK10603<br>Analytical Chemistry                             | KMK21303<br>Oleochemical Process & Products           | KMK21602<br>Plant Utilities                         | KMK31303<br>Petroleum & Gas Processing Technology        | KMK31603<br>Polymer Processing Technology                  | KMK41203<br>Particle Processing Technology                      |                                 |
|                                                                | KMK10202<br>Engineering Graphics for Chemical Engineering |                                                              |                                                       | KMK21703<br>Renewable Energy                        |                                                          | KMK35002<br>Process Plant Troubleshooting                  |                                                                 |                                 |
|                                                                |                                                           |                                                              |                                                       |                                                     | Elective I<br>(A1 or A2)                                 | Elective II<br>(B1 or B2)                                  | Elective III<br>(C1 or C2)                                      |                                 |
| <b>COMMON CORE COURSES</b><br>(15 CREDITS)                     | QM11103<br>Mathematics for Engineering Technology I       | QM11203<br>Mathematics for Engineering Technology II         | QM12103<br>Mathematics for Engineering Technology III |                                                     |                                                          | KMK30303<br>Engineering Technology Management              | KMK40103<br>Engineering Technologist in Society                 |                                 |
| <b>UNIVERSITY REQUIREMENT COURSES</b><br>(16 CREDITS)          | SMB41002<br>University Malay Language <sup>[3]</sup>      | SMU13002<br>Philosophy & Current Issues                      | SMU22402<br>Engineering Entrepreneurship              | SMU13102<br>Appreciation of Ethics and Civilization | SMU12102<br>Integrity and Anti-Corruption <sup>[4]</sup> |                                                            |                                                                 |                                 |
|                                                                | SMZXXX01<br>Co-Curriculum I                               | SMB20102<br>English for General Communication <sup>[2]</sup> |                                                       | SMB31202<br>English for Technical Communication     |                                                          |                                                            |                                                                 |                                 |
|                                                                |                                                           | SMZXXX01<br>Co-Curriculum II                                 |                                                       |                                                     |                                                          |                                                            |                                                                 |                                 |
| <b>TOTAL CREDITS</b><br>(141 CREDITS)                          | <b>19</b>                                                 | <b>20</b>                                                    | <b>17</b>                                             | <b>18</b>                                           | <b>17</b>                                                | <b>19</b>                                                  | <b>19</b>                                                       | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                           | SMB10102<br>Preparatory English <sup>[1]</sup>            |                                                              |                                                       |                                                     |                                                          |                                                            |                                                                 |                                 |

| Elective 1                               | Elective 2                                              | Elective 3                                             |
|------------------------------------------|---------------------------------------------------------|--------------------------------------------------------|
| A1. KMK31403 Industrial Electrochemistry | B1. KMK31703 Pharmaceutical Processing Technology       | C1. KMK32703 Bioactive compounds Extraction Technology |
| A2. KMK31503 Scale Up & Optimization     | B2. KMK31803 Advanced Membrane Technology & Application | C2. KMK41403 Food Processing Technology                |

- [1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.
- [2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.
- [3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.
- [4] International students should register SMU13202 Malaysian Studies.



**UR6524006**  
**Bachelor of Chemical Engineering Technology (Industrial Biotechnology)**  
**with Honours**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1**

Engineering technology graduates engaged in the field of chemical engineering technology as demonstrated through career advancement.

**PEO 2**

Engineering technology graduates who are members and contribute to professional society.

**PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities.

**PEO 4**

Engineering technology graduates who are technopreneurs.

## PROGRAMME OUTCOMES (PO)

### P01

Knowledge: Apply knowledge of mathematics, science, engineering fundamentals and engineering specialisation principles to defined and applied engineering procedures, processes, systems or methodologies

### P02

Problem analysis: Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialization.

### P03

Design/development of solutions: Design solutions for broadly-defined engineering technology problems and contribute to the design of system, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

### P04

Investigation: Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, databases and literature, design and conduct experiments to provide valid conclusions.

### P05

Modern Tool Usage: Select and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modelling, to broadly-defined engineering problems, with an understanding of the limitations.

### P06

The Engineer and Society: Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and

solutions to broadly-defined engineering problems.

### P07

Environment and Sustainability: Understand the impact of engineering technology solutions of broadly-defined engineering problems in societal and environmental context and demonstrate knowledge of and need for sustainable development.

### P08

Ethics: Understand and commit to professional ethics and responsibilities and norms of engineering technology practice.

### P09

Individual and Teamwork: Function effectively as an individual, and as a member or leader in diverse technical teams.

### P010

Communications: Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write the effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

Project Management and Finance: Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments

### P012

Life-Long Learning: Recognize the need for, and have the ability to engage in independent and lifelong learning in specialist technologies.

**CURRICULUM STRUCTURE**  
**UR6524006 BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (INDUSTRIAL BIOTECHNOLOGY) WITH HONOURS INTAKE 2024/2025**

| YEAR                                                           | FIRST                                                |                                                           | SECOND                                                          |                                                    | THIRD                                                   |                                                         | FOURTH                                                  |                                 |
|----------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|---------------------------------|
| SEMESTER                                                       | 1                                                    | 2                                                         | 3                                                               | 4                                                  | 5                                                       | 6                                                       | 7                                                       | 8                               |
| <b>DISCIPLINE CORE &amp; ELECTIVE COURSES</b><br>(109 CREDITS) | KMK10403<br>Electrical Technology                    | KMK10103<br>Organic Chemistry                             | KMK20003<br>Thermodynamics for Chemical Engineering             | KMK20103<br>Fluid Mechanics                        | KMK30002<br>Safety & Loss Prevention                    | KMK30403<br>Final Year Project I                        | KMK40005<br>Final Year Project II                       | KMK49912<br>Industrial Training |
|                                                                | KMK10502<br>Physical Chemistry                       | KMK10704<br>Principles of Chemical Process                | KMK20303<br>Reaction Engineering                                | KMK20203<br>Heat Transfer for Chemical Engineering | KMK30203<br>Separation Engineering                      | KMK32503<br>Plant Design for Industrial Biotechnology 1 | KMK42503<br>Plant Design for Industrial Biotechnology 2 |                                 |
|                                                                | KMK10003<br>Materials Engineering                    | KMK10202<br>Engineering Graphics for Chemical Engineering | KMK20403<br>Mass Transfer                                       | KMK22104<br>Biochemistry & Enzyme Technology       | KMK32002<br>Waste Management & Utilization              | KMK30103<br>Process Control & Dynamics                  | KMK42003<br>Issues & Commercialization in Biotechnology |                                 |
|                                                                | KMK10802<br>Introduction to Process Instrumentation  | KMK10603<br>Analytical Chemistry                          | KMK22004<br>Industrial Microbiology                             | KMK22203<br>Biomolecular & Genetic Engineering     | KMK32103<br>Cell & Tissue Culture Technology            | KMK32603<br>Biopharmaceutical Technology                |                                                         |                                 |
|                                                                | KMK10303<br>Engineering Skills                       |                                                           |                                                                 |                                                    | KMK32204<br>Upstream & Downstream Processing Technology |                                                         |                                                         |                                 |
|                                                                |                                                      |                                                           |                                                                 |                                                    | Elective 1<br>(A1 or A2)                                | Elective 2<br>(B1 or B2)                                | Elective 3<br>(C1 or C2)                                |                                 |
| <b>COMMON CORE COURSES</b><br>(15 CREDITS)                     | QMQ11103<br>Mathematics for Engineering Technology I | QMQ11203<br>Mathematics for Engineering Technology II     | QMQ21303<br>Mathematics for Engineering Technology III          |                                                    |                                                         | KMK30303<br>Engineering Technology Management           | KMK40103<br>Engineering Technologist in Society         |                                 |
| <b>UNIVERSITY REQUIREMENT COURSES</b><br>(16 CREDITS)          | SMU13002<br>Philosophy and Current Issues            | SMB41002<br>University Malay Language <sup>[3]</sup>      | SMB20102<br>English for General Communication <sup>[2]</sup> OR | SMB31202<br>English for Technical Communication    |                                                         |                                                         |                                                         |                                 |
|                                                                | SMZXXX<br>Co-Curriculum I                            | SMZXXX<br>Co-Curriculum II                                | SMU12102<br>Integrity and Anti-Corruption <sup>[4]</sup>        |                                                    |                                                         |                                                         |                                                         |                                 |
|                                                                |                                                      | SMU13102<br>Appreciation of Ethics and Civilization       |                                                                 | SMU22402<br>Engineering Entrepreneurship           |                                                         |                                                         |                                                         |                                 |
| <b>TOTAL CREDITS</b><br>(140 CREDITS)                          | <b>19</b>                                            | <b>20</b>                                                 | <b>20</b>                                                       | <b>17</b>                                          | <b>17</b>                                               | <b>18</b>                                               | <b>17</b>                                               | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                           |                                                      | SMB10102<br>Preparatory English <sup>[1]</sup>            |                                                                 |                                                    |                                                         |                                                         |                                                         |                                 |

| Elective 1                                    | Elective 2                                             | Elective 3                                   |
|-----------------------------------------------|--------------------------------------------------------|----------------------------------------------|
| A1. KMK32303<br>Biotechnology Facility Design | B1. KMK32703 Bioactive Compounds Extraction Technology | C1. KMK42103 Bioenergy Production Technology |
| A2. KMK31503 Scale up & Process Optimization  | B2. KMK32803 Sustainable Green Technology              | C2. KMK41403 Food Processing Technology      |

- [1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.
- [2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.
- [3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.
- [4] International students should register SMU13202 Malaysian Studies.

**LIST OF COURSES:**

| COURSE CODE | COURSE NAME                                                                                  |
|-------------|----------------------------------------------------------------------------------------------|
| KMK10003    | Kejuruteraan Bahan [Material Engineering]                                                    |
| KMK10103    | Kimia Organik [Organic Chemistry]                                                            |
| KMK10202    | Kejuruteraan Grafik untuk Kejuruteraan Kimia [Engineering Graphics for Chemical Engineering] |
| KMK10303    | Engineering Skills [Kemahiran Kejuruteraan]                                                  |
| KMK10403    | Teknologi Elektrik [Electrical Technology]                                                   |
| KMK10502    | Kimia Fizikal [Physical Chemistry]                                                           |
| KMK10603    | Kimia Analitikal [Analytical Chemistry]                                                      |
| KMK10704    | Prinsip-prinsip Proses Kimia [Principles of Chemical Process]                                |
| KMK10802    | Pengenalan kepada Proses Instrumentasi [Introduction to Process Instrumentation]             |
| KMK20003    | Termodinamik untuk Kejuruteraan Kimia [Thermodynamics for Chemical Engineering]              |
| KMK20103    | Mekanik Bendalir [Fluid Mechanics]                                                           |
| KMK20203    | Pemindahan Haba untuk Kejuruteraan Kimia [Heat Transfer for Chemical Engineering]            |
| KMK23003    | Mikrobiologi Makanan [Food Microbiology]                                                     |
| KMK20303    | Kejuruteraan Tindakbalas [Reaction Engineering]                                              |
| KMK20403    | Pemindahan Jisim [Mass Transfer]                                                             |
| KMK23103    | Biokimia Makanan [Food Biochemistry]                                                         |
| KMK23203    | Teknologi Lepastuai [ Postharvest Technology]                                                |
| KMK30002    | Keselamatan & Pencegahan Kehilangan [Safety & Loss Prevention]                               |

| COURSE CODE | COURSE NAME                                                                                                                    |
|-------------|--------------------------------------------------------------------------------------------------------------------------------|
| KMK30103    | Kawalan Proses & Dinamik [Process Control & Dynamics]                                                                          |
| KMK30203    | Kejuruteraan Pemisahan [Separation Engineering]                                                                                |
| KMK33003    | Analisis dan Instrumentasi untuk Teknologi Makanan [ Analysis and Instrumentation for Food Technology]                         |
| KMK33104    | Pemprosesan dan Pengawetan Makanan [ Food Processing and Preservation                                                          |
| KMK30403    | Projek Tahun Akhir I [Final Year Project I]                                                                                    |
| KMK33403    | Pengurusan Sisa & Penggunaan Makanan [Food Waste Management & Utilization]                                                     |
| KMK33503    | Reka Bentuk Loji untuk Teknologi Makanan 1 [Plant Design for Food Technology 1]                                                |
| KMK33604    | Sistem Pengurusan Kualiti dan Keselamatan dalam Penghasilan Makanan [ Quality and Safety Management System in Food Production] |
| KMK30303    | Pengurusan Teknologi Kejuruteraan [Engineering Technology Management]                                                          |
| KMK40005    | Projek Tahun Akhir II [Final Year Project II]                                                                                  |
| KMK43003    | Pembangunan dan Pengkomersilan Produk Makanan [Food Product Developement and Commercialization]                                |
| KMK43503    | Reka Bentuk Loji untuk Teknologi Makanan 2 [Plant Design for Food Technology 2]                                                |
| KMK40103    | Jurutera Teknologi dalam Masyarakat                                                                                            |
| KMK33203    | Teknologi Lemak dan Minyak [Fats and Oils Technology]                                                                          |
| KMK33303    | Ingredien Makanan [Food Ingredients]                                                                                           |
| KMK33703    | Makanan Berfungsi dan Neutraceutikal [Functional Foods and Nutraceuticals ]                                                    |
| KMK33803    | Teknologi Tenusu dand Dagin [Dairy and Meat Technology]                                                                        |
| KMK43103    | Teknologi Pembungkusan Makanan [Food Packaging Technology]                                                                     |

| COURSE CODE | COURSE NAME                                                                                                |
|-------------|------------------------------------------------------------------------------------------------------------|
| KMK43202    | Teknologi Poltri dan Ikan [Poultry and Fish Technology]                                                    |
| KMK49912    | Latihan Industri [Industrial Training]                                                                     |
| KMK21503    | Teknologi Pemprosesan Sumber Bio [Bioresource Processing Technology]                                       |
| KMK21303    | Proses dan Produk Oleokimia [Oleochemical Process and Products]                                            |
| KMK21602    | Utiliti Loji [Plant Utilities]                                                                             |
| KMK21703    | Tenaga Boleh Baharu [Renewable Energy]                                                                     |
| KMK31203    | Kejuruteraan Alam Sekitar [Environmental Engineering]                                                      |
| KMK31303    | Teknologi Pemprosesan Petroleum & Gas [Petroleum & Gas Processing Technology]                              |
| KMK31603    | Teknologi Pemprosesan Polimer [Polymer Processing Technology]                                              |
| KMK31403    | Elektrokimia Industri [Industrial Electrochemistry]                                                        |
| KMK31503    | Peningkatan & Proses Optimasi [Scale Up & Process Optimization]                                            |
| KMK31903    | Projek Reka Bentuk Loji untuk Proses Kimia Industri I [Plant Design for Industrial Chemical Process I]     |
| KMK31703    | Teknologi Pemprosesan Farmaseutikal [Pharmaceutical Processing Technology]                                 |
| KMK31803    | Teknologi Membran Termaju dan Aplikasi [Advance Membrane Technology and Applications]                      |
| KMK32703    | Teknologi Pengestrakan Sebatian Bioaktif [ Bioactive Compounds Extraction Technology]                      |
| KMK35002    | Penyelesaian Masalah Process Loji [Process Plant Troubleshooting]                                          |
| KMK41102    | Jaminan Kualiti dan Kawalan dalam Kejuruteraan Kimia [Quality Assurance & Control in Chemical Engineering] |
| KMK41203    | Teknologi Pemprosesan Polimer [Polymer Processing Technology]                                              |



| COURSE CODE | COURSE NAME                                                                                             |
|-------------|---------------------------------------------------------------------------------------------------------|
| KMK41403    | Teknologi Pemrosesan Makanan [Food Processing Technology]                                               |
| KMK41903    | Projek Reka Bentuk Loji untuk Proses Kimia Industri I [Plant Design for Industrial Chemical Process II] |
| KMK22004    | Mikrobiologi Industri [Industrial Microbiology]                                                         |
| KMK22104    | Biokimia & Teknologi Enzim [Biochemistry & Enzyme Technology]                                           |
| KMK22203    | Biomolekular & Kejuruteraan Genetik [Biomolecular & Genetic Engineering]                                |
| KMK32002    | Pengurusan Sisa & Penggunaan [Waste Management & Utilization]                                           |
| KMK32204    | Sel & Teknologi Kultur Tisu [Cell & Tissue Cell Culture]                                                |
| KMK32103    | Teknologi Pemrosesan Hulu & Hiliran [Upstream & Downstream Processing]                                  |
| KMK32303    | Reka Bentuk Fasiliti Bioteknologi [Biotechnology Facility Design]                                       |
| KMK31503    | Peningkatan & Proses Optimasi [Scale Up & Process Optimization]                                         |
| KMK32503    | Reka Bentuk Loji untuk Bioteknologi Industri 1 [ Plant Design for Industrial Biotechnology 1]           |
| KMK32603    | Teknologi Biofarmaseutikal [Biopharmaceutical Technology]                                               |
| KMK32703    | Teknologi Pengestrakan Sebatian Bioaktif [ Bioactive Compounds Extraction Technology]                   |
| KMK32803    | Teknologi Hijau Lestari [ Sustainable Green Technology]                                                 |
| KMK42003    | Isu & Komersialisasi dalam Bioteknologi [Issues & Commercialization in Biotechnology]                   |
| KMK42103    | Teknologi Penghasilan Tenaga Bio [Bioenergy Production Technology]                                      |
| KMK41403    | Teknologi Pemrosesan Makanan [Food Processing Technology]                                               |
| KMK45203    | Reka Bentuk Loji untuk Bioteknologi Industri 2 [Plant Design for Industrial Biotechnology 2]            |

**KMK10003 KEJURUTERAAN BAHAN [MATERIAL ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course covers the introduction to materials science and engineering which emphasizes on different types of material properties, structures, application and selection. The course encompasses the classification of material properties that determine their applicability and fundamental of material structures. The characteristics of materials and methods of assessing the characteristics of materials including the behavior of material in thermal equilibrium are also embedded in this course. The application and processing of specific material as well as introduction of electrical, magnetic and optical properties of materials are also presented in the course.

**Course Outcomes:**

1. Ability to apply fundamental knowledge in different classes of material engineering.
2. Ability to apply knowledge of material properties with processing methods and application.
3. Ability to analyze and select the suitability of material in engineering related problem.

**KMK10103 KIMIA ORGANIK [ORGANIC CHEMISTRY]****No of Credits: 3****Course Synopsis:**

This course covers structure, nomenclature, synthesis, physical and chemical properties, reactions of the major classes of organic compounds such as alkanes, alkenes, alkynes, alcohols, ethers, aldehydes and ketones, benzene ring, other aromatic rings, and carboxylic acids. Reaction mechanisms and multisteps organic synthesis involving these organic compounds will also be covered.

**Course Outcomes:**

1. Ability to DIFFERENTIATE different classes of organic compounds based on nomenclature, structure, physical and chemical properties.
2. Ability to DISTINGUISH types of organic reaction and mechanism involved based on starting materials, functional groups and reaction condition.
3. Ability to FOLLOW standard procedure for handling laboratory equipments and techniques such as distillation and reflux.

**KMK10202 KEJURUTERAAN GRAFIK UNTUK KEJURUTERAAN KIMIA [ENGINEERING GRAPHICS FOR CHEMICAL ENGINEERING]****No of Credits: 2****Course Synopsis:**

This course offers a fundamental introduction to engineering graphics techniques, with the goal of developing the ability to comprehend, envision, evaluate, create, and produce engineering drawings with proficiency and accuracy. At the end of this course, students will be able to (depict the engineering process / acquire the engineering process drawing skill) using an appropriate software package.

**Course Outcomes:**

1. Ability to create 2D plans and 3D models using AutoCAD
2. Ability to construct parallel and perspective projections using AutoCAD
3. Ability to analyse and solve the drafting and design of engineering process using AutoCAD

**KMK10303 KEMAHIRAN KEJURUTERAAN [ENGINEERING SKILLS]****No of Credits: 3****Course Synopsis:**

This course intends to give students with basic knowledge of engineering skills. The subtopics that will be emphasized are technical drawing with CAD, PCB design and fabrication, electrical wiring, GNU Octave, sample preparation and mechanical testing.

**Course Outcomes:**

1. Ability to apply a basic skill and standard practice of sample preparation and mechanical testing
2. Ability to apply and complete the basic skills and standard practice of domestic wiring.
3. Ability to apply and construct a mathematical analysis using GNU Octave software
4. Ability to apply a standard practice of manual technical drawing and able to design a product using common software (AutoCAD)
5. Ability to apply the basic skills and standard practice of PCB layout design and fabrication process.

**KMK10403 TEKNOLOGI ELEKTRIK [ELECTRICAL TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course covers the international system of measurement, introduction to the electrical systems including characteristics and principles of operation of DC and AC circuits, capacitance, and inductance. The students will also be exposed to the simple magnetic circuit and electromagnetism as well as the application of electrical technology in a variety of sectors.

**Course Outcomes:**

1. Ability to explain the fundamental concepts of the electrical circuits.
2. Ability to analyze the concept and operation principle of DC and AC circuits
3. Ability to analyze magnetic circuits, electromagnetism, and the application of electrical technology in various sectors.

**KMK10502 KIMIA FIZIKAL [PHYSICAL CHEMISTRY]****No of Credits: 2****Course Synopsis:**

The course discusses the concept of physical chemistry in terms of laws of thermodynamics, involving enthalpy and entropy. The course also covers the topics of material equilibrium, standard thermodynamic functions of reactions, reaction equilibrium in a gas mixture, reaction kinetics, phase diagram and equilibrium electrochemistry.

**Course Outcomes:**

1. Ability to EXPLAIN the basic concepts, laws and principles in physical chemistry.
2. Ability to DIFFERENTIATE the given problem related to the basic concepts, laws and principles in physical chemistry
3. Ability to ANALYZE the laws and principles in physical chemistry

**KMK10603 KIMIA ANALISIS [ANALYTICAL CHEMISTRY]****No of Credits: 3****Course Synopsis:**

The first part of the course covers the basic principle of analytical chemistry which includes data analysis and its interpretation. The second part provides an introduction and application of classical analytical methods such as gravimetry

and titrimetry as well as modern methods in analytical chemistry such as chromatographic and spectroscopic techniques.

**Course Outcomes:**

1. Ability to understand and APPLY the basic chemical concepts that are particularly important to analytical chemistry
2. Ability to APPLY basic principle of different analytical techniques in order to CALCULATE and solve analytical problems by integrating different analytical techniques
3. Ability to DIFFERENTIATE, DEMONSTRATE and WRITE about different analytical techniques

**KMK10704 PRINSIP-PRINSIP PROSES KIMIA [PRINCIPLES OF CHEMICAL PROCESS]****No of Credits: 4****Course Synopsis:**

This course emphasizes the underlying concepts of material and energy balance in chemical processes. More fundamentally, it introduces the engineering approach to solving process-related problems. Topics to be covered include basic process calculations, process system variables, material and energy balances on reactive and non-reactive processes. At the end of this course, students will be able to identify and perform material and energy balances on reactive and non-reactive processes.

**Course Outcomes:**

1. Ability to apply knowledge of material balances and analyze the reactive and nonreactive chemical processes
2. Ability to apply knowledge of energy balances and analyze the reactive and nonreactive chemical processes
3. Ability to apply appropriate simulation tools to perform material and energy balances for reactive and nonreactive chemical processes

**KMK10802 PENGENALAN KEPADA PROSES INSTRUMENTASI [INTRODUCTION TO PROCESS INSTRUMENTATION]****No of Credits: 2****Course Synopsis:**

This course provides the students with the introductory fundamentals and application knowledge of the essential process instruments (including valves, pumps, compressors, blowers, fans) which are commonly used in the process industries. Students are also trained with the ability to examine both process flow diagrams (PFD) as well as piping and instrumentation diagrams (P&ID) using the Instrumentation Systems and Automation Society (ISA) symbology and tagging systems. Ultimately, the design and development of both PFD and P&ID of both simple and complex systems are studied and practiced.

**Course Outcomes:**

1. Ability to analyze the function of various industrial process instrumentation and application of engineering drawings.
2. Ability to demonstrate the ISA symbology and tagging as well as numbering
3. Ability to construct process flow diagram (PFD) and piping and instrumentation diagram (P&ID) using appropriate tools

**KMK20003 TERMODINAMIK UNTUK KEJURUTERAAN KIMIA [THERMODYNAMICS FOR CHEMICAL ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course introduces students to the basic of thermodynamics for chemical engineering application and problem solving, which covers on first and second laws of thermodynamics. The course also highlights on pure substance properties, mass and energy analysis, entropy, refrigeration cycles, thermodynamic property relations, thermodynamics of gas mixture and solutions, as well as the chemical and phase equilibrium.

**Course Outcomes:**

1. Ability to analyze the fundamentals properties and laws of thermodynamics involved in chemical engineering systems.
2. Ability to evaluate the thermodynamic property relations, mass, work, energy and heat transfer analysis, as well as the thermodynamic behaviour of pure substance and mixtures.
3. Ability to measure the thermodynamic properties of gaseous and solutions, as well as the phase equilibrium of vapor-liquid and chemical reaction systems.
4. Ability to justify the concept and cycle of thermodynamics in chemical engineering system applications.

**KMK20103 MEKANIK BENDALIR [FLUID MECHANICS]****No of Credits: 3****Course Synopsis:**

This course covers all the basic principles of fluid mechanics, both static and dynamics. This course emphasizes fundamental concepts and problem-solving techniques that ties theory directly to real systems used in chemical process industries. In the fluid static part, students will be introduced to basic properties of fluid, pressure measurement, buoyancy and stability and also force due to static fluid. In fluid dynamics, students will be learning general equations of fluid flow, friction loss and separation losses.

**Course Outcomes:**

1. Ability to ANALYSE problems related to fluid static
2. Ability to evaluate broadly-defined engineering problems related to fluid dynamics
3. Ability to conduct fluid mechanics experiments based on the objectives outlined according to procedures.

**KMK20203 PEMINDAHAN HABA UNTUK KEJURUTERAAN KIMIA [HEAT TRANSFER FOR CHEMICAL ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course emphasizes the fundamental concepts and problem-solving techniques related to heat transfer in process engineering. The fundamental theoretical concepts and mechanisms of conduction, convection and radiation of heat transfer and the design fundamentals of basic industrial heat exchangers are analyzed. In particular, the fundamental knowledge gained from the single heat exchanger analysis is further applied for designing a heat exchanger network for specific processes towards minimum energy requirement and rejection.

**Course Outcomes:**

1. Ability to ANALYZE the principles of conduction, convection and radiation heat transfer.
2. Ability to ASSESS the problems related to heat transfer processes.
3. Ability to DESIGN the heat exchangers and the networks related to specific process

**KMK23003 MIKROBIOLOGI MAKANAN [FOOD MICROBIOLOGY]****No of Credits: 3****Course Synopsis:**

The early part of this course introduces the features of microorganisms typically involved in the food industry namely foodborne, waterborne, and spoilage microorganisms, followed by the methods of their isolation, detection, and identification. Then, the intrinsic and extrinsic conditions with factors that affect the growth, survival, and death of microorganisms in foods are covered in the later part. Finally, in food application, the indicators of food safety and quality, differentiation between beneficial use (fermentation) in the microorganism and foodborne diseases are established.

**Course Outcomes:**

1. Ability to apply the knowledge on characteristics of foodborne, waterborne, and spoilage microorganisms, as well as methods of their isolation, detection, and identification
2. Ability to analyze and responds to the intrinsic and extrinsic conditions affecting the growth, survival and death of microorganisms in foods.
3. Ability to explain and differentiate the beneficial use (fermentation) in microorganisms and disease that are contracted from the consumption of food products.

**KMK20303 KEJURUTERAAN TINDAKBALAS [REACTION ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course highlights the principles of chemical reactions engineering involving knowledge exploitation of industrial scale reactor design. Fundamental concepts are emphasized through the knowledge of reactor sizing, rate law, isothermal reactor design, collection and analysis of rate data, catalysis and catalytic reaction mechanism, and distributions of residence time for reactors.

**Course Outcomes:**

1. Ability to DEMONSTRATE the principles of chemical reaction engineering design for industrial reactors and related practical skills.
2. Ability to ANALYZE and solve various problems related to reactor design, reaction process, and related practical skills.
3. Ability to EVALUATE the catalytic reaction mechanism, Residence Time Distribution (RTD) functions in reactors, and related practical skills.

**KMK20403 PEMINDAHAN JISIM [MASS TRANSFER]****No of Credits: 3****Course Synopsis:**

This course emphasizes the fundamental concepts and problem-solving techniques on mass transfer operations and principles. This course also provides the knowledge on mass transfer operations at basic to an intermediate level, which covers the theoretical and analytical background to solve the mass transfer operations problems. The concepts of diffusion and inter-phase mass transfer to the analysis of different mass transfer operations such as absorption, evaporation, and drying will be covered in this course.

**Course Outcomes:**

1. Ability to DEMONSTRATE the diffusion mass transfer principles and CALCULATE the mass transfer coefficient
2. Ability to ANALYZE mass transfer systems related to industry
3. Ability to APPLY the appropriate techniques in mass transfer related equipment individually and in teams.

**KMK23103 BIOKIMIA MAKANAN [FOOD BIOCHEMISTRY]****No of Credits: 3****Course Synopsis:**

This course highlighted the chemical/biochemical reaction of carbohydrate, lipids, proteins, vitamins, water and minerals in fresh and processed foods with respect to food quality and health. It also covers biochemical and functional properties of food components, enzymes and food additives (emulsifiers, pigments, colours, flavours, sweeteners, preservatives, etc). Metabolism and processes of nutritive aspects of food constituents are also emphasized.

**Course Outcomes:**

1. Ability to APPLY knowledge of basic principles of food science and biochemistry into real-world food science and nutrition studies.
2. Ability to EVALUATE the chemical structure and interactions of food components and CONSTRUCT analytical experiments with respect to the components interactions for food quality and safety.
3. Ability to ASSEMBLE different biochemical testing with appropriate methods to understand its chemical interactions between food components.

**KMK23203 TEKNOLOGI LEPAS TUAI [POSTHARVEST TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course provides an overview on postharvest handling technology of agricultural produce. The course emphasizes the basic of postharvest handling technology, pre-harvest and harvesting factors affecting the postharvest quality, postharvest operations in the packinghouse and appropriate equipment or chemicals that relates to postharvest treatments and storage of agricultural products, quality assurance and preparation of fresh-cuts, and postharvest socio-economics

**Course Outcomes:**

1. Ability to apply knowledge and analyse the factors during pre-harvest, harvesting and postharvest handlings that affect the quality of fresh produce.
2. Ability to perform appropriate analyses in determining the chemical and physical properties of agricultural products in order to apply the appropriate postharvest handling technology.
3. Ability to function effectively in a group / team to complete all the tasks in group activity and assignment on postharvest handling technology of different fresh produces.

**KMK30002 KESELAMATAN & PENCEGAHAN KEHILANGAN [SAFETY & LOSS PREVENTION]****No of Credits: 2****Course Synopsis:**

The course offers a detailed study on applications of engineering principles to process safety, hazards analysis and mitigation. It covers issues relevant to chemical process safety which include Occupational Safety and Health laws and regulations, methods and techniques for identifying, assessing and eliminating or controlling hazards to acceptable levels which are required on any process plant to ensure safe and efficient operation. The course also covers principles and guidelines on safe design engineering and the design of relief systems. The course also emphasizes on maintenance programs, emergency response planning, occupational safety and health management system and relevant case studies. The course is concluded with the lesson in accident investigation.

**Course Outcomes:**

1. Ability to apply occupational safety and health management, planning and legal issues
2. Ability to evaluate suitable methods for prevention and control in

- occupational safety and health
3. Ability to propose safety element in engineering work

**KMK30103 KAWALAN PROSES DAN DINAMIK [PROCESS CONTROL & DYNAMICS]****No of Credits: 3****Course Synopsis:**

The course aims to introduce the concept of process control and dynamics which starts with the introduction to process control, theoretical models of chemical processes, Laplace transform, transfer function and dynamic behavior of the processes. In addition, a complete control system includes the feedback controller, control system instrumentations will be also covered with understanding of dynamics behavior of the closed loop and apply the PID controller design and tuning.

**Course Outcomes:**

1. Ability to analyze basic concepts of process control and theoretical model of chemical processes.
2. Ability to evaluate and perform the dynamics behaviour of chemical processes and feedback controllers.
3. Ability to design and analyze feedback control systems for chemical processes.

**KMK30203 KEJURUTERAAN PEMISAHAN [SEPARATION ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course emphasizes the theory and basic principles of separation process based on equilibrium stage concepts and mass transfer rate control. This course provides the knowledge of basic design criteria required for binary and multi component separations processes. At the end of the course, the students are expected to be able to solve engineering problems related to separation in chemical processes.

**Course Outcomes:**

1. Ability to analyze the scientific and engineering technology principles to examine basic design/operation of liquid-liquid and solid-solid extraction processes.
2. Ability to evaluate and apply the principles of mechanical-physical separation process.
3. Ability to apply principles and theory to develop basic design/operation of separation processes involving vapor and liquid.



**KMK33003 ANALISIS DAN INSTRUMENTASI UNTUK TEKNOLOGI MAKANAN [ANALYSIS & INSTRUMENTATION FOR FOOD TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course provides students with knowledge in the application of analytical procedures and instrumentations used for the physical and chemical characterization of foods. Physical properties of foods such as rheological properties, texture properties, colour determination, and viscosity are characterized using rheometer, texture analyzer, colour meter, and viscomer. Proximate compositions (moisture, ash, protein, fat content) of food are analyzed using an oven, furnace, kjedahl, and soxhlet system. The course also covers analytical technique using high ends equipment such as spectrophotometry (UV-Vis, IR, AAS, NMR), chromatography (TLC, GC and HPLC), and calorimetric (Bomb calorimeter) for food compound determination, concentration, and characterization. These analytical procedures are important to ensure food safety and quality.

**Course Outcomes:**

1. Ability to DIFFERENTIATE the principle of food analysis between physical and chemical characterizations.
2. Ability to EVALUATE the type of instruments and methods used for specific food analysis
3. Ability to CONSTRUCT and DEMONSTRATE appropriate procedures of different food testing with suitable instruments in groups.

**KMK33104 PEMROSESAN DAN PENGAWETAN MAKANAN [FOOD PROCESSING & PRESERVATION]****No of Credits: 4****Course Synopsis:**

This course covers multidisciplinary fields of food processing technology and related industries. Topics covered include physico-chemical, sensory and nutritional properties of foods, food spoilage, food production systems and preservation processes including thermal and non-thermal processes, chilling and freezing, freeze-drying, irradiation, texturization, extrusion, mechanical separation, packaging, chemical preservation, fermentation and food biotechnology

**Course Outcomes:**

1. Ability to differentiate the principles and technology of food processing and preservation and analyse the effects of processing on food quality and shelf life.

2. Ability to perform the appropriate processing methods on selected food products and apply the appropriate measurement techniques to analyse the effects of processing on physico-chemical, sensory and nutritional properties of foods.
3. Ability to communicate effectively on the appropriate solution to the problems and issues involved in food processing and preservation through technical report and presentation.

**KMK33203 TEKNOLOGI LEMAK DAN MINYAK [FATS & OILS TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course is designed to provide the students with the knowledge in the chemistry of fats and oils, their sources, the corresponding techniques and technologies in fats and oils processing, analytical methods used to assess its physicochemical properties and quality, the applications of fats and oils in food manufacturing as well as the method of handling and preservation of the oils and fats products.

**Course Outcomes:**

1. Ability to differentiate the major commercial sources of fats and oils as well as understanding their components and chemical composition.
2. Ability to evaluate the technology utilized for the processing of fats and oils, and the analytical procedures for quality assessment of fats and oils products.
3. Ability to propose and explain appropriate methods for handling and preservation of fats and oils product, and the potential applications based on their physical and chemical properties.

**KMK33303 INGREDIEN MAKANAN [FOOD INGREDIENTS]****No of Credits: 3****Course Synopsis:**

This course provides the knowledge in major food ingredients in various categories such as food coloring, food flavorings, acidulants, emulsifiers, stabilizers, specialty protein-based ingredients, enzymes and many other ingredients. The course also emphasizes on technical information in the area of ingredient interactions pertaining to foods in order to optimize ingredient performance in food formulations and obtaining high quality food products.

**Course Outcomes:**

1. Ability to analyze the mechanism of the techno-functionality or bio-functionality as well as physicochemical properties of food ingredients.
2. Ability to predict the effect of the interaction between ingredient and complex food matrix under different conditions.
3. Ability to propose and explain the right ingredients for food formulations in food manufacturing.

**KMK30403 PROJEK TAHUN AKHIR 1 [FINAL YEAR PROJECT 1]****No of Credits: 3****Course Synopsis:**

Final year project is the culmination of study towards the Bachelor of Chemical Engineering Technology degree that requires the application of knowledge learned throughout the program. This course consists of the combination between guided supervision and independent study focusing on the technique of identification of problem statements, research objectives, conducting literature review and proposing research methodology. This course also covers scientific and technical guidance on proposal writing and preparation. Presentation of the research proposal to internal examiners is conducted.

**Course Outcomes:**

1. Ability to COMPOSE problem statements and research objectives of the project based on the scientific information which FOLLOW the ethical principle in order to engage life-long learning on theory and practical knowledge.
2. Ability to DESCRIBE and FORMULATE research methodology incorporating clear fundamentals resources, theories and benchmarked against standard practices governing the research project and to plan activities pertaining to the research project to meet the required research objectives and deadlines.

3. Ability to PRESENT and defend research proposals with effective communication skills.

**KMK33503 REKA BENTUK LOJI UNTUK TEKNOLOGI MAKANAN 1 [PLANT DESIGN FOR FOOD TECHNOLOGY 1]****No of Credits: 3****Course Synopsis:**

This course contains the preliminary design of a food technology processing plant. It focuses on the process synthesis of a typical food product gathering with process plant capacity based on market survey analysis. The calculation of material and energy balance, heat and mass transfer analysis and designing proper equipment. It is a team-based approach to provide capstone design experience emphasizing on the application of science, mathematics and fundamentals of chemical engineering and food technology knowledge acquired in earlier courses.

**Course Outcomes:**

1. Ability to EXAMINE the key steps with consideration of environmental issue and economic analysis in carrying out a process synthesis of a typical food process plant.
2. Ability to PROPOSE chemical engineering design principle with appropriate engineering codes.
3. Ability to TROUBLE-SHOOT a process simulation of the proposed plant using appropriate process simulator tools
4. Ability to ORGANIZE teamwork and communication skill
5. Ability to STRUCTURE the project management and interpret the needs with the engagement in independent and life-long learning in food project design.

**KMK33403 PENGURUSAN DAN PENGGUNAAN SISA MAKANAN [FOOD WASTE MANAGEMENT AND UTILIZATION]****No of Credits: 3****Course Synopsis:**

This course covers waste management of industrial wastes including wastewater, solid and hazardous waste in order to minimize their effect on the environment which in compliance with Department of Environment (DOE). Treatment of industrial food wastes and its utilization in relation to pollution control and value-added commercial by-products are also included.

**Course Outcomes:**

1. Ability to APPLY legislative act for waste management and treatment in industries
2. Ability to EVALUATE and CONDUCT appropriate waste treatment systems with sustainable approach
3. Ability to PROPOSE and PRACTICE the utilization of waste from food industries into value-added products

**KMK33604 SISTEM PENGURUSAN KUALITI DAN KESELAMATAN DALAM PENGELUARAN MAKANAN [QUALITY & SAFETY MANAGEMENT SYSTEM IN FOOD PRODUCTION]****No of Credits: 4****Course Synopsis:**

This course provides an overview on food quality and safety in food production such as sources and types of contaminants and toxins in foods, sensory analysis, food safety policy and laws, methods of analyses and measurements of the risk of toxicity and methods of detoxification. It also emphasizes on the quality and safety management systems such as good manufacturing practices (GMP), Good Hygiene Practices (GHP), and good distribution practices (GDP) as well as Standards in Malaysia and in advanced countries which compliance with global food safety initiatives (GFSI) including HACCP, Halal and quality and safety requirements for obtaining accreditation from authority by the food manufacturers for export.

**Course Outcomes:**

1. Ability to ANALYSE and CONSTRUCT the quality and safety of food in relation to contaminants and toxin in foods and sensory evaluation
2. Ability to PRESENT the importance of quality and safety management system in food production
3. Ability to ASSESS and MEASURE the quality and safety-based problems in food production.

**KMK33703 MAKANAN BERFUNGSI DAN NUTRASEUTIKAL [FUNCTIONAL FOODS & NUTRACEUTICALS]****No of Credits: 3****Course Synopsis:**

This course discusses the relation of functional foods and nutraceuticals to food and drugs. The course also focuses on chemistry, processing, analyses, bioavailability and health benefits of bioactive food components. The safety and efficacy of individual functional foods and nutraceuticals products, and the regulatory issues that influence the development and commercialization of functional foods and nutraceuticals in global markets are also emphasized.

**Course Outcomes:**

1. Ability to analyze the concepts and analytical methods related to functional foods and nutraceuticals.
2. Ability to evaluate the effect of processing on the bioactivity and bioavailability of functional and nutraceutical ingredients.
3. Ability to propose and explain the latest development of researches and markets in functional foods and nutraceuticals.

**KMK33803 TEKNOLOGI TENUSU DAN DAGING [DAIRY & MEAT TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course provides students with knowledge in milk and meat compositions, handling, processing techniques and technologies to preserve various types of dairy and meat products. Methods used to assess the quality of the processed dairy and meat products are also emphasized.

**Course Outcomes:**

1. Ability to apply the knowledge of basic composition and properties of meat and milk on the product processing, safety and quality requirements.
2. Ability to analyze processing techniques and technology for meat and dairy products and communicate effectively in the form of presentation
3. Ability to analyze the method used to maintain and assess the quality and safety of meat and dairy products

**KMK30303 PENGURUSAN TEKNOLOGI KEJURUTERAAN [ENGINEERING TECHNOLOGY MANAGEMENT]****No of Credits: 3****Course Synopsis:**

This course aims to teach students on how to apply the project management skills and economic techniques in evaluating the design. The role of economics is to assess the appropriateness of a given project, estimate its value, and justify it from an engineering technology standpoint. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineering technologists relating to project management in the current economic scenarios.

**Course Outcomes:**

1. Ability to evaluate the process of project management, develop work plans, do cost estimation and perform project evaluation
2. Ability to evaluate economic scenarios and apply decision making processes to engineering projects and business ventures.

**KMK40005 PROJEK TAHUN AKHIR II [FINAL YEAR PROJECT II]****No of Credits: 5****Course Synopsis:**

Final year project is the culmination of study towards the Bachelor of Chemical Engineering Technology degree that requires the application of knowledge learned throughout the program. This course consists of a combination between guided supervision and independent study focusing on the techniques of conducting laboratory and/or field experiments. This course also covers the implementation of research activities based on a research plan or gantt chart. The experimental data are analysed and written in a scientific manner and oral presentation on project findings is conducted and assessed by the appointed internal examiners. Finally, a thesis is submitted indicating the course completion.

**Course Outcomes:**

1. Ability to perform planning activities related to the objectives of the research project to be engage in independent and life-long theoretical and practical learning
2. Ability to assess and demonstrate techniques using modern tools to solve research problems.
3. Ability to follow ethical principles and evaluation of experimental data to draw good conclusions
4. Ability to perform and effectively communicate the findings through standard thesis and presentation

**KMK43503 REKA BENTUK LOJI UNTUK TEKNOLOGI MAKANAN 2 [PLANT DESIGN FOR FOOD TECHNOLOGY 2]****No of Credits: 3****Course Synopsis:**

This course is a complementary course of Plant Design for Food Technology 1. This course covers the Piping and Instrumentation Diagram (P&ID) of the selected food plant processing using CAD tools in conjunction with the control system. The engineering economic evaluation topic in this course comprises the estimation of total capital cost investment, cost of manufacture, and profitability analysis. This course also covers food quality, safety, packaging, and food waste management systems.

**Course Outcomes:**

1. Ability to design piping and instrumentation diagrams (P&ID) using appropriate CAD tools and control systems for the food process plant.
2. Ability to evaluate costing and profitability analysis of the food process plant.
3. Ability to propose a packaging system for quality assurance and design a food waste management system for environmental sustainability.
4. Ability to complete the report task in the team and communicate effectively.
5. Ability to structure the project management and interpret the needs with the engagement in independent and life-long learning in food project design.

**KMK43003 PEMBANGUNAN DAN PENGKOMERSILAN PRODUK MAKANAN [FOOD PRODUCT DEVELOPMENT & COMMERCIALIZATION]****No of Credits: 3****Course Synopsis:**

This course covers the current trends of food innovations and commercialization in the market starting from idea generation, market analysis and costing, product design and development, product quality and management, product sensory evaluation and statistical analysis, packaging and shelf life, and implementation to market launch which combine current theoretical practices from the food industry to illustrate the subject matter. Students will work in small groups to integrate knowledge in food technology for a food product development project which involves the planning, management and assessment of a product from conceptualization to launch.

**Course Outcomes:**

1. Ability to evaluate the process in the development and commercialization of a new food product.
2. Ability to design appropriate processes and select appropriate techniques in the development of a new food product.
3. Ability to appraise management techniques and apply economic decision-making into the development of a new food product and communicate effectively in form of a presentation.

**KMK43103 JURUTERA TEKNOLOGI DALAM MASYARAKAT [FOOD PACKAGING TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

The course introduces basic knowledge on food packaging materials, equipment, design and technology with an overview on the science and technology applied to the preservation and shelf life, distribution and marketing of various food products, different procedures involved and food safety requirements for developing, evaluating and testing of food packages in accordance to international standards.

**Course Outcomes:**

1. Ability to ANALYSE the understanding on the importance and functions of a packaging system in relation to food preservation.
2. Ability to ASSESS and EXPLAIN the manufacture, properties and economic use of packaging materials (glass, plastic, paper and aluminium).
3. Ability to PROPOSE how packaging materials interact with diverse food products in order to maximize quality and shelf-life of the products.

**KMK43203 TEKNOLOGI POLTRI DAN IKAN [POULTRY & FISH TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course provides students with the knowledge on the chemical, biochemical and nutritional compositions of poultry and fish including the appropriate handling procedures that are bound to the GHP, HACCP, Halal and food regulations standard. It will also cover the concept of processing techniques, equipment and technologies adopted to produce various types of poultry and fish products. Methods used to assess the quality and safety, handling and preservation of the products originating from poultry and fish will also be emphasized.

**Course Outcomes:**

1. Ability to DEMONSTRATE the understanding on the chemical and biochemical constitution of poultry and fish of different species
2. Ability to DISTINGUISH the processing techniques, equipment and technology adopted including methods used to assess the quality of various types of poultry and fish products
3. Ability to PROPOSE and EXPLAIN the appropriate methods of handling and preservation of poultry- and fish-based products.

**KMK40103 JURUTERA TEKNOLOGI DALAM MASYARAKAT [ENGINEERING TECHNOLOGY IN SOCIETY]****No of Credits: 3****Course Synopsis:**

This course aims to explain the main concepts in engineering and technology ethics, risk management and occupational safety and health. Introduction the nature to enable engineering technologists to appreciate factors that have to be taken into account in decision-making. Examine and assess issues and challenges faced by engineering technologists relating to engineering and technology ethics, risk management and to understand the legal requirements related to engineering and technology field.

**Course Outcomes:**

1. Ability to ASSESS hazards, the function of risk management and occupational safety and health (OSHA).
2. Ability to EVALUATE the aspects and procedures of legal and ethics on engineering and technology issues.
3. Ability to INTERGRATE and RELATE the issues and challenges of engineering and technology in the community.

**KMK49912 LATIHAN INDUSTRI [INDUSTRIAL TRAINING]****No of Credits: 12****Course Synopsis:**

This practical-based course exposes students to a company's technical functions and organizational structure and operation such as departmental function, work procedure, safety procedure, communication, technical skills and project management. During this course, the students will apply knowledge learned in the university and increase the related skills required in their future profession.

**Course Outcomes:**

1. Ability to demonstrate technical knowledge and practical skills.
2. Ability to practice the health, safety, legal and cultural issues in the working environment.
3. Ability to apply societal environmental and sustainable development in engineering problems.
4. Ability to demonstrate good work performance, work ethics during training period.
5. Ability to perform as an individual, a member or leader in diverse technical teams.
6. Ability to communicate and operate assigned tasks given by the host company.
7. Ability to engage in independent and lifelong learning in specialist technologies

**KMK21503 TEKNOLOGI PEMROSESAN SUMBER BIO [BIORESOURCE PROCESSING TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course aims to enrich students with the knowledge of bioresource utilization. The course includes understanding the need and demand of bioreresources industries by learning the types of bioreresources, highlighting the important role of bioreresources as raw material in industrial processing, knowledge on different types of bioreresources processing technology, potential application of bioreresources and challenges of bioresource in traditional chemical industry.

**Course Outcomes:**

1. Ability to explain the need, principle and demand of the bioresource industry as renewable resources and to distinguish the different types of bioreresources processing technology.
2. Ability to evaluate the application and environmental impact and economic factor of this renewable resource.

3. Ability to conduct guided experiments and open-ended experiments regarding bioresource processing technology.

**KMK21303 PROSES DAN PRODUK OLEOKIMIA [OLEOCHEMICAL PROCESS AND PRODUCTS]****No of Credits: 3****Course Synopsis:**

This course emphasizes the palm oil and oleochemical industries in Malaysia, processes involved in palm oil mills, palm oil refineries, and any related process towards the production of oil and fats from different sources. Besides that, this course also discusses the major oleochemical products in the industry and their applications, product formulation and analysis, and the quality management of oleochemical products.

**Course Outcomes:**

1. Ability to define and apply the oleochemical basic concept.
2. Ability to explain and differentiate the important processes in the oleochemical industry.
3. Ability to explain and analyse the oleochemical products, analysis and formulations.

**KMK21602 UTILITI LOJI [PLANT UTILITIES]****No of Credits: 3****Course Synopsis:**

This course covers the requirement of different utilities for the process plant, along with its generation and its effective utilization. Main utilities required for process plants are water, steam, air & refrigerants. Steam & non-steam heating media are important for conversion of raw material to products in reactors & to elevate the temperature in the chemical processes. Refrigeration is important to maintain the temperature in the process plant.

**Course Outcomes:**

1. Ability to describe the process involving water, steam-heating and inert gas in a chemical plant.
2. Ability to evaluate the principle involving air, refrigerant and vacuum pump compressor, with their applications.
3. Ability to conduct experiments related to plant utilities based on the procedures according to the objectives outlined



**KMK21703 TENAGA BOLEH BAHARU [RENEWABLE ENERGY]****No of Credits: 3****Course Synopsis:**

This subject aims to introduce students to renewable energy resources, their technology application and environmental assessments. The course includes renewable energy sources such as solar, wind power, geothermal, hydro and biomass. More emphasis is given to bioenergy technologies to convert biomass into biofuels. The course has been designed to provide students with a knowledge of the renewable energy sources and the engineering skills associated with them.

**Course Outcomes:**

1. Ability to gain knowledge on the principle and the environmental aspect of renewable energy.
2. Ability to evaluate the different types of renewable energy resources.
3. Ability to follow the lab works of biomass energy processes in producing biofuels.

**KMK31203 KEJURUTERAAN ALAM SEKITAR [ENVIRONMENTAL ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course introduces the cause, effect and method to control pollution from industries. The course covers the three major categories of industrial pollution; water pollution, air pollution and industrial waste management. In the first part, the course includes the source and types of water pollutants, environmental regulations pertaining to waste water discharge, and techniques to treat wastewater before discharging to the environment. The second part of the course covers the source and effect of air pollution, regulations requirements for air pollution control, and technology to control air pollution emissions from industries. The third part covers the management of industrial waste that includes definition of scheduled waste, scheduled waste regulations, and techniques to manage the waste.

**Course Outcomes:**

1. Ability to apply knowledge of legislative act for waste management in industry.
2. Ability to analyze types of pollution emission from industries and effect of industrial pollution to the environment and public health.
3. Ability to evaluate air pollution control and wastewater treatment systems.

**KMK31303 TEKNOLOGI PEMROSESAN PETROLEUM DAN GAS [PETROLEUM AND GAS PROCESSING TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course introduces the students to process and technology involved in oil and gas production field. Topics covered including history and background of refinery process, separation of produced fluids and treatment of crude oil. Apart from that, this subject also contains the field processing and treatment of natural gas as well as petroleum refinery process.

**Course Outcomes:**

1. Ability to recognize and explain background, formation and production of oil and gas.
2. Ability to describe and compare and select separation process of produced fluids and treatment process of crude oil and water.
3. Ability to demonstrate understanding and distinguish field processing and treatment of natural gas.

**KMK31603 TEKNOLOGI PEMROSESAN POLIMER [POLYMER PROCESSING TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course intends to give students fair knowledge of the fundamentals of chemistry, synthesis mechanism of polymer and introduction of polymer composites. Polymer characteristics including chemical, thermal, physical and mechanical properties and rheology of polymer are included in this course. The course also focuses on the processing technology of the polymer which comprises mixing, extrusion and various types of moulding. The laboratory session consists of polymer synthesis, characterisation of physical and mechanical properties as well as polymer processing techniques.

**Course Outcomes:**

1. Ability to apply knowledge of basic concepts of polymer and polymer properties
2. Ability to evaluate the processing techniques for various polymer applications
3. Ability to follow analytical techniques and modern engineering tools for polymer characterization and polymer processing and work in a group.

**KMK31403 ELEKTROKIMIA INDUSTRI [INDUSTRIAL ELECTROCHEMISTRY]****No of Credits: 3****Course Synopsis:**

This subject aims to provide students with the fundamental concepts of electrochemistry and electrode processes. This course will integrate the fundamental concepts with electrochemical applications such as metallurgy, electroplating, batteries, fuel cells, corrosion and electroanalysis. Examples of applications of electrochemistry are also presented.

**Course Outcomes:**

1. Ability to demonstrate the importance of knowledge of electrochemistry.
2. Ability to evaluate the fundamental concepts with electrochemical applications such as metallurgy, electroplating, batteries, fuel cells, corrosion and electroanalysis.
3. Ability to design the corrosion prevention methods and current electrochemical application.
4. Ability to present the resolution of electrometallurgy and hydrometallurgy techniques with environmental and economic concern.

**KMK31503 PENINGKATAN DAN PROSES OPTIMASI [SCALE UP AND PROCESS OPTIMIZATION]****No of Credits: 3****Course Synopsis:**

To fulfil the increasing demand of experts in the industry when it comes to scale-up and process optimization of any manufacturing processes.

**Course Outcomes:**

1. Ability to apply principles of scale up and to analyze scale up methods in related chemical/biotechnological processes.
2. Ability to demonstrate theories of optimization and to analyze optimization methods in related chemical/biotechnological processes.
3. Ability to develop a solution to chemical/biotechnological related problems using selected scale up and optimization methods.

**KMK31903 PROJEK REKA BENTUK UNTUK PROSES KIMIA INDUSTRI I [PLANT DESIGN PROJECT FOR INDUSTRIAL CHEMICAL PROCESS]****No of Credits: 3****Course Synopsis:**

This course contains the preliminary design of industries chemical process plants. It focuses on process synthesis of a typical chemical process product with process plant capacity based on market survey analysis. The calculation includes material and energy balance, heat and mass transfer analysis, and process equipment design. The design project is a team-based approach to provide capstone design experience emphasizing on the application of sciences, mathematics, and fundamental chemical engineering knowledge acquired in earlier courses.

**Course Outcomes:**

1. This course contains the preliminary design of industrial chemical process plants. It focuses on process synthesis of a typical chemical process product with process plant capacity based on market survey analysis. The calculation includes material and energy balance, heat and mass transfer analysis, and process equipment design. The design project is a team-based approach to provide capstone design experience emphasizing on the application of sciences, mathematics, and fundamental chemical engineering knowledge acquired in earlier courses.
2. Ability to propose chemical engineering design principle with appropriate engineering codes.
3. Ability to demonstrate a process simulation of the proposed plant using appropriate process simulator tools.
4. Ability to organize teamwork and develop communication skills.
5. Ability to monitor project management and appraise the needs and life-long learning in industrial chemical process project design.

**KMK32703 TEKNOLOGI PENGESTRAKAN SEBATHAN BIOAKTIF [BIOACTIVE COMPOUNDS EXTRACTION TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

The course discusses various sources of natural bioactive compounds as well as their extraction methods. The methods are steam distillation, distillation, low-pressure solvent extraction (solid to liquid), high-pressure extraction, liquid to liquid extraction and adsorption besides its applications in related industries. Several analyses to obtain high-quality bioactive extracts and purified compounds are also discussed.

**Course Outcomes:**

1. Ability to examine variability of bioactive compounds.
2. Ability to suggest the extraction method for related problem
3. Ability to evaluate various analyses to obtain high quality and purified compounds.

**KMK41102 JAMINAN KUALITI DAN KAWALAN DALAM KEJURUTERAAN KIMIA [QUALITY ASSURANCE & CONTROL IN CHEMICAL ENGINEERING]****No of Credits: 2****Course Synopsis:**

This course covers the principles of quality control that can be applied in related fields of chemical engineering. The course covers related processes and standards commonly used in industry. The course also discusses the statistical method and acceptance sampling as tools and techniques that are broadly implemented in quality assurance and quality control.

**Course Outcomes:**

1. Ability to examine and apply the principles for quality assurance, quality control and management improvement.
2. Ability to understand, apply and present the processes in quality assurance and quality control with statistical methods.
3. Ability to formulate the suitable sampling and testing procedure in quality assurance and quality control.

**KMK41203 TEKNOLOGI PEMROSESAN ZARAH [PARTICLE PROCESSING TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course emphasizes the fundamental concepts and problem-solving techniques on particle processing technology. This course covers many of the aspects related to particle processing and handling, including particle analysis, particle separation, storage and transporting of particles, mixing and segregation, as well as particle size reduction and enlargement.

**Course Outcomes:**

1. Ability to solve and analyse various problems related to the particles/particulate-systems/process and particle equipment design.
2. Ability to apply the particle system/equipment for handling of particle related processes in operation.
3. Ability to function effectively in a group/team to plan and prepare the technical/lab report related to the particles/particulate systems/process.

**KMK41403 TEKNOLOGI PEMROSESAN MAKANAN [FOOD PROCESSING TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course covers multidisciplinary fields of food processing technology and related industries. Topics covered include food science, sensory and nutritional properties of foods, food spoilage, food production systems and preservation processes including thermal and non-thermal processes, chilling and freezing, freeze-drying, irradiation, extrusion, packaging, texturization, mechanical separation and genetically modified foods.

**Course Outcomes:**

1. Ability to apply the knowledge of the basic concepts and principles of food processing technology.
2. Ability to evaluate the effects of processing on sensory and explain the nutritional properties of food.
3. Ability to evaluate the problems involved in food production.

**KMK41903 REKA BENTUK LOJI UNTUK PROSES KIMIA INDUSTRI 2 [PLANT DESIGN FOR INDUSTRIAL CHEMICAL PROCESS 2]****No of Credits: 3****Course Synopsis:**

This course is a complementary course of Plant Design for Industrial Chemical Process 1. It focused on the Piping and Instrumentation Diagram (P&ID) in conjunction with the control system and engineering economic knowledge consisting of estimation of total capital cost investment, cost of manufacture, and profitability analysis. This course also covers waste management systems and safety precautions.

**Course Outcomes:**

1. Ability to develop piping and instrumentation diagrams (P&ID) and control systems for industrial biotechnology process plants by demonstrating appropriate software tools.
2. Ability to evaluate costing and economic analysis of the process plant.
3. Ability to propose a sustainable waste management system for environmental needs and society's safety.
4. Ability to organize teamwork and communication skills.
5. Ability to evaluate the needs with the engagement in independent and life-long learning in project design.

**KMK22004 MIKROBIOLOGI INDUSTRI [INDUSTRIAL MICROBIOLOGY]****No of Credits: 4****Course Synopsis:**

The course refreshes microbial fundamentals which include characterization of micro-organisms; aseptic techniques, microscopy, microbial structure, nutrition, energy generation, reproduction, control of microbial populations and microbial diversity as well as strain improvement for new products and productivity improvement. This course also emphasizes on the microbiological industry development, scope of microbiological industries, microbes in microbiological industries, biomass and metabolite production, microbes in bioremediation and in waste treatment industries.

**Course Outcomes:**

1. Ability to evaluate microbiological processes involved in fundamental microbiological methods.
2. Ability to evaluate applications production for industrial products and bioprocessing systems for industrial products by applying fundamentals of microbial classification, physiology and metabolisms.
3. Ability to demonstrate practical skills in fundamental microbiological methods.

**KMK22104 BOKIMIA & TEKNOLOGI ENZIM [BIOCHEMISTRY & ENZYME TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course covers the properties and structure of water, classification and function of biomolecules such as carbohydrates, lipids and amino acids, role of proteins and enzymes in biochemistry, metabolism and photosynthesis. Also covering advanced topics in production, isolation, purification, immobilization, and application of enzymes in various reaction systems, together with examples of specific applications for immobilized enzymes. The course also covers applications of free and immobilized enzymes in the food, chemical and pharmaceutical industries, as well as probable future trends in enzyme technology.

**Course Outcomes:**

1. Ability to differentiate basic structure, properties, functions and classification of biomolecules. Ability to distinguish techniques for enzyme isolation, purification and immobilization.
2. Ability to illustrate electron transport, citric acid cycle and photosynthesis.
3. Ability to distinguish properties and manipulate techniques for biomolecules determination.
4. Ability to assess the current and future trends of biomolecules applications in bio-analysis, biotechnology and industrial

**KMK22203 BIOMOLEKULAR & KEJURUTERAAN GENETIK [BIOMOLECULAR & GENETIC ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course provides fundamental knowledge on molecular biology processes such as DNA replication, transcription, and translation. The course also covers the basic principle of genetic engineering that involves the manipulation of genetic materials, the regulations of their interactions, and the techniques employed in gene cloning and recombinant DNA technology. The students are expected to be able to perform simple DNA sequence analysis using the National Center for Biotechnology Information (NCBI) platform.

**Course Outcomes:**

1. Ability to perform and to discuss fundamental molecular biology laboratory techniques.
2. Ability to distinguish between the mechanisms of bacterial and eukaryotic DNA replication, DNA repair, transcription, and translation
3. Ability to assess the techniques used in the isolation, manipulation and cloning of heterologous DNA

**KMK32002 PENGURUSAN SISA & PENGGUNAAN [WASTE MANAGEMENT & UTILIZATION]****No of Credits: 2****Course Synopsis:**

This course introduces the types of waste material, such as wastewater, solid waste, and hazardous waste generated by various industries, and discusses the utilization of the bioprocessing industrial waste and the treatments required before discharge to the environment. Topic cover includes classification of hazardous waste, physical, chemical and biological properties of waste and its toxicology, treatment and disposal methods, current management practices as well as specific degradation of solid wastes including their direct practical applicability.

**Course Outcomes:**

1. Ability to apply the basic principles of physical, chemical and biological properties of waste, waste treatment, and management as well as management practices used in bioprocessing industries.
2. Ability to conduct an investigation and analyze the performance of waste treatment and disposal methods as well as utilization of waste to provide valid conclusions
3. Ability to apply appropriate techniques for treatment, disposal, and utilization of waste

**KMK32103 SEL & TEKNOLOGI KULTUR TISU [CELL & TISSUE CELL CULTURE]****No of Credits: 3****Course Synopsis:**

This course introduces the basic knowledge and principle of mammalian cell culture as well as plant tissue culture with the incorporation of cutting-edge technology. The topics that are covered in this course include aseptic techniques, media preparation and sterilisation methods pertaining to cell culture, and applications of the mammalian cell culture and plant tissue culture in various fields..

**Course Outcomes:**

1. Ability to apply knowledge and differentiate the basic unit of life and basic laboratory equipment for mammalian cell culture and plant tissue culture.
2. Ability to apply knowledge on different culture techniques and evaluate the importance of mammalian cell culture and plant tissue culture
3. Ability to apply appropriate techniques for maintaining the mammalian cell culture and plant tissue culture in a group project.

**KMK32204 TEKNOLOGI PEMROSESAN HULUAN & HILIRAN [UPSTREAM & DOWNSTREAM PROCESSING]****No of Credits: 4****Course Synopsis:**

The course covers the upstream processes on the media formulation, modes of fermentation, basic principle of bioreactor design, sterilization techniques, fermenter instrumentation and control. This course also emphasizes on the downstream strategies which can be generalized to four primary functions as follows: separation of insoluble products and other solids, concentration of products, purification followed by product preparation.

**Course Outcomes:**

1. Ability to analyze the effect of media formulation on the microbial growth kinetics.
2. Ability to design the fermenter instrumentation and control based on specific parameters.
3. Ability to propose a suitable integrated recovery and purification system based on the product.
4. Ability to perform basic fermentation experiments and downstream processes

**KMK32303 REKA BENTUK FASILITI BIOTEKNOLOGI [BIOTECHNOLOGY FACILITY DESIGN]****No of Credits: 3****Course Synopsis:**

This course exposes an overview of biotechnology facilities design which parallel to the regulatory compliance in manufacturing process. The topics emphasized on the general equipments design involves in producing and processing biological products, instrumentation and controls in bioprocess, aseptic processing and sanitary design, as well as utilities system. This course also covers on regulatory compliance according to current Good Manufacturing Practices (GMP), and documentation for validation of biotechnology facilities.

**Course Outcomes:**

1. Ability to analyze the biotechnology process facility design based on industrial regulatory demand
2. Ability to evaluate the basic instrumentations and utilities system design in biotechnology industry
3. Ability to develop and propose the validation scheme for systems and equipments facility to meet the regulatory compliance

**KMK31503 PENINGKATAN & PROSES OPTIMASI [SCALE UP & PROCESS OPTIMIZATION]****No of Credits: 3****Course Synopsis:**

To fulfil the increasing demand of experts in the industry when it comes to scale-up and process optimization of any manufacturing processes.

**Course Outcomes:**

1. Ability to apply principles of scale up and to analyze scale up methods in related chemical/biotechnological processes.
2. Ability to demonstrate theories of optimization and to analyze optimization methods in related chemical/biotechnological processes.
3. Ability to develop a solution to chemical/biotechnological related problems using selected scale up and optimization methods.

**KMK32503 REKA BENTUK LOJI UNTUK BIOTEKNOLOGI INDUSTRI 1 [PLANT DESIGN FOR INDUSTRIAL BIOTECHNOLOGY 1]****No of Credits: 3****Course Synopsis:**

This course contains the preliminary design of biotechnology industrial process plant. It focuses on process synthesis of a typical product with material balance analysis and process equipment design. The design project is a team-based approach to provide capstone design experience emphasizing on the application of sciences, mathematics and fundamental chemical engineering knowledge acquired in earlier courses.

**Course Outcomes:**

1. Ability to analyze the research literature and key steps of a process synthesis including the sustainability and market survey analysis for industrial biotechnology process plant.
2. Ability to propose engineering equipment design with appropriate engineering codes.
3. Ability to demonstrate a process simulation of the propose plant using appropriate process simulator tools
4. Ability to organize teamwork and develop communication skill.
5. Ability to monitor project management, and appraise the needs and life-long learning in industrial biotechnology project design.

**KMK32603 TEKNOLOGI BIOFARMASEUTIKAL [BIOPHARMACEUTICAL TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course is designed to provide the students with the knowledge in the field of biopharmaceutical technology, its importance, the corresponding techniques and technologies in drug development, regulatory aspects for biopharmaceutical production and registration as well as manufacturing process and applications of important biopharmaceuticals in the current world.

**Course Outcomes:**

1. Ability to apply knowledge and differentiate biopharmaceutical regulatory compliance and illustrate the biopharmaceutical delivery.
2. Ability to apply knowledge, demonstrate and evaluate different biopharmaceutical formulation and production.
3. Ability to apply appropriate techniques in processing, manufacturing, and evaluating biopharmaceuticals in a group project.

**KMK32703 TEKNOLOGI PENGESTRAKAN SEBATHIAN BIOAKTIF [BIOACTIVE COMPOUNDS EXTRACTION TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

The course discusses various sources of natural bioactive compounds as well as their extraction methods. The methods are steam distillation, distillation, low-pressure solvent extraction (solid to liquid), high-pressure extraction, liquid to liquid extraction and adsorption besides its applications in related industries. Several analyses to obtain high-quality bioactive extracts and purified compounds are also discussed.

**Course Outcomes:**

1. Ability to examine variability of bioactive compounds.
2. Ability to suggest the extraction method for related problem
3. Ability to evaluate various analyses to obtain high quality and purified compounds.

**KMK32803 TEKNOLOGI HIJAU LESTARI [SUSTAINABLE GREEN TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

The course provides students with various aspects of green technology and its application of products, equipment, and systems to conserve the natural resources and environment, as well as to minimize or mitigate the negative impacts on the environment. This course includes renewable energy, energy efficiency, waste management, remediation, and pollution control. Green technology should meet the needs of society in ways that can continue indefinitely into the future without damaging or depleting natural resources. As the demand for global energy increases, alternative energy sources are needed to address the growing interest in how energy is produced, provided, and transported in sustainable ways. At the same time, a focus also lies on bioenergy technologies to convert waste biomass into biofuels, which also covers green solutions in the area of the biotechnology industry.

**Course Outcomes:**

1. Ability to apply knowledge of the concepts and principles of different types of green technologies and understand their role as alternative technologies.
2. Ability to analyze and explain the various aspects of green technologies and their application of products, equipment, and systems to conserve natural resources and the environment.
3. Ability to analyze the issues about green technologies development and explain their potential impacts as green steps towards a sustainable environment.



**KMK42003 ISU & KOMERSIALISASI DALAM BIOTEKNOLOGI [ISSUES & COMMERCIALIZATION IN BIOTECHNOLOGY]****No of Credits: 3****Course Synopsis:**

The course covers the current status in biotechnology research and commercialization aspects of biotechnology products. There is also information on patenting, intellectual property and licensing of biotechnology products as well as developing business plans to meet the market needs. There also guidelines, agreements and policy in commercialization networking as well as the preparation of pre-commercialization phase and technopreneurial skills that should be possessed by the students.

**Course Outcomes:**

1. Ability to assess the commercial aspects of biotechnology products
2. Ability to select a potential product and prepare a business plan for that particular product
3. Ability to appraise technopreneurial skills and cultures for success technopreneur<sup>TM</sup>'s business.

**KMK42103 TEKNOLOGI PENGHASILAN TENAGA BIO [BIOENERGY PRODUCTION TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course is designed to provide the students with the principles of bioenergy production technology, its importance, and the current advancement. The students will be exposed to the potential of different bioenergy sources that have been developed in recent years as future sustainable and renewable energy sources, their limitations, and the required technologies for commercialization. Other issues related to bioenergy production including economics and environmental policy will also be discussed in this course to enhance students' awareness.

**Course Outcomes:**

1. Ability to analyse the advantages of renewable and sustainable bioenergy.
2. Ability to appraise different bioenergy technologies, the process, principles and application of each technology
3. Ability to evaluate feasibility of new bioenergy technologies and relate the impact of bioenergy technology on economics and environmental policy

**KMK41403 TEKNOLOGI PEMROSESAN MAKANAN [FOOD PROCESSING TECHNOLOGY]****No of Credits: 3****Course Synopsis:**

This course covers multidisciplinary fields of food processing technology and related industries. Topics covered include food science, sensory and nutritional properties of foods, food spoilage, food production systems and preservation processes including thermal and non-thermal processes, chilling and freezing, freeze-drying, irradiation, extrusion, packaging, texturization, mechanical separation and genetically modified foods.

**Course Outcomes:**

1. Ability to apply the knowledge of the basic concepts and principles of food processing technology
2. Ability to evaluate the effects of processing on sensory and explain the nutritional properties of food.
3. Ability to evaluate the problems involved in food production.

**KMK45203 REKA BENTUK LOJI UNTUK BIOTEKNOLOGI INDUSTRI 2 [PLANT DESIGN FOR INDUSTRIAL BIOTECHNOLOGY 2]****No of Credits: 3****Course Synopsis:**

This course represents a capstone in the chemical engineering fundamental subjects. In this course students will have the opportunity to apply the basic concepts learned in previous courses to the design and analysis of an industrial process plant.

**Course Outcomes:**

1. Ability to develop piping and instrumentation diagrams (P&ID) and control system for industrial biotechnology process plant by demonstrating an appropriate software tool.
2. Ability to evaluate costing and profitability analysis of industrial biotechnology process plant
3. Ability to propose a sustainable waste management system for environment needs and society safety.
4. Ability to organize teamwork and develop communication skill
5. Ability to monitor project management and appraise the needs and life-long learning in industrial biotechnology project design.

# FACULTY OF CIVIL ENGINEERING & TECHNOLOGY (FKTA)

## Programmes Offered:

1. Bachelor of Civil Engineering with Honours
2. Bachelor of Environmental Engineering with Honours
3. Bachelor of Civil Engineering Technology (Construction) with Honours
4. Bachelor of Technology in Building Construction with Honours

## Address:

FACULTY OF CIVIL ENGINEERING & TECHNOLOGY

Universiti Malaysia Perlis

Kompleks Pusat Pengajian Jejawi 3

Kawasan Perindustrian Jejawi, 02600 Arau Perlis

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Phone: +604-979 8629

## **UR6526001** **Bachelor of Civil Engineering with Honours**

### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

#### **PEO 1**

Graduates who have demonstrated career advancement in the field of Civil Engineering or related engineering field.

#### **PEO 2**

Graduates who are involved in a professional body or society.

#### **PEO 3**

Graduates who pursue life-long learning.

## PROGRAMME OUTCOMES (PO)

### P01

**Engineering Knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to the solution of complex engineering problems.

### P02

**Problem Analysis:** Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK1 to WK4)

### P03

**Design/ development of solutions:** Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (WK5)

### P04

**Investigation:** Conduct investigations of complex problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### P05

**Modern Tool Usage:** Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations. (WK6)

### P06

**The Engineer and Society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (WK7)

### P07

**Environment and Sustainability:** Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (WK7)

### P08

**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)

### P09

**Individual and Team work:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

### P010

**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

### P012

**Lifelong learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**CURRICULUM STRUCTURE**  
**UR6526001 BACHELOR OF CIVIL ENGINEERING WITH HONOURS INTAKE 2024/2025**

| YEAR                                                                    | FIRST                                          |                                                                    | SECOND                                        |                                                       | THIRD                                                     |                                                             |                                 | FOURTH                                                        |                                                          |
|-------------------------------------------------------------------------|------------------------------------------------|--------------------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------------------|---------------------------------|---------------------------------------------------------------|----------------------------------------------------------|
| SEMESTER                                                                | 1                                              | 2                                                                  | 3                                             | 4                                                     | 5                                                         | 6                                                           | BREAK                           | 7                                                             | 8                                                        |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES<br/>(107 CREDITS)</b> | AMJ11004<br>Statics & Dynamics <sup>a</sup>    | AMJ10903<br>Computer<br>Programming                                | AMJ20103<br>Structural<br>Theory <sup>c</sup> | AMJ20504<br>Soil Mechanics <sup>e</sup>               | AMJ30104<br>Geotechnical<br>Engineering <sup>f</sup>      | AMJ30604<br>Highway &<br>Transportation<br>Engineering      | AMJ39905<br>Industrial Training | AMJ40103<br>Industrialized Building<br>System                 | AMJ40004<br>Final Year Project II <sup>j</sup>           |
|                                                                         | AMJ10202<br>Engineering Geology                | AMJ10404<br>Strength of Materials <sup>b</sup>                     | AMJ20204<br>Fluid Mechanics<br>Engineering    | AMJ20603<br>Water Supply<br>Engineering               | AMJ30203<br>Reinforced<br>Concrete<br>Structures Design I | AMJ30703<br>Steel Structure<br>Design                       |                                 | AMJ40002<br>Final Year Project I <sup>i</sup>                 | AMJ4XX03<br>Elective II                                  |
|                                                                         | AMJ10304<br>Geomatic Engineering               | AMJ10503<br>Civil Engineering Skills                               | AMJ20303<br>Building Material<br>Engineering  | AMJ20703<br>Structural Analysis I <sup>d</sup>        | AMJ30303<br>Structural Analysis II                        | AMJ30804<br>Water & Wastewater<br>Engineering               |                                 | AMJ4XX03<br>Elective I                                        | AMJ48103<br>Integrated Design<br>Project II <sup>h</sup> |
|                                                                         |                                                |                                                                    | AMJ20403<br>Engineering<br>Drawing            | AMJ20803<br>Hydraulics                                | AMJ30403<br>Construction<br>Management                    | AMJ30903<br>Reinforced Concrete<br>Structures Design II     |                                 | AMJ47103<br>Integrated Design<br>Project I <sup>g</sup>       | AMJ40302<br>Professional Engineers                       |
|                                                                         |                                                |                                                                    |                                               |                                                       | AMJ30503<br>Hydrology & Water<br>Resources<br>Engineering |                                                             |                                 | AMJ40203<br>Construction<br>Contract, Estimating &<br>Finance |                                                          |
| <b>COMMON CORE<br/>COURSES<br/>(12 CREDITS)</b>                         | QMQ10103<br>Engineering<br>Mathematics I       | QMQ10203<br>Engineering<br>Mathematics II                          | QMQ20303<br>Engineering<br>Mathematics III    | QMQ27103<br>Engineering<br>Statistics                 |                                                           |                                                             |                                 |                                                               |                                                          |
| <b>UNIVERSITY<br/>REQUIREMENT<br/>COURSES<br/>(16 CREDITS)</b>          | SMZXXX01<br>Co-Curriculum I                    | SMZ2XX01<br>Co-Curriculum II                                       | SMU22402<br>Engineering<br>Entrepreneurship   | SMB31202<br>English for<br>Technical<br>Communication |                                                           | SMU12102<br>Integrity and Anti -<br>Corruption <sup>l</sup> |                                 | SMU13002<br>Philosophy and<br>Current Issues                  | SMU13102<br>Appreciation of Ethic<br>and Civilization    |
|                                                                         |                                                | SMB41002<br>University Malay<br>Language <sup>[3]</sup>            |                                               |                                                       |                                                           |                                                             |                                 |                                                               |                                                          |
|                                                                         |                                                | SMB20102<br>English for General<br>Communication<br><sup>[2]</sup> |                                               |                                                       |                                                           |                                                             |                                 |                                                               |                                                          |
| <b>TOTAL CREDITS<br/>(135 CREDITS)</b>                                  | <b>14</b>                                      | <b>18</b>                                                          | <b>18</b>                                     | <b>18</b>                                             | <b>16</b>                                                 | <b>16</b>                                                   | <b>5</b>                        | <b>16</b>                                                     | <b>14</b>                                                |
| <b>AUDIT COURSES</b>                                                    | SMB10102 Preparatory<br>English <sup>[1]</sup> |                                                                    |                                               |                                                       |                                                           |                                                             |                                 |                                                               |                                                          |

Elective 1 : AMJ40603 Advanced Reinforced Concrete Structures Design, AMJ40703 Foundation Engineering, AMJ40803 Urban Stormwater Management, AMJ40903 Building Maintenance Information System, AMJ41703 Advanced Wastewater Engineering

Elective 2 : AMJ41003 Advanced Structural Analysis, AMJ41103 Advanced Steel Design, AMJ41203 Construction Contract and Law,

AMJ41303 Building Information Modelling, AMJ41403 Civil/Environmental Engineers for Society

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

COURSE <sup>a</sup> IS A PRE-REQUISITE TO COURSE <sup>b</sup>  
 COURSE <sup>c</sup> IS A PRE-REQUISITE TO COURSE <sup>d</sup>  
 COURSE <sup>e</sup> IS A PRE-REQUISITE TO COURSE <sup>f</sup>  
 COURSE <sup>g</sup> IS A PRE-REQUISITE TO COURSE <sup>h</sup>  
 COURSE <sup>i</sup> IS A PRE-REQUISITE TO COURSE <sup>j</sup>

## **UR6526002**

### **Bachelor of Environmental Engineering with Honours**

#### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

##### **PEO 1**

Graduates who have developed career advancement in the field of Environmental Engineering or related engineering field.

##### **PEO 2**

Graduates who are involved in a professional body or society.

##### **PEO 3**

Graduates who pursue lifelong learning



## PROGRAMME OUTCOMES (PO)

### P01

**Engineering Knowledge:** Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to the solution of complex engineering problems.

### P02

**Problem Analysis:** Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences. (WK1 to WK4)

### P03

**Design/ development of solutions:** Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (WK5)

### P04

**Investigation:** Conduct investigations of complex problems using research-based knowledge (WK8) and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

### P05

**Modern Tool Usage:** Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations. (WK6)

### P06

**The Engineer and Society:** Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (WK7)

### P07

**Environment and Sustainability:** Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (WK7).

### P08

**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)

### P09

**Individual and Team work:** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

### P010

**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

### P012

**Lifelong learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



| CURRICULUM STRUCTURE<br>UR6526002 BACHELOR OF ENVIRONMENTAL ENGINEERING WITH HONOURS INTAKE 2024/2025 |                                                         |                                                                 |                                                              |                                                       |                                                         |                                                               |                                 |                                                                                         |                                                                                          |
|-------------------------------------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| YEAR                                                                                                  | FIRST                                                   |                                                                 | SECOND                                                       |                                                       | THIRD                                                   |                                                               |                                 | FOURTH                                                                                  |                                                                                          |
| SEMESTER                                                                                              | 1                                                       | 2                                                               | 3                                                            | 4                                                     | 5                                                       | 6                                                             | BREAK                           | 7                                                                                       | 8                                                                                        |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES<br/>(107 CREDITS)</b>                               | AMJ10604<br>Environmental<br>Chemistry                  | AMJ10903<br>Computer<br>Programming                             | AMJ20904<br>Fluid Mechanics<br>and Hydraulics                | AMJ21303<br>Hydrology                                 | AMJ31004<br>Mass Transfer <sup>b</sup>                  | AMJ31403<br>Noise Pollution<br>Engineering                    | AMJ39905<br>Industrial Training | AMJ4XX03<br>Elective I                                                                  | AMJ4XX03<br>Elective II                                                                  |
|                                                                                                       | AMJ10104<br>Mechanical and<br>Material Engineering      | AMJ10704<br>Basic Ecology                                       | AMJ21003<br>Thermodynamics <sup>a</sup>                      | AMJ21403<br>Environmental Law,<br>Health and Safety   | AMJ31103<br>Water Supply<br>Engineering                 | AMJ31503<br>Public Health and<br>Occupational<br>Hygiene      |                                 | AMJ40403<br>Engineering Project<br>Management                                           | AMJ48203 <sup>f</sup><br>Integrated<br>Environmental<br>Engineering Design<br>Project II |
|                                                                                                       |                                                         | AMJ10503<br>Civil Engineering Skills                            | AMJ21103<br>Fundamental of<br>Environmental<br>Engineering   | AMJ21503<br>Geo environmental<br>Engineering          | AMJ31203<br>Solid and<br>Hazardous Waste<br>Engineering | AMJ31603<br>Environmental<br>Management System                |                                 | AMJ40002 <sup>g</sup><br>Final Year<br>Project I                                        | AMJ40004 <sup>h</sup><br>Final Year<br>Project II                                        |
|                                                                                                       |                                                         | AMJ10803<br>Fundamental of<br>Chemical Processes                | AMJ21203<br>Environmental<br>Engineering Skills <sup>c</sup> | AMJ21603<br>Environmental<br>Transport Processes      | AMJ31303<br>Environmental<br>Impact Assessment          | AMJ31704<br>Wastewater<br>Engineering                         |                                 | AMJ40503<br>Environmental<br>Remediation                                                | AMJ40302<br>Professional Engineers                                                       |
|                                                                                                       |                                                         |                                                                 |                                                              |                                                       |                                                         | AMJ31804<br>Air Pollution Control<br>Engineering              |                                 | AMJ47203 <sup>e</sup><br>Integrated<br>Environmental<br>Engineering Design<br>Project I |                                                                                          |
| <b>COMMON CORE<br/>COURSES<br/>(12 CREDITS)</b>                                                       | QMQ10103<br>Engineering<br>Mathematics I                | QMQ10203<br>Engineering<br>Mathematics II                       | QMQ20303<br>Engineering<br>Mathematics III                   | QMQ27103<br>Engineering<br>Statistics                 |                                                         |                                                               |                                 |                                                                                         |                                                                                          |
| <b>UNIVERSITY<br/>REQUIREMENT<br/>COURSES<br/>(16 CREDITS)</b>                                        | SMZXX01<br>Co-Curriculum I                              | SMZ2XX01<br>Co-Curriculum II                                    |                                                              | SMB31202<br>English for<br>Technical<br>Communication |                                                         | SMU12102<br>Integrity and Anti -<br>Corruption <sup>[4]</sup> |                                 | SMU13002<br>Philosophy and<br>Current Issues                                            | SMU13102<br>Appreciation of Ethic<br>and Civilization                                    |
|                                                                                                       | SMB41002<br>University Malay<br>Language <sup>[3]</sup> | SMB20102<br>English for General<br>Communication <sup>[2]</sup> |                                                              | SMU22402<br>Engineering<br>Entrepreneurship           |                                                         |                                                               |                                 |                                                                                         |                                                                                          |
| <b>TOTAL CREDITS<br/>(135 CREDITS)</b>                                                                | <b>14</b>                                               | <b>17</b>                                                       | <b>16</b>                                                    | <b>19</b>                                             | <b>15</b>                                               | <b>19</b>                                                     | <b>5</b>                        | <b>16</b>                                                                               | <b>14</b>                                                                                |
| <b>AUDIT COURSES</b>                                                                                  | SMB10102<br>Preparatory English <sup>[1]</sup>          |                                                                 |                                                              |                                                       |                                                         |                                                               |                                 |                                                                                         |                                                                                          |

**ELECTIVE COURSES:**

Elective 1 : AMJ41503 Remote Sensing<sup>d</sup>, AMJ41603 Environmental Process Control & Instrumentation, AMJ41703 Advanced Wastewater Engineering,

AMJ40803 Urban Stormwater Management

Elective 2 : AMJ41803 Environmental Informatics, AMJ41903 Built Environment, AMJ42003 Sustainable Energy, AMJ42103 Environmental Risk Assessment

AMJ41403 Engineer for Society

COURSE <sup>a</sup> IS A PRE-REQUISITE TO COURSE <sup>b</sup>  
COURSE <sup>c</sup> IS A PRE-REQUISITE TO COURSE <sup>d</sup>  
COURSE <sup>e</sup> IS A PRE-REQUISITE TO COURSE <sup>f</sup>  
COURSE <sup>g</sup> IS A PRE-REQUISITE TO COURSE <sup>h</sup>

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

**LIST OF COURSES:**

| COURSE CODE | COURSE NAME                                                                         |
|-------------|-------------------------------------------------------------------------------------|
| AMJ11004    | Statik & Dinamik [Statics and Dynamics]                                             |
| AMJ10202    | Geologi Kejuruteraan [Engineering Geology]                                          |
| AMJ10304    | Kejuruteraan Geomatik [Geomatic Engineering]                                        |
| AMJ10404    | Kekuatan Bahan [Strength of Materials]                                              |
| AMJ10503    | Kemahiran Kejuruteraan Awam [Civil Engineering Skills]                              |
| AMJ10903    | Pengaturcaraan Komputer [Computer Programming]                                      |
| AMJ20103    | Teori Struktur [Structural Theory]                                                  |
| AMJ20204    | Kejuruteraan Mekanik Bendalir [Fluid Mechanics Engineering]                         |
| AMJ20303    | Kejuruteraan Bahan Bangunan [Building Materials Engineering]                        |
| AMJ20403    | Lukisan Kejuruteraan [Engineering Drawing]                                          |
| AMJ20504    | Mekanik Tanah [Soil Mechanics]                                                      |
| AMJ20603    | Kejuruteraan Bekalan Air [Water Supply Engineering]                                 |
| AMJ20703    | Analisis Struktur I [Structural Analysis I]                                         |
| AMJ20803    | Hidraulik [Hydraulics]                                                              |
| AMJ30104    | Kejuruteraan Geoteknik [Geotechnical Engineering]                                   |
| AMJ30203    | Rekabentuk Struktur Konkrit Bertetulang I [Reinforced Concrete Structures Design I] |
| AMJ30303    | Analisis Struktur II [Structural Analysis II]                                       |
| AMJ30403    | Pengurusan Pembinaan [Construction Management]                                      |

| COURSE CODE | COURSE NAME                                                                                       |
|-------------|---------------------------------------------------------------------------------------------------|
| AMJ30503    | Hidrologi dan Kejuruteraan Sumber Air [Hydrology and Water Resources Engineering]                 |
| AMJ30604    | Kejuruteraan Lebuhraya dan Pengangkutan [Highway & Transportation Engineering]                    |
| AMJ30703    | Rekabentuk Struktur Keluli [Steel Structure Design]                                               |
| AMJ30804    | Kejuruteraan Air Sisa [Wastewater Engineering]                                                    |
| AMJ30903    | Rekabentuk Struktur Konkrit Bertetulang II [Reinforced Concrete Structure Design II]              |
| AMJ39905    | Latihan Industri [Industrial Training]                                                            |
| AMJ40002    | Projek Tahun Akhir I [Final Year Project I]                                                       |
| AMJ40004    | Projek Tahun Akhir II [Final Year Project II]                                                     |
| AMJ40103    | Sistem Bangunan Berindustri [Industrialised Building System]                                      |
| AMJ40203    | Kontrak, Taksiran dan Kewangan Pembinaan [Construction Contract, Estimating & Finance]            |
| AMJ40302    | Jurutera Profesional [Professional Engineers]                                                     |
| AMJ40603    | Rekabentuk Struktur Konkrit Bertetulang Lanjutan [Advanced Reinforced Concrete Structures Design] |
| AMJ40703    | Kejuruteraan Asas [Foundation Engineering]                                                        |
| AMJ40803    | Pengurusan Air Ribut Bandar [Urban Storm Water Management]                                        |
| AMJ40903    | Sistem Maklumat Penyelenggaraan Bangunan [Building Maintenance Information System]                |
| AMJ41003    | Analisis Struktur Lanjutan [Advanced Structural Analysis]                                         |
| AMJ41103    | Rekabentuk Keluli Lanjutan [Advanced Steel Design]                                                |
| AMJ41203    | Kontrak & Perundangan Pembinaan [Construction Contract & Law]                                     |

| COURSE CODE | COURSE NAME                                                                               |
|-------------|-------------------------------------------------------------------------------------------|
| AMJ41303    | Pemodelan Maklumat Bangunan [Building Information Modelling]                              |
| AMJ41403    | Jurutera Awam/Alam Sekitar Untuk Masyarakat [Civil / Environmental Engineers For Society] |
| AMJ41703    | Kejuruteraan Air Sisa Termaju [Advanced Wastewater Engineering]                           |
| AMJ47103    | Reka Bentuk Projek Berintegrasi I [Integrated Design Project I]                           |
| AMJ48103    | Reka Bentuk Projek Berintegrasi II [Integrated Design Project II]                         |
| AMJ10104    | Mekanik dan Kejuruteraan Bahan [Mechanics and Material Engineering]                       |
| AMJ10604    | Kimia Sekitaran [Environmental Chemistry]                                                 |
| AMJ10704    | Ekologi Asas [Basic Ecology]                                                              |
| AMJ10803    | Asas Proses Kimia [Fundamental of Chemical Processes]                                     |
| AMJ20904    | Mekanik Bendalir dan Hidraulik [Fluid Mechanics and Hydraulic]                            |
| AMJ21003    | Termodinamik [Thermodynamics]                                                             |
| AMJ21103    | Asas Kejuruteraan Alam Sekitar [Fundamental Of Environmental Engineering]                 |
| AMJ21203    | Kemahiran Kejuruteraan Alam Sekitar [Environmental Engineering Skill]                     |
| AMJ21303    | Hidrologi [Hydrology]                                                                     |
| AMJ21403    | Perundangan Kesihatan Dan Keselamatan Persekitaran [Environmental Law, Health and Safety] |
| AMJ21503    | Kejuruteraan Geopersekitaran [Geoenvironmental Engineering]                               |
| AMJ21603    | Proses Pengangkutan Alam Sekitar [Environmental Transport Process]                        |
| AMJ31004    | Pemindahan Jisim [Mass Transfer]                                                          |

| COURSE CODE | COURSE NAME                                                                                                           |
|-------------|-----------------------------------------------------------------------------------------------------------------------|
| AMJ31103    | Kejuruteraan Bekalan Air [Water Supply Engineering]                                                                   |
| AMJ31203    | Kejuruteraan Sisa Pepejal dan Sisa Berbahaya [Solid and Hazardous Waste Engineering]                                  |
| AMJ31303    | Penilaian Kesan Alam Sekitar [Environmental Impact Assessment]                                                        |
| AMJ31403    | Kejuruteraan Pencemaran Hingar [Noise Pollution Engineering]                                                          |
| AMJ31503    | Kesihatan Awam Dan Higin Pekerjaan [Public Health And Occupational Hygiene]                                           |
| AMJ31603    | Sistem Pengurusan Alam Sekitar [Environmental Management System]                                                      |
| AMJ31704    | Kejuruteraan Air Sisa [Wastewater Engineering]                                                                        |
| AMJ31804    | Kejuruteraan Pencemaran Udara [Air Pollution Control Engineering]                                                     |
| AMJ40403    | Pengurusan Projek Kejuruteraan [Engineering Project Management]                                                       |
| AMJ40503    | Remediasi Sekitaran [Environmental Remediation]                                                                       |
| AMJ41503    | Penderiaan Jauh [Remote Sensing]                                                                                      |
| AMJ41603    | Kawalan Proses Sekitaran dan Instrumentasi [Environmental Process Control and Instrumentation]                        |
| AMJ41803    | Informatik Sekitaran [Environmental Informatics]                                                                      |
| AMJ41903    | Alam Bina [Built Environment]                                                                                         |
| AMJ42003    | Tenaga Lestari [Sustainable Energy]                                                                                   |
| AMJ42103    | Penilaian Risiko Alam Sekeliling [Environmental Risk Assessment]                                                      |
| AMJ47203    | Reka Bentuk Projek Kejuruteraan Alam Sekitar Berintegrasi I [Integrated Environmental Engineering Design Project I]   |
| AMJ48203    | Reka Bentuk Projek Kejuruteraan Alam Sekitar Berintegrasi II [Integrated Environmental Engineering Design Project II] |

**AMJ11004 STATIK & DINAMIK [STATICS & DYNAMICS]****No of Credits: 4****Course Synopsis:**

This course introduces engineering students to the analysis of basic static and dynamic objects and systems encountered in engineering practice. It introduces force systems, simple structural elements and principles of work and energy. Scope of the study includes center of gravity, moment of inertia of a body and impulse and momentum of a rigid body. At the end of the course, students should be able to apply theory and practical to solve problems related to the scope of static and dynamic.

**Course Outcomes:**

1. Ability to apply the knowledge of statics and dynamics.
2. Ability to analyze statics and dynamics engineering problems.
3. Ability to assess the principles of statics and dynamics engineering through laboratory.

**AMJ10202 GEOLOGI KEJURUTERAAN [ENGINEERING GEOLOGY]****No of Credits: 2****Course Synopsis:**

This course introduces the basic knowledge of the geology engineering. The anatomy of the earth, the plate movement that caused the volcanoes and earthquakes, rock classification, weathering process, geological structure and strength, stresses and stabilization of rock mass were discussed in this course. At the end of the course, the students are expected to be able to understand the relationship between the behavior of earth and the geological process.

**Course Outcomes:**

1. Ability to analyze the knowledge of engineering geology.
2. Ability to evaluate the potential geologic hazards and the strength, stresses and stabilization of rock mass.

**AMJ10304 KEJURUTERAAN GEOMATIK [GEOMATIC ENGINEERING]****No of Credits: 4****Course Synopsis:**

In this course, student will be introduce basic surveying involved in engineering. Starting from linear measurement on plane. Student will do levelling after they

learn two different data logging. With their knowledge in tapping and levelling, they have to do traversing and tachymetry. Lastly, student will be test in real work in geomatic camp.

**Course Outcomes:**

1. Ability to explain concept of geomatic engineering.
2. Ability to analyse data for surveying in geomatic engineering.
3. Ability to determine technique and procedure through integration of surveying data under some supervision.

**AMJ10404 KEKUATAN BAHAN [STRENGTH OF MATERIALS]****No of Credits: 4****Course Synopsis:**

This course focus on the strengths of the materials which begins with the concept of stress and strain, axial load, torsion, and bending. The stress results from combined loadings also will be covered, as well as the concepts for transforming multiaxial states of stress and in a similar manner, the methods for strain transformation. Besides that, the buckling of the column also will be exposed to the student.

**Course Outcomes:**

1. Ability to apply the fundamental knowledge and theory of structural mechanics of deformable solids.
2. Ability to analyse engineering problems in strength of materials.
3. Ability to apply stress caused by combined loadings and buckling of column.
4. Ability to relate the principles of strength of materials through laboratory experiments.



**AMJ10503 KEMAHIRAN KEJURUTERAAN AWAM [CIVIL ENGINEERING SKILLS]****No of Credits: 3****Course Synopsis:**

This course is 100% coursework. This course contains modules which are architectural and engineering plans, a basic workshop for brickwork and reinforced concrete work, electrical wiring, aircond and lift, basic fire fighting and plumbing system, sampling and also safety and health at site. This course will expose students to the basic skills that will be used in the Civil and Environmental Engineering Program. This course requires an emphasis on practical training and teamwork where students can easily understand the course content effectively.

**Course Outcomes:**

1. Ability to analyse the fundamental theories and principles for different civil engineering applications.
2. Ability to perform the basic principles and theories in civil engineering practices through practical training.
3. Ability to work effectively in a group during the civil engineering practical works.

**AMJ10903 PENGATURCARAAN KOMPUTER [COMPUTER PROGRAMMING]****No of Credits: 3****Course Synopsis:**

This course is designed to expose students to the basic programming concept using computer programming language, which is suitable for the current computer operating system. It emphasises the general idea of computer programming, including problem-solving analysis and programming concept including variables, operators, control structures, function, arrays and pointers.

**Course Outcomes:**

1. Ability to apply computer programming concepts and principles.
2. Ability to use GNU/LINUX compiler for coding, compiling, executing and debugging computer programs.
3. Ability to analyse solution for engineering related problems using computer programming techniques.

**AMJ20103 TEORI STRUKTUR [STRUCTURAL THEORY]****No of Credits: 3****Course Synopsis:**

This course provides students with a clear and thorough presentation of the theory and application of structural analysis as it applies to beams, trusses and frames. It introduces an analysis of statically determinate structures for beams, trusses, and frames. Besides that, it also introduces deflections using the geometrical method for the beams and also the virtual work method for trusses, beams and frames. Cable and arches also will be discussed at the end of this course.

**Course Outcomes:**

1. Ability to apply the knowledge of structural theory in structural engineering.
2. Ability to analyse the structure component using various methods in the structural theory.

**AMJ20204 KEJURUTERAAN MEKANIK BENDALIR [FLUID MECHANICS ENGINEERING]****No of Credits: 4****Course Synopsis:**

This course provides student knowledge in the patterns of movement of fluid particles. By the end of this subject, the students will be expected to understand the basic characteristics of fluid mechanics and fluid statics, and to analyse the hydrostatics and basic hydrodynamics in the fluid. The students will also be able to analyse the flow in the pipe: Bernoulli's equation, Darcy-Weisbach equation, Moody diagram, and energy losses in pipelines.

**Course Outcomes:**

1. Ability to apply the knowledge of fluid mechanics engineering.
2. Ability to evaluate civil engineering problems using fluid mechanics principles.
3. Ability to analyse experiments results and theories related to fluid mechanics engineering.

**AMJ20303 KEJURUTERAAN BAHAN BANGUNAN [BUILDING MATERIAL ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course introduces the students to the materials used in building construction. It covers four main engineering materials such as cementitious, metallic, organic and inorganic materials. The students also learn about compositions, properties, and modification of some of their properties with respect to environmental effects and their behaviour in service.

**Course Outcomes:**

1. Ability to compare various building materials and differentiate its influence to their properties.
2. Ability to discuss the materials used to make concrete and properties.
3. Ability to suggest new applications and/or new construction material for sustainable development.
4. Ability to propose the experiment associated with concrete and/or other building materials for building construction.

**AMJ20403 LUKISAN KEJURUTERAAN [ENGINEERING DRAWING]****No of Credits: 3****Course Synopsis:**

This course introduces student to the use of technical drawing in an effective way for communicating and integrating with engineering concepts. This course will also enlighten the student on the significant changes in the engineering and technical graphic due to the use of computer and Computer Aided Design (CAD) software. At the end of the course, student should be able to apply the skill and knowledge of engineering drawing to interpret design, using graphics method such as geometric drawing, isometric, detailed drawing and basic CAD software.

**Course Outcomes:**

1. Ability to explain the knowledge of engineering drawing and bill of quantity.
2. Ability to solve engineering problems related to bill of quantity.
3. Ability to use techniques, skills and modern engineering tools for engineering activities.
4. Ability to presents effectively on engineering activities.

**AMJ20504 MEKANIK TANAH [SOIL MECHANICS]****No of Credits: 4****Course Synopsis:**

The course introduces the students with the basic and background of the properties and behavior of soil deposits and the applications of soil mechanics theory. It includes brief introduction on geological and physical characteristics of soils. Also includes identification, classification and description of soil for engineering purposes. Application of mechanics on soil such as phase relationship, compaction, permeability and seepage, stresses and effective stresses, shear strength and consolidation are also covered.

**Course Outcomes:**

1. Ability to categories the knowledge of soil mechanics.
2. Ability to assess problems and theoretical aspects relevant to soil mechanics problems.
3. Ability to propose the experiments associated with soil classification and parameters.

**AMJ20603 KEJURUTERAAN BEKALAN AIR [WATER SUPPLY ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course focuses on water sources and usage, method on estimating water demand, water quality characteristics and legislations, water treatment processes as well as water distribution and reticulation system. Special focus will be given on the design of raw water treatment comprising pre-treatment and primary treatment. Students will also be exposed to the design criteria for water supply systems used in Malaysia as part of the course.

**Course Outcomes:**

1. Ability to elucidate water sources and quality required in water supply system.
2. Ability to calculate water consumption and water demand.
3. Ability to design water treatment unit and water distribution system.
4. Ability to construct water distribution system using modern engineering tool.

**AMJ20703 ANALISIS STRUKTUR I [STRUCTURAL ANALYSIS I]****No of Credits: 3****Course Synopsis:**

This course provides students with an understanding of influence lines for statically determinate structures and approximate analysis of statically indeterminate structures. Students also will be introduced to beam, trusses, and plane frame analysis using slope deflection and moment distribution methods.

**Course Outcomes:**

1. Ability to analyse statically determinate or indeterminate structures.
2. Ability to analyse structures using the displacement method of analysis.

**AMJ20803 HIDRAULIK [HYDRAULICS]****No of Credits: 3****Course Synopsis:**

Hydraulics builds on the fundamentals given in Fluid Mechanics Engineering. It reinforces students' understanding of the behaviour of fluids through the study of the flow of water in typical civil engineering applications. The course covers the study of uniform and non-uniform flow in open channels, steady incompressible flow in pipelines and pipe networks, dimensional analysis and similitude, and hydraulics machinery.

**Course Outcomes:**

1. Ability to apply the knowledge of hydraulics in a civil engineering field.
2. Ability to evaluate civil engineering problems using hydraulics theories and principles.
3. Ability to analyse the experimental results and theories associated with hydraulics in civil engineering.

**AMJ30104 KEJURUTERAAN GEOTEKNIK [GEOTECHNICAL ENGINEERING]****No of Credits: 4****Course Synopsis:**

This course provides further discussion and explanation related to geotechnical engineering. The topics cover in this course includes site investigation, bearing capacity and design of shallow foundation and pile foundation, lateral earth pressure and slope stability. At the end of the course, students should be able to apply the theory and practical to solve problem related to geotechnical

engineering.

**Course Outcomes:**

1. Ability to explain the basic principles and concepts of geotechnical engineering to the issues in the geotechnical engineering.
2. Ability to justify the decision on sub-structures analysis using basic theories of geotechnical engineering.
3. Ability to examine the geotechnical engineering elements according to basic theories of geotechnical engineering.
4. Ability to perform the sub-structures modelling using appropriate computer software to analyse.

**AMJ30203 REKA BENTUK STRUKTUR KONKRIT BERTETULANG I [REINFORCED CONCRETE STRUCTURE DESIGN I]****No of Credits: 3****Course Synopsis:**

This course is designed to provide the student with a understanding of the limit state design concept and analysis of sections for bending; to provide a basic understanding of standard methods of analysis and design of reinforced concrete behaviour (including an understanding of capabilities and limitations); and to ability to analyze and design reinforces concrete structural elements. Among the topics discussed are objectives and methods of design, code of practice, analysis and design of sections for moment, design for shear, checking for deflection and cracking, durability and detailing requirements. Design of simply supported, continuous beams and cantilever beam, design of one way and two way restrained and simply supported slab, design staircase and design a column. The syllabus is cover ultimate and serviceability limit state. Design resistance typical structural element and detailing.

**Course Outcomes:**

1. Ability to design reinforced concrete structures.
2. Ability to evaluate the design of reinforced concrete structures.

**AMJ30303 ANALISIS STRUKTUR II [STRUCTURAL ANALYSIS II]****No of Credits: 3****Course Synopsis:**

This course is offered to provide an understanding of the methods of structural analysis for statically indeterminate structures using force (flexibility) and stiffness (displacement) matrix approaches. Non-prismatic members are also included in the analysis. Students will be introduced to the principles of basic understanding of civil engineering to solve realistic problems using the finite element method. Structural modelling and analysis using commercial structural analysis software are emphasized.

**Course Outcomes:**

1. Ability to analyse a variety of engineering problems using principles and concepts of structural analysis.
2. Ability to analyse structural analysis problems using finite element method and basic theories of structural analysis learned.
3. Ability to use appropriate computer software to analyse structures.

**AMJ30403 PENGURUSAN PEMBINAAN [CONSTRUCTION MANAGEMENT]****No of Credits: 3****Course Synopsis:**

This course provides further discussion and explanation related to construction management. The topics cover in this course includes the introduction to construction management, project initiation, construction estimation and costing, project planning and scheduling, project monitoring and control, handling over activities, project close-up and resources consideration. At the end of the course, students should be able to apply the knowledge, concept related to construction management.

**Course Outcomes:**

1. Ability to describe general construction management principles.
2. Ability to evaluate the construction management planning.
3. Ability to demonstrate engineering management principles and economic decision-making in project monitoring and handling over.
4. Ability to communicate effectively regarding complex construction management process.

**AMJ30503 HIDROLOGI DAN KEJURUTERAAN SUMBER AIR [HYDROLOGY AND WATER RESOURCES ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course is designed to expose students to the engineering principles involved in analysing and managing the quantity of water in natural and developed systems. This course consists of the hydrological cycle, water resources management and planning, precipitation, infiltration, flood routing, surface water, ground water and storm water management. The students also will be exposed to the Urban Storm Water Management Manual for Malaysia (MSMA).

**Course Outcomes:**

1. Ability to demonstrate the scenario of hydrology and water resources engineering.
2. Ability to assess problems and theoretical aspects relevant to hydrology and water resources engineering.
3. Ability to design basic stormwater management using prescribed manual.

**AMJ30604 KEJURUTERAAN LEBUHRAYA DAN PENGANGKUTAN [HIGHWAY AND TRANSPORTATION ENGINEERING]****No of Credits: 4****Course Synopsis:**

This course intends to give students fair knowledge of transportation engineering, which includes traffic and highway engineering. The traffic part will cover the topics of road user characteristics, traffic operation, transportation planning, location, geometrics, and drainage. The highway part covers the pavement material, the design of flexible and rigid pavement, and pavement maintenance.

**Course Outcomes:**

1. Ability to apply the fundamental knowledge of traffic and highway engineering.
2. Ability to analyse the traffic and highway engineering process and engineering problems.
3. Ability to design the geometric highway facilities, pavement mix design, flexible pavement, and rigid pavement.
4. Ability to evaluate the experimental results based on fundamental principles of traffic flow and flexible pavement.

**AMJ30703 REKA BENTUK STRUKTUR KELULI [STEEL STRUCTURE DESIGN]****No of Credits: 3****Course Synopsis:**

This course provides a basic understanding of behavior and design of steel members, connections and structures. At the end of this unit, students should be familiar with the behavior of steel structures; in particular the various forms of buckling and failure, particularly those associated with tension, bending, shear, compression, combined actions and connections; have a working knowledge of Eurocode, and be competent in designing a simple structure to Eurocode. The syllabus comprises the behavior of steel members and structures - properties of cross-sections, local buckling, elastic beams, plastic beams, tension members, compression members, effective lengths and elastic in-plane frame buckling, local lateral buckling of beams, in-plane bending of beam columns, lateral buckling of beam-columns, biaxial bending of beam-columns, bolted and welded connections.

**Course Outcomes:**

1. Ability to analyse complex engineering problem axially loaded member, flexural members and joints for steel structures.
2. Ability to design axially loaded member, flexural members and joints for steel structures.

**AMJ30804 KEJURUTERAAN AIR SISA [WASTEWATER ENGINEERING]****No of Credits: 4****Course Synopsis:**

This course is designed to expose students to the characteristics of water and wastewater. Student also will be explained about urban water cycle that involved water and wastewater treatment particularly the engineering principles involved in designing the component and treatment system of sewage specifically domestic sewage. Design will involve from the starting point of sewerage collection at service area until the discharge point at wastewater treatment plant. Preliminary, physical and biological treatment will be teaching in this course. The students also will be exposed to the Malaysian Sewerage Industry Guidelines (MSIG) Volume III, IV & V. published by Suruhanjaya Perkhidmatan Air Negara (SPAN).

**Course Outcomes:**

1. Ability to demonstrate the scenario of wastewater engineering.
2. Ability to assess problems and theoretical aspects associated with wastewater for physical and biological parameter.

3. Ability to design component and system of sewage treatment.
4. Ability to examine the experiment associated with wastewater for physical and biological parameter.

**AMJ30903 REKA BENTUK STRUKTUR KONKRIT BERTETULANG II [REINFORCED CONCRETE STRUCTURE DESIGN II]****No of Credits: 3****Course Synopsis:**

This course is designed to provide the student with ability to analyze and design advanced reinforced concrete structural elements. Among the topics discussed are objectives and methods of design, code of practice, analysis and design of sections for moment, checking for shear, deflection and cracking, durability and detailing requirements. Calculation for design includes retaining wall, foundation, reinforced concrete frame and prestressed concrete.

**Course Outcomes:**

1. Ability to design reinforced concrete structures.
2. Ability to check shear and cracking.

**AMJ39905 LATIHAN INDUSTRI [INDUSTRIAL TRAINING]****No of Credits: 5****Course Synopsis:**

The course will expose students to technical and practical application as well as other aspect such as the operation of the company, work culture, safety procedure, project management, communication, technical skills and presentation. Students are required to submit their logbook and written report at the end of the industrial training.

**Course Outcomes:**

1. Ability to demonstrate technical knowledge and practical skills.
2. Ability to adapt to health, safety, legal and cultural requirements in working environments.
3. Ability to perform tasks with professional ethics and responsibilities
4. Ability to work independently, interact with co-workers and work in a team.
5. Ability to report and communicate verbally and in written form.

**AMJ40002 PROJEK TAHUN AKHIR I [FINAL YEAR PROJECT I]****No of Credits: 2****Course Synopsis:**

The Final Year Project (FYP) is a major component of the undergraduate degree course in Civil and Environmental Engineering Programs. The main objective is to develop problem solving, mathematical analysis, experimental tests, synthesis and evaluation skills, computer simulation, hard and/or software development in the field of Civil and Environmental Engineering. This is an individual research project in connection with a special engineering problems and under the academic staff guidance. While working on the project, the student would be able to develop personal and soft skills such as instance time management, self-confidence and interaction. The evaluation of the FYP indirectly provides the student with training in technical and communication skills.

**Course Outcomes:**

1. Ability to assess theoretical and practical knowledge in addressing complex engineering research problem.
2. Ability to evaluate complex research problem using knowledge of mathematics, natural sciences and engineering sciences.
3. Ability to propose solution for complex research problem using research-based knowledge and research methods.
4. Ability to value ethics and professional responsibility in conducting research activities.
5. Ability to practice effective communication skills in dissemination of research work with engineering community.
6. Ability to construct research activities based on engagement with relevant information from various sources for application in independent and continuous learning.

**AMJ40004 PROJEK TAHUN AKHIR II [FINAL YEAR PROJECT II]****No of Credits: 4****Course Synopsis:**

The course is an extension of AMJ40002 Final Year Project I course. The goal of this course is to prepare students to conduct research and present the findings verbally and in writing. The student is expected to be able to conduct research activities independently with supervision from their supervisor. By the end of the course, students should be able to conduct research in a methodical manner, gather project-related data, solve and analyse data to achieve results, write a solid project report, and present project findings.

**Course Outcomes:**

1. Ability to assess theoretical and practical knowledge in addressing complex engineering research problem.
2. Ability to evaluate complex research problem using knowledge of mathematics, natural sciences and engineering sciences.
3. Ability to synthesise information for complex research problem using research-based knowledge and research methods.
4. Ability to value ethics and professional responsibility in conducting research activities.
5. Ability to practice effective communication skills in dissemination of research work with engineering community.
6. Ability to develop research activities based on engagement with relevant information from various sources for application in independent and continuous learning.

**AMJ40103 SISTEM BANGUNAN BERINDUSTRI [INDUSTRIALISED BUILDING SYSTEM]****No of Credits: 3****Course Synopsis:**

This course is designed to give exposure to the students on the Industrialised Building System (IBS) concepts, which include the advantages and disadvantages of using IBS in construction, IBS roadmap and the applications of IBS. It also highlighted the principle of score calculation and submission, the principle of modular coordination in IBS and concepts of buildability.

**Course Outcomes:**

1. Ability to justify the concept of IBS modern construction technology.
2. Ability to suggest the principle of score calculation, submissions, and concept of modular coordination in IBS.
3. Ability to design a building using the concept of IBS according to Malaysian Standard.
4. Ability to demonstrate problem-solving in design the building using IBS.



**AMJ40203 KONTRAK, TAKSIRAN DAN KEWANGAN PEMBINAAN [CONSTRUCTION CONTRACT, ESTIMATING AND FINANCE]****No of Credits: 3****Course Synopsis:**

This course consists of three parts. The first part exposes student to the introduction to construction contract; preparation of tender document and strategy in tendering. The second part covers introduction to cost estimating based on the Standard Method of Measurement (SMM) for building works and Civil Engineering Standard Method of Measurement (CESMM), method of cost estimating and quantity measurement and build-up rate calculation. Finally, the third part covers economic and financial, including introduction to engineering economics, foundation of decision making in engineering economics and comparing alternative proposals; business financing and financial performance measurement.

**Course Outcomes:**

1. Ability to apply the basic knowledge regarding construction tender and contract.
2. Ability to evaluate the quantity and cost of building elements and civil engineering works.
3. Ability to evaluate critical reasoning and make informed judgment in addressing economic and financial issues in construction practice.

**AMJ40302 JURUTERA PROFESIONAL [PROFESSIONAL ENGINEERS]****No of Credits: 2****Course Synopsis:**

This course aims to explain the main concepts in engineering ethics, risk management and occupational safety and health as well as to expose the students to basic of law in the engineering context. The materials will be of introductory nature to enable engineers to appreciate factors that have to be taken into account in decision-making. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineers relating to engineering ethics, risk management and to understand the legal requirements related to engineering field.

**Course Outcomes:**

1. Ability to assess and discuss the issues and challenges of engineering ethics.
2. Ability to assess the sustainability issues and its impact in society and environmental context.
3. Ability to revise hazards and compile the function of risk management,

occupational safety, health (OSHA) and procedures of legal on engineering issues.

**AMJ40603 REKA BENTUK STRUKTUR KONKRIT BERTETULANG LANJUTAN [ADVANCED REINFORCED CONCRETE STRUCTURES DESIGN]****No of Credits: 3****Course Synopsis:**

The syllabus comprises the additional knowledge on the aspect of reinforced concrete structural elements. As a continuation to the Reinforced Concrete Structures Design I and II, the topics discussed include analysis and design of ribbed, waffle and flat slabs, water retaining structures and reinforced concrete wall. As well as design of elements for torsion and analysis and design of raft foundation are also covered.

**Course Outcomes:**

1. Analyse complex engineering problem for concrete slab, raft foundation, torsional moment element, wall and water retaining structure.
2. Design reinforced concrete structure for concrete slab, raft foundation, torsional moment element, wall and water retaining structure.

**AMJ40703 KEJURUTERAAN ASAS [FOUNDATION ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course intends to provide further discussion and explanation related to foundation engineering. The topics cover in this course includes mat foundations, drilled-shaft foundations, retaining walls, foundations on difficult soils and soil improvement. At the end of the course, students should be able to apply theory and practical to solve problems related to foundation engineering.

**Course Outcomes:**

1. Ability to analyze sub-structure engineering and difficult soil problems.
2. Ability to design the foundations and retaining walls.
3. Ability to explain the stability of sub-structure in Foundation Engineering.

**AMJ40803 PENGURUSAN AIR RIBUT BANDAR [URBAN STORM WATER MANAGEMENT]****No of Credits: 3****Course Synopsis:**

This course aims to equip students with in-depth knowledge in urban stormwater design and management. This course highlights the aspects of urban drainage management. The students are also exposed to environmentally friendly drainage systems, hydrological analysis, Best Management Practices (BMPs), and quantity and quality controls. Upon completing this course, the students should be able to analyse and determine viable project options, propose appropriate management strategies, and apply the proper techniques in urban stormwater planning and design.

**Course Outcomes:**

1. Ability to apply the aspects of urban drainage scheme which applies the concept of environmental friendly drainage in civil engineering.
2. Ability to evaluate urban drainage design alternative solutions based on the practices of the relevant authorities.
3. Ability to design urban drainage systems with regard to sustainable development.

**AMJ40903 SISTEM MAKLUMAT PENYELENGGARAAN BANGUNAN [BUILDING MAINTENANCE INFORMATION SYSTEM]****No of Credits: 3****Course Synopsis:**

This course is designed to introduce students to building maintenance and enhance their knowledge on management method that seems to become mislaid from time to time due to poor service delivery, inadequate finance, poor maintenance planning and maintenance backlogs. It will emphasize on the principles and practices relating to maintenance management in facilitating the assessment, planning and execution processes in relation to building facility. At the end of the course students should be able to apply, evaluate and develop the information system (i.e. database management) suitable for the building maintenance work on defect report and information transfer techniques with the aid of building information modelling technology.

**Course Outcomes:**

1. Ability to apply principles and practices relating to maintenance of building in construction engineering.
2. Ability to evaluate effective method for building maintenance information system.
3. Ability to construct complex maintenance information system with the aid of modern engineering tools.

**AMJ41003 ANALISIS STRUKTUR LANJUTAN [ADVANCED STRUCTURAL ANALYSIS]****No of Credits: 3****Course Synopsis:**

This course provides students with basic knowledge of the finite element method (FEM) in structural analysis and response of the systems under dynamic excitation. For the finite element method this course explains the fundamental of the FEM and procedure to develop FEM equation. The fundamental of the FE will be utilized in the development of FEM equation for 2 dimensional solid models. The plasticity of the structural member also discussed and analysed in this course. Moreover, the students will be introduced and exposed to the structural dynamic. For that purpose two basic topics in structural dynamic (i.e. equation of motion and response of single degree of freedom system under free vibration) will be covered in this course.

**Course Outcomes:**

1. Ability to analyse the advanced structural analysis knowledge in-depth of technical competence to the solution of engineering problem.
2. Ability to conduct structural engineering problem using modern engineering tools.

**AMJ41103 REKA BENTUK KELULI LANJUTAN [ADVANCED STEEL DESIGN]****No of Credits: 3****Course Synopsis:**

This course is to prepare Civil Engineering students with additional knowledge on the design aspect of steel structural elements using EUROCODE 3. This module is a continuation of steel building design by enhancing the fundamental approach in designing steel components. The aim of this subject is to develop professional engineering skills with special emphasis on analysis, and reliability of design approaches.

**Course Outcomes:**

1. Ability to integrate the advanced steel knowledge design in depth of technical competence to the solution of engineering problems.
2. Ability to design the advanced complex steel design in engineering problems.
3. Ability to measure the engineering problems systems using technique, skills and modern engineering tools.

**AMJ41203 KONTRAK AND PERUNDANGAN PEMBINAAN [CONSTRUCTION CONTRACT AND LAW]****No of Credits: 3****Course Synopsis:**

This course introduces students to Malaysian laws, which will focus on the sources, and branches of law in Malaysia. The course will emphasize on private laws related to construction practice, torts, law of contract and construction contract administration. Students will be exposed to construction contract administration which covers the Standard Forms of Contract, disputes in construction and dispute resolutions. At the end of the course, students should possess a sound knowledge of the Malaysian legal framework and familiar with legislative and legal constraints applicable to the practise of construction. More importantly, the students should be able to use their knowledge to promote ethical and better image of the construction industry.

**Course Outcomes:**

1. Ability to apply construction law and contracts in construction practice.
2. Ability to propose problem-solving skill and integration knowledge gained in other core subject to problem emerged.
3. Ability to evaluate in laws and regulations related to the professional and ethical responsibilities and commitment to community.
4. Ability to explain critical reasoning and informed judgement in addressing construction law and contract issues in construction practise.

**AMJ41303 PEMODELAN MAKLUMAT BANGUNAN [BUILDING INFORMATION MODELLING]****No of Credits: 3****Course Synopsis:**

The main objective of this course is to give an insight into Building Information Modelling (BIM), defining the parametric modelling process involving BIM technology to improve the building construction. This course will also assist the students in understanding the BIM software function and conceptual design of construction management in the building projects. The BIM practice will further deliberate an overview on design services and practices as a major potential in improving the management of buildings primarily for simulation, analysis and Level of Information (LOI) techniques.

**Course Outcomes:**

1. Ability to discuss contributions of BIM to civil engineering.
2. Ability to perform complex database of architecture and structure models for modelling libraries in BIM.

3. Ability to explain complex BIM model through integration of civil engineering database under some supervision.

**AMJ41403 JURUTERA UNTUK MASYARAKAT [ENGINEERS FOR SOCIETY]****No of Credits: 3****Course Synopsis:**

The objective of this course is to improve student learning by integrating theory with practice in the society. This course is embed SULAM element align with KPM inspiration. Student will be placed in community to hear their problem and then choose a problem related to their engineering field to be resolved. From this engagement, it will increase students soft skills as well as creating collaborative environment students, lecturers and communities. In addition, this course will providing opportunities for agencies, corporate and NGOs to contribute to the community through volunteering. At the end of the course, communities involved will get the benefit that will be maps based on Sustainable Development Goals (SDG) by UNESCO.

**Course Outcomes:**

1. Ability to combine theory and practice in the society and the consequent responsibilities relevant to Civil/Environmental engineering practice and solution to complex engineering problems.
2. Ability to perform effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
3. Ability to display effective communication strategies with society for engineers

**AMJ41703 KEJURUTERAAN AIR SISA TERMAJU [ADVANCED WASTEWATER ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course focuses on the design aspect of secondary and tertiary treatment units in wastewater treatment plant. The student will be learned on the process analysis and reactor design for various suspended growth and attached growth biological treatment processes. In addition, the student will be exposed to the design of the advanced wastewater treatment unit such as membrane filter, adsorber, ion exchanger and advanced oxidation process unit. By the end of the course, the student is expected to be able to design in detail the specific unit processes of secondary and tertiary treatment units in wastewater treatment plant.

**Course Outcomes:**

1. Ability to analyse basic knowledge of process analysis and reactor design toward in-depth understanding in wastewater treatment plant design.
2. Ability to propose the biological reactor for the secondary treatment unit in wastewater treatment plant.
3. Ability to propose the design of tertiary treatment unit in wastewater treatment plant.

**AMJ47103 REKA BENTUK PROJEK BERINTEGRASI I [INTEGRATED DESIGN PROJECT I]****No of Credits: 3****Course Synopsis:**

AMJ47103 Integrated Design Project I is an engineering capstone course for the civil engineering programme. This course enables students to design a real civil engineering project. In this course, students are required to integrate their knowledge of civil engineering disciplines such as geotechnical engineering, structural engineering, water supply engineering, and highway engineering. This course also emphasizes project management and economic evaluation in the conceptual design phase. This course is an actual example of the implementation of complex problem solving and complex engineering activities, which incorporate various disciplines and consist of all phases of work, for example, project briefing, designing, sketching, and drawings. At the end of the semester, students are required to submit a project report and present their findings.

**Course Outcomes:**

1. Ability to design solutions for complex civil engineering problems and design systems, components, or processes that meet specified needs.
2. Ability to use appropriate design software(s) to assist in complex civil engineering design projects.
3. Ability to evaluate the sustainability and impact of professional engineering work on the solution of complex civil engineering problems in societal and environmental contexts.
4. Ability to function effectively as an individual and as a member or leader in team.
5. Ability to demonstrate effective communication, verbal and written, in civil engineering design projects.
6. Ability to evaluate knowledge and understanding of engineering management principles and economics evaluation to manage civil engineering design project.

**AMJ48103 REKA BENTUK PROJEK BERINTEGRASI II [INTEGRATED DESIGN PROJECT II]****No of Credits: 3****Course Synopsis:**

The AMJ48103 Integrated Design Project (IDP) 2 is a team based project undertaken by all final year students. It is a continual project from AMJ47103 in semester 1. The engineering capstone course aims to give students experience of the type of multi-disciplinary projects that are now common in industry. Students are expected to implement knowledge and skills obtained throughout the programme in solving specific engineering problem. Students are also required to practice proper ethics, professional responsibilities and entrepreneurship skills in providing a sustainable solution via functioning in a multidisciplinary team. Every student is required to plan and manage their project through the supervision of the IDP team. Solving the problem using proper knowledge and skills shall help the student to understand the need for life-long learning. Students also required to demonstrate their project during viva/presentation.

**Course Outcomes:**

1. Ability to compose complex engineering problems reaching substantial conclusions using first principles of natural sciences and mathematics, fundamental and civil engineering specialist.
2. Ability to analyze the societal, health, safety, legal and cultural issues as well as the responsibilities of professional engineering in solving the complex civil engineering design.
3. Ability to extend ethical principles and commit to professional ethics as well responsibilities and norms of complex civil engineering practice.
4. Ability to function effectively as an individual and as a member or leader in teams.
5. Ability to demonstrate communication effectively, verbal and written on complex civil engineering activities.
6. Ability to evaluate knowledge and understanding of engineering management principles and economics evaluation to manage complex civil engineering design project.
7. Ability to determine the need for and to engage in independent and life-long learning of the complex technological change in civil engineering.

**AMJ10104 MEKANIK DAN KEJURUTERAAN BAHAN [MECHANICS AND MATERIAL ENGINEERING]****No of Credits: 4****Course Synopsis:**

The aim of this course is to enable the students to learn the basic of mechanics and material engineering. In engineering mechanics portion, students will be introduced to fundamentals and principles of static and dynamics mechanics. Resultant and equilibrium of coplanar force system as well as spatial force system will be covered in static portion, while, kinematics and kinetics of particle in dynamics portion. In material engineering portion, the student will be also taught on structure of crystalline solids, imperfection of solid as well as strength of material.

**Course Outcomes:**

1. Ability to apply the knowledge of mechanics and materials engineering.
2. Ability to analyse mechanics and materials engineering problems based on its properties and structures.
3. Ability to assess the principles of mechanics and material engineering through laboratory experiments.

**AMJ10604 KIMIA PERSEKITARAN [ENVIRONMENTAL CHEMISTRY]****No of Credits: 4****Course Synopsis:**

The study of environmental chemistry is fundamental to an understanding of the natural and anthropogenic processes occurring on our planet. The course aimed to familiarize the students with qualitative and quantitative aspects of chemical and biological principles of environmental engineering and their application to pollution control. The syllabus focuses on the fundamentals of chemistry, water chemistry, atmospheric chemistry and soil chemistry.

**Course Outcomes:**

1. Ability to evaluate the knowledge related to fundamental chemistry involving water, soil and atmospheres.
2. Ability to solve problems related to fundamental chemistry involving water, soil and atmospheres
3. Ability to analyze experiments associated with appropriate methods related to water, soil and atmospheres

**AMJ10704 EKOLOGI ASAS [BASIC ECOLOGY]****No of Credits: 4****Course Synopsis:**

The study of basic ecology in understanding nature and environment, and the relationship between the organism and environment. Students will understand the effect of global environmental changes to the environment and how to preserve the environment. The syllabus covers on ecology, ecosystems, population, community, biogeochemical cycles, global environmental changes and microbiology.

**Course Outcomes:**

1. Ability to evaluate the knowledge related basic concept of ecology, environment and the relationship among the organism/ microorganisms in ecosystems.
2. Ability to determine energy flow of ecosystems, biochemistry and metabolism pathways of microorganisms in soil, water and wastewater treatment.
3. Ability to analyse the population of organism and microorganisms' growth.

**AMJ10803 ASAS PROSES KIMIA [FUNDAMENTAL OF CHEMICAL PROCESS]****No of Credits: 3****Course Synopsis:**

This course aims to introduce students on how to solve problems on basic process calculations and process system variables. Then, student will be taught on how to analyse and solve material balances on nonreactive and reactive process units. Furthermore, the students will be familiarized with solving problems on material and energy balances on reactive and nonreactive processes.

**Course Outcomes:**

1. Able to analyse the basic process calculation and process system variables.
2. Able to evaluate material and energy balances on nonreactive processes and reactive multiple-unit processes.

**AMJ20904 MEKANIK BENDALIR DAN HIDRAULIK [FLUIDS MECHANIC AND HYDRAULICS]****No of Credits: 4****Course Synopsis:**

This course provides student knowledge in the patterns of movement of fluid particles. By the end of this subject student will be expected to understand the basic characteristics of fluid mechanics and fluid statics, be able to analyze the hydrostatics and basic hydrodynamics in fluid. Student also will be able to analyze and differentiate between the flow in pipe and flow in open channels.

**Course Outcomes:**

1. Ability to apply the knowledge of fluid mechanics and hydraulic engineering
2. Ability to solve environmental engineering problems using fluid mechanics and hydraulic principles
3. Ability to analyze experiments associated with fluid mechanics and hydraulic engineering

**AMJ21003 TERMODINAMIK [THERMODYNAMICS]****No of Credits: 3****Course Synopsis:**

Thermodynamics is a study related to the science of energy and their relation to heat and work. This course will discuss the basic concepts and properties of thermodynamics and the forms of energy and energy transfer. The first and second law of thermodynamics are useful in performing energy analysis and measuring thermal efficiency of a system.

**Course Outcomes:**

1. Able to use thermodynamic tables, charts and equation of state to obtain appropriate property data in solving thermodynamics problems.
2. Able to evaluate fundamental engineering problems in thermodynamics involving closed systems, open systems under steady state and transient conditions by applying the first and second laws of thermodynamics.
3. Able to apply second law analysis methods for thermodynamic systems.

**AMJ21103 ASAS KEJURUTERAAN ALAM SEKITAR [FUNDAMENTAL OF ENVIRONMENTAL ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course focuses on fundamental concept of environmental engineering. Student will be exposed to the main component in environmental engineering that are water, air, solid and noise pollution. The basic principles, theories and legislation of water quality and wastewater, air pollution, noise pollution and solid and hazardous waste will be covered in this course.

**Course Outcomes:**

1. Ability to evaluate the basic principles, theories and legislation of water quality and wastewater, air pollution, noise pollution and solid and hazardous waste
2. Ability to analyze the problems on water quality and wastewater, air pollution, noise pollution and solid and hazardous waste
3. Ability to demonstrate and function effectively as an individual, and as a member or leader in the project on a specific scope of water quality and wastewater/ air pollution/ noise pollution or solid and hazardous waste

**AMJ21203 KEMAHIRAN KEJURUTERAAN ALAM SEKITAR [ENVIRONMENTAL ENGINEERING SKILLS]****No of Credits: 3****Course Synopsis:**

This course is divided into three topics that cover the basics of surveying, geographical information system (GIS) and engineering drawing. In the first topic, the students will learn how to conduct basic surveying works that include levelling, tacheometry and traversing. The second topic covers the basics of geographical information systems that include data capture and analysis. In this topic, the student will learn how to use the related software that will assist them in producing maps and data analysis from the maps. In the last topic, the student will be introduced to the basics of engineering drawing using AutoCAD software that will include 2D and 3D drawings. Most of this course will be conducted in the laboratory to familiarize the students with all the equipment and software while the theoretical part will be conducted in the class.



**Course Outcomes:**

1. Ability to apply the basic knowledge of surveying, mapping, and drawing to produce maps and engineering drawings.
2. Ability to select the suitable method and/or technique of surveying, mapping, and engineering drawing in solving environmental related problems.
3. Ability to demonstrate the proper use of equipment and/or software in surveying, mapping, and engineering drawing

**AMJ21303 HYDROLOGI [HIDROLOGY]****No of Credits: 3****Course Synopsis:**

This course introduces the fundamental of hydrological process such as hydrologic cycle, precipitation, evaporation, transpiration, evapotranspiration and infiltration. Students will be introduced to equations to calculate, and equipment's to measure many important hydrologic data including rainfall amount, evaporation rate and infiltration rate. Analysis will be done to look at the relationship between these values especially between rainfall, land use, and streamflow values. Emphasis will be given for measurement technique of flowrate in river, and usage of Rating Curve to find the relationship between water level and streamflow values. Usage and derivation of Unit Hydrograph will also be included.

**Course Outcomes:**

1. Ability to examine the scenario of hydrological cycle.
2. Ability to analyze the problem related to hydrology.
3. Ability to DESIGN basic stormwater management using prescribed manual.

**AMJ21403 PERUNDANGAN ALAM SEKITAR, KESIHATAN DAN KESELAMATAN [ENVIRONMENTAL LAW, HEALTH AND SAFETY]****No of Credits: 3****Course Synopsis:**

In the promotion of environmentally sound and sustainable development, our country has established the necessary legal and institutional arrangements such that environmental factors are considered for the establishment of business/industry in the country. In this course, the student will be exposed to the knowledge and ethical principles of Environmental, Health, and Safety Legislation in Malaysia. The student will be able to evaluate the issues and the need for Environmental, Health, and Safety Legislation related to occupational safety and health management.

**Course Outcomes:**

1. Ability to analyse the knowledge and ethical principles of Environmental, Health and Safety legislation in Malaysia
2. Ability to evaluate independently the knowledge by using the broadest context of technological change and recognize the need for Environmental, Health, and Safety Legislation.

**AMJ21503 KEJURUTERAAN GEOPERSEKITARAN [GEOENVIRONMENTAL ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course presents the principles of geoenvironmental engineering. It covers the chemical and geo-chemistry background of soil, rock classification and groundwater flow. This course also discusses the sources of contaminants and available remediation technologies, which are widely used for groundwater treatment. Global environmental problems pose a challenge to the geoenvironmental engineering profession. In particular, the safe disposal of hazardous solid waste. Concerns should be focused on the requirements and criteria should be established for the safety of public health and the environment.

**Course Outcomes:**

1. Ability to determine basic principle of geoenvironmental engineering.
2. Ability to evaluate the basic principle of remediation technologies for contaminated land.

**AMJ21603 PROSES PENGANGKUTAN PERSEKITARAN [ENVIRONMENTAL TRANSPORT PROCESS]****No of Credits: 3****Course Synopsis:**

The objective of this course is to introduce Environmental Engineering student on natural transport processes in the environment. Basic concept on mass balance, physical, chemical and biological transport process will be covered. Chemical and biological Kinetics will be introduced by applying Gibbs free energy concept. Similarly, phase equilibrium and partitioning in the environment will be introduced. By the end of the course, the student is expected to be able to understand the related driving forces in the process of advection, diffusion, and the combination of the two phases in air, water, and soil media.

**Course Outcomes:**

1. Ability to analyse basic concept of transport phenomena toward in depth understanding in environmental transport processes
2. Ability to evaluate models of physical, chemical and biological transport process in the environment
3. Ability to display model of environmental transport process using modern tools

**AMJ31004 PEMINDAHAN JISIM [MASS TRANSFER]****No of Credits: 4****Course Synopsis:**

The study of mass transfer is of particular interest to environmental engineers which involves processes that move chemicals through the air, surface water, subsurface environment, or engineered systems. Transport processes move pollutants from the location at which they are generated, resulting in impacts that can be distant from the pollution source. In addition, environmental engineers make use of the contents of this course in the design of emission-control systems. In this course the lectures discuss some of the processes that transport pollutants in the environment and in engineered systems. The goals of this discussion are twofold: to provide an understanding of the processes that cause pollutant transport, and to present and apply the mathematical formulas used to calculate the resulting pollutant fluxes.

**Course Outcomes:**

1. Ability to analyze mass transfer problems involving molecular diffusion by applying the concept and principles of mass transfer processes for steady state or unsteady state conditions
2. Ability to estimate mass transfer coefficients and use them to determine mass transfer rates for various separation processes
3. Ability to design emission-controlled operations by applying fundamentals of mass transfer in separation processes
4. Ability to construct experimental works and assemble appropriate laboratory equipment to determine mass transfer coefficients and rates of separation process

**AMJ31103 KEJURUTERAAN SUMBER AIR [WATER SUPPLY ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course will be focused on water sources and usage, method on estimating water demand, water quality characteristics and legislation, conventional and

advanced water treatment processes, water distributions and reticulation systems. Special focus will be given on the design water treatment unit, applying the design guidelines of water supply system which is applied in Malaysia.

**Course Outcomes:**

1. Ability to analyse water sources, consumption and water demand, and classification of technology of water treatment processes.
2. Ability to evaluate water distribution system.
3. Ability to design water treatment unit and water distribution system.
4. Ability to construct water distribution system using modern engineering tool.

**AMJ31203 KEJURUTERAAN SISA PEPEJAL DAN SISA BERBAHAYA [SOLID AND HAZARDOUS WASTE ENGINEERING]****No of Credits: 3****Course Synopsis:**

Students will be introduced to elements of solid waste engineering which is municipal solid waste characterization, waste handling, generation rate, waste storage, collection and transport, waste treatment and disposal methods; including biological and chemical treatment, incineration, pyrolysis, landfill and site remediation, and waste minimization. Then, students will be enriched with characteristics of hazardous waste, waste handling, storage and collection, treatments and disposal methods, physicochemical and biological methods, stabilization and other disposal option such as solidification, incineration and secured landfill. Finally student will be able to design engineered final disposal facilities for solid and hazardous waste and analyse the sustainability in societal and environmental context.

**Course Outcomes:**

1. Ability to analyze the integrated solid and hazardous waste management and engineering.
2. Ability to analyse hazardous waste management and the concept of risk assessment.
3. Ability to design the engineered final disposal facilities for solid and hazardous waste.
4. Ability to analyse the sustainability in societal and environmental contexts and to have entrepreneurship skills.

**AMJ31303 PENILAIAN KESAN ALAM SEKITAR [ENVIRONMENTAL IMPACT ASSESSMENTS]****No of Credits: 3****Course Synopsis:**

This course will introduce the components and structure of an Environmental Impact Assessment (EIA) in line with Malaysian statutory requirement. This course will provide students with skills and knowledge in hazard and impact identification, prediction and evaluation of impacts and mitigation to reduce the magnitude of impacts. The scope will focus on environmental and societies impacts on the proposed project.

**Course Outcomes:**

1. Ability to examine the EIA requirement and to evaluate the potential adverse effects, mitigation measures and monitoring program associated with the prescribed activities.
2. Ability to evaluate the terms of reference in conducting EIA.
3. Ability to evaluate the environmental sustainability on the proposed project.

**AMJ31403 KEJURUTERAAN PENCEMARAN HINGAR [NOISE POLLUTION ENGINEERING]****No of Credits: 3****Course Synopsis:**

This course presents the basic principle and concepts of the noise pollution engineering. It covers how to tackle noise pollution problems, solutions available for noise control, how to determine noise, and how noise generated and radiated, and how it can be reduced. From the course, students will also be exposed to laws and codes governing noise and its control Environmental Quality Act 1974, OSHA, Factories and Machinery Act 1967.

**Course Outcomes:**

1. Ability to evaluate the basic principle and concept of noise pollution and noise control.
2. Ability to analyse the problems on noise pollution.
3. Ability to demonstrate and function effectively as an individual, and as a member or leader in the project on a noise pollution.

**AMJ31503 KESIHATAN AWAM DAN HIGIN PEKERJAAN [PUBLIC HEALTH AND OCCUPATIONAL HYGIENE]****No of Credits: 3****Course Synopsis:**

Public health and occupational hygiene are two interrelated studies. This course is divided into two sections that covers both public health and occupational hygiene. The first section is devoted to the fundamentals of health in the tropics, water supply and sanitation, diseases transmitted by microbes, vectors, and other agents. This includes introduction to pollutants and other hazards in nature and indoors. The second section is on occupational hygiene and the topics covers in this section includes introduction to safety and health of workers and public. Malaysian occupational Safety and Health Act, Environmental, quality, health and safety management.

**Course Outcomes:**

1. Ability to evaluate a base of knowledge in the hazards related to public health
2. Ability to discuss the theoretical, engineering and control aspects for the prevention of occupational hygiene related issues
3. Ability to present the outcome of group work on related issues in public health /occupational hygiene
4. Ability to function effectively as an individual, and as a member or leader in group work on specific scope of public health /occupational hygiene

**AMJ31603 SISTEM PENGURUSAN ALAM SEKITAR [ENVIRONMENTAL MANAGEMENT SYSTEM]****No of Credits: 3****Course Synopsis:**

This course aims to develop an understanding of the role and implementation for ISO 14001 or Environmental Management System (EMS). The course focuses on the processes involved in ISO 14001/EMS, with a particular emphasis on technical requirements of the system, regulatory and community issues. Students will be able to interpret the requirements of ISO 14001/EMS and suggest the appropriate measures to reduce environmental degradation. Students will also be exposed to corporate environmental reporting which reflect the company commitment towards environmental conservation.

**Course Outcomes:**

1. Ability to assess the requirements for environmental management, monitoring and auditing.
2. Ability to evaluate the environmental aspect and impact of human work processes that may result in adverse effects on the environment
3. Ability to distinguish suitable tools and methods in making an ethical and responsible environmental decision

**AMJ31704 KEJURUTERAAN AIR SISA [WASTEWATER ENGINEERING]****No of Credits: 4****Course Synopsis:**

The aim of this course is to enable the students to have the comprehensive understanding on wastewater treatment processes, including preliminary, primary, secondary and tertiary treatments. In the first part of the course, student will be introduced to the wastewater sources, flow rate, treatment standard, location and plant hydraulics. The second part will be dealing with unit processes in primary treatment such as bar rack, screen, grit removal and sedimentation basin. The following part of the course containing the biological and chemical treatment processes of wastewater. By the end of the course, the student is expected to be familiarizing with the design principles of unit processes in wastewater treatment plant, applying all the basic knowledge in wastewater treatment theory.

**Course Outcomes:**

1. Ability to analyse the suitable unit process in wastewater engineering
2. Ability to design unit process applied in wastewater treatment
3. Ability to propose on engineering management principles and cost evaluation of the waste water treatment plant/unit
4. Ability to conduct experiment associated with wastewater treatment process.

**AMJ31804 KEJURUTERAAN KAWALAN PENCEMARAN UDARA [AIR POLLUTION CONTROL ENGINEERING]****No of Credits: 4****Course Synopsis:**

Air pollution damages human health, ecosystems and vegetation, and is expected to worsen in many regions. Because Malaysia, an industrialising country, is developing quickly, it has to contend with increasing air pollution generated predominantly by transport and industry. Therefore, the Regulations of the Environmental Quality (Clean Air) Regulation 2014 was gazetted on June 2014,

further make provisions for: monitoring of air pollution control system, maintenance of records, license required to contravene acceptable conditions for emitting emissions into atmosphere, offences and penalties. The regulation also highlighted that every premises shall be equipped with an air pollution control system in accordance with the specifications and ensure that all components of the air pollution control system are in good working condition. Thus, this course is developed to provide a comprehensive understanding of the causes and effects of air pollution, and the management measures and engineering technologies available for its control. In addition, meteorological aspects which control the transport of air pollutants will also be discussed in this course. The laboratory activities will be also incorporated to enhance the understanding on the key parameters that influence the air pollution control system and design.

**Course Outcomes:**

1. Ability to assess the behaviour of meteorological conditions and their influence in modelling the air dispersion via the Gaussian Plume Model
2. Ability to suggest key parameters that affect the collection efficiency and operating cost from the collection/removal efficiency calculation for a given pollutant (particulates and gases).
3. Ability to design the appropriate air pollution control system for a particular industrial air pollution problem
4. Ability to conclude the effect of key parameters that may influence air pollution control systems efficiencies for a particular application supported by research-based knowledge and research methodologies

**AMJ40403 PENGURUSAN PROJEK KEJURUTERAAN [ENGINEERING PROJECT MANAGEMENT]****No of Credits: 4****Course Synopsis:**

This course will give exposure to project management knowledge from project management concept to project management process including project management skills together with exposure to decision making process involving engineering economics.

**Course Outcomes:**

1. Ability to analyze the process of engineering project management.
2. Ability to analyze engineering economic scenarios.
3. Ability to analyze and evaluate the process of project management and finance principle.

**AMJ40503 REMEDIASI SEKITARAN [ENVIRONMENTAL REMEDIATION]****No of Credits: 3****Course Synopsis:**

This course provides a general overview of the environmental remediation with emphasis on soil, groundwater and aquifer contaminants. The student will be taught about the source and behavior of subsurface contaminants, analysis of contaminants and remediation planning. Student will also be enriched with bioremediation technologies to recover the contaminants.

**Course Outcomes:**

1. Ability to apply the concepts of bioremediation in different states of environment.
2. Ability to compose the appropriate strategies in soil and groundwater remediation techniques
3. Able to construct the planning solutions for the environmental remediation.

**AMJ41503 REMOTE SENSING [PENDERIAAN JAUH]****No of Credits: 3****Course Synopsis:**

The course introduces the principle of remote sensing for earth observation. Remote sensing is the acquisition of information about an object or phenomenon, without making physical contact with the object. Space-based observation usually consist of measurements of electromagnetic (EM) radiation made by sensors at times and locations by the mechanics of satellite orbits. This course emphasizes the understanding of the remote sensing foundation and principle as well as the use of remote sensor data, image interpretation and processing techniques. Specifically, this includes introduction to electromagnetic energy, platforms and sensors also its applications. There are many applications of remote sensing in the domains of environmental science, policy and treaty verification, military applications, meteorology, oceanography, agriculture and ecology. The characteristic of various system in particular: passive and active remote sensing (physical principles of the visible, infrared and microwave section of the electromagnetic spectrum).

**Course Outcomes:**

1. Ability to evaluate the basic concept of remote sensing.
2. Ability to justify the various system of remote sensing.
3. Ability to manipulate environmental data by using digital image processing.

**AMJ41603 KAWALAN PROSES SEKITARAN DAN INSTRUMENTASI [ENVIRONMENTAL PROCESS CONTROL AND INSTRUMENTATION]****No of Credits: 3****Course Synopsis:**

The aim of this course is to enable the students to have the conceptual understanding on Process Control and Instrumentation that applied in Environmental Engineering. In the first part of the course, student will be introducing to common control system and instrumentation related to Environmental Processes. The second part will be consisting of process dynamics modeling, transformation of model into mathematical equation and solving the model by Laplace transform. The following part of the course containing the Characteristics, Forms, Modes, performances and tuning of Proportional-Integral Derivative (PID) Control. By the end of the course, the student is expected to be familiarizing with control system in Environmental Engineering field. The application of the control system in Environmental Engineering will be introduce to the student at the last part of the course.

**Course Outcomes:**

1. Ability to analyze mathematical model of process control and instrumentation.
2. Ability to evaluate dynamics model of a process.
3. Ability to evaluate the automatic control system
4. Ability to formulate the process control strategies of typical chemical and biological process related to environmental engineering

**AMJ41803 INFORMATIK SEKITARAN [ENVIRONMENTAL INFORMATICS]****No of Credits: 3****Course Synopsis:**

Environmental informatics plays an important role in environmental decision making. It investigates the development of effective techniques to deliver comprehensive and reliable information for environmental research, management and public awareness. This assimilates expertise and technologies as well as promotes interaction between fields such as environmental monitoring, environmental databases and information systems, geographical information systems, numerical simulation modelling, knowledge-based systems, internet exploitation, data visualisation, human-computer interaction, information theory and public understanding of science. Great potential now exists to adopt the holistic perspective offered by Environmental Informatics to address the pressing problems surrounding environmental information in the world today. From this course, students will be at the forefront of these developments.

**Course Outcomes:**

1. Ability to assess the element and principles of sampling techniques
2. Ability to evaluate the relevant environmental data into reliable information and knowledge for decision making.
3. Ability to manipulate environmental data into decision making information by using statistical analysis or tools.

**AMJ41903 ALAM BINA [BUILT ENVIRONMENT]****No of Credits: 3****Course Synopsis:**

This course introduces students to the environmental issues that pervade the built environment and, as a result, influence sustainable design. This is followed by a thorough and systematic evaluation of the designs of energy-efficient buildings, including thermal control, thermal dynamics, green architecture, thermal insulation, ventilation, lighting, and acoustics. At the end of the course, the students are expected to be able to solve engineering problems related to the holistic design of a building, its internal environment, and the system required to achieve a sustainable building.

**Course Outcomes:**

1. Ability to apply the elements and principles of building designs and planning.
2. Ability to integrate tools and best practices within building planning that address the needs of energy efficiency.
3. Ability to justify the critical planning solutions to built environment that promote healthier communities and sustainable development

**AMJ42003 TENAGA LESTARI [SUSTAINABLE ENERGY]****No of Credits: 3****Course Synopsis:**

This course assesses current and potential future energy systems, covering resources, extraction, conversion and end-use technologies, with emphasis on meeting regional and global energy needs in the 21st century in a sustainable manner. Various conventional and renewable energy production technologies, energy end-use practices and alternatives as well as consumption practices are also discussed. This includes the current usage of fossil fuels, solar and biomass energy. This course also assesses the current storage technology, which include fuel cells and batteries.

**Course Outcomes:**

1. Ability to analyze the concept of sustainable energy and relate to a real-world project
2. Ability to assess the potential of different renewable energy approaches as alternative energy
3. Ability to evaluate the present and future energy needs and options for alternative energy sources.

**AMJ42103 ENVIRONMENTAL RISK ASSESSMENT [PENILAIAN RISIKO ALAM SEKITAR]****No of Credits: 3****Course Synopsis:**

This course aims to assist students in the development of understanding and skills required for carrying out risk assessments and management. Students will learn on how to identify potential environmental/workplace hazards and their potential adverse effect that may be harmful to humans and environment via qualitative and quantitative approach.

**Course Outcomes:**

1. Ability to understanding the principles and method of risk assessment.
2. Ability to investigate and assess human activity that influencing the distribution of chemicals in the environment.
3. Ability to assess and determine the magnitude of risk on humans associated with the exposure level.



### AMJ47203 REKA BENTUK PROJEK KEJURUTERAAN ALAM SEKITAR BERINTEGRASI I [INTEGRATED ENVIRONMENTAL ENGINEERING DESIGN PROJECT I]

**No of Credits: 3**

#### **Course Synopsis:**

AMJ47203 Integrated Environmental Engineering Design I is a capstone course designed to encourage students to conduct feasibility studies and preliminary design for real-world environmental engineering development projects. The feasibility study phase's objective is to identify the most optimal scheme from a technical, economic, environmental, and sustainability standpoint. The course enables students to design a typical environmental engineering project, and enhance the technical design, communication, and teamwork skills. At the end of this course, students will understand the critical nature of proposing a viable and workable development project and the value of integrating and synthesizing knowledge from various disciplines of environmental engineering.

#### **Course Outcomes:**

1. Ability to formulate complex engineering problems reaching substantial conclusion using first principles of natural sciences and mathematics, engineering fundamental and engineering specialist.
2. Ability to assess the specific design of complex unit process and unit operation in Environmental Engineering field.
3. Ability to apply the environmental and sustainability on the impact in the societal and environmental contexts.
4. Ability to function as an individual and as a member or leader in diverse teams.
5. Ability to communicate effectively on engineering activities, verbally and written, with the engineering community and with society at large.
6. Ability to evaluate knowledge and understanding of engineering management principles and economics evaluation to manage environmental engineering design project.

### AMJ48203 REKA BENTUK PROJEK KEJURUTERAAN ALAM SEKITAR BERINTEGRASI II [INTEGRATED ENVIRONMENTAL ENGINEERING DESIGN PROJECT II]

**No of Credits: 3**

#### **Course Synopsis:**

The AMJ48203 Integrated Environmental Engineering Design Project II is a team-based project that all final year students are required to complete. It is a continuation of the semester one project from AMJ47203 which will then be developed to the point of producing a detailed design that will be adopted during the final integrated design project phase, while considering environmental (sustainability), health and safety, ethics, and economic concerns. Students are

expected to apply the knowledge and skills acquired throughout the course to the solution of a particular engineering problem. Additionally, students are expected to demonstrate proper ethics, professional responsibilities, and entrepreneurial abilities while collaborating on a multidisciplinary team to provide a sustainable solution. Finally, students will create the primary deliverables, which will include an explanation of design concepts, analysis and as well as design calculations. By the end of this course, students will understand the value of reviewing and selecting a feasible technical proposal, as well as the value of integrating and synthesizing knowledge from various disciplines of environmental engineering.

#### **Course Outcomes:**

1. Ability to design the specific complex unit process and unit operation in Environmental Engineering field.
2. Ability to use the design software(s) to assist the complex environmental engineering design work.
3. Ability to assess the societal and cultural issues as well as public health and safety responsibilities of a professional engineer practise in reporting the environmental engineering design
4. Ability to function as an individual and as a member or leader in diverse teams.
5. Ability to communicate effectively on engineering activities, verbally and written, with the engineering community and with society at large.
6. Ability to evaluate knowledge and understanding of engineering management principles and economics evaluation to manage environmental engineering design project.

## **UR6526003**

### **Bachelor of Civil Engineering Technology (Construction) with Honours**

#### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

##### **PEO 1**

Engineering technology graduates engaged in the field of civil engineering technology as demonstrated through career advancement

##### **PEO 2**

Engineering technology graduates who are members and contribute to professional society

##### **PEO 3**

Engineering technology graduates embracing in life-long learning or pursuing continuing education opportunities

##### **PEO 4**

Engineering technology graduates who are technopreneurs

## PROGRAMME OUTCOMES (PO)

### P01

**Engineering Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialisation to defined and applied engineering procedures, processes, systems or methodologies. (SK1 to SK4)

### P02

**Problem Analysis:** Identify, formulate, research literature and analyse broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to their discipline or area of specialisation. (SK1 to SK4)

### P03

**Design/ development of solutions:** Design solutions for broadly-defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (SK5)

### P04

**Investigation:** Conduct investigations of broadly-defined problems; locate, search and select relevant data from codes, data bases and literature, design and conduct experiments to provide valid conclusions. (SK8)

### P05

**Modern Tool Usage:** Select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to broadly-defined engineering problems, with an understanding of the limitations. (SK6)

### P06

**The Engineer and Society:** Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technology practice and solutions to broadly-defined engineering problems. (SK7)

### P07

**Environment and Sustainability:** Understand the impact of engineering technology solutions of broadly-defined engineering problems in societal and environmental context and demonstrate knowledge of and need for sustainable development. (SK7)

### P08

**Ethics:** Understand and commit to professional ethics and responsibilities and norms of engineering technology practice. (SK7)

### P09

**Individual and Team work:** Function effectively as an individual, and as a member or leader in diverse technical teams.

### P010

**Communication:** Communicate effectively on broadly-defined engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

### P011

**Project Management and Finance:** Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member and leader in a team and to manage projects in multidisciplinary environments.

### P012

**Lifelong Learning:** Recognize the need for, and have the ability to engage in independent and life-long learning in specialist technologies

| CURRICULUM STRUCTURE                                                                            |                                                          |                                                              |                                                       |                                                          |                                                       |                                                            |                                                             |                                 |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------|---------------------------------|
| UR6526003 BACHELOR OF CIVIL ENGINEERING TECHNOLOGY (CONSTRUCTION) WITH HONOURS INTAKE 2024/2025 |                                                          |                                                              |                                                       |                                                          |                                                       |                                                            |                                                             |                                 |
| YEAR                                                                                            | FIRST                                                    |                                                              | SECOND                                                |                                                          | THIRD                                                 |                                                            | FOURTH                                                      |                                 |
| SEMESTER                                                                                        | 1                                                        | 2                                                            | 3                                                     | 4                                                        | 5                                                     | 6                                                          | 7                                                           | 8                               |
| <b>DISCIPLINE CORE &amp; ELECTIVE COURSES</b><br>(110 CREDITS)                                  | AMK10102<br>Fundamental of Engineering Mechanics         | AMK10503*<br>Fundamental of Solid Mechanics                  | AMK 20102<br>Structural Theory                        | AMK20602*<br>Structural Analysis                         | AMK30103<br>Structure Design I                        | AMK30703<br>Structural Design II                           | AMK40103<br>Industrialized Building Construction Technology | AMK49912<br>Industrial Training |
|                                                                                                 | AMK10203<br>Physic Technology                            | AMK10603<br>Fundamental of Fluid Mechanics                   | AMK 20203*<br>Hydraulic and Hydrology                 | AMK20703<br>Construction Project Management              | AMK30203<br>Construction Technology I                 | AMK30803<br>Construction Technology II                     | AMK40204<br>Construction Technology Integrated Project      |                                 |
|                                                                                                 | AMK10302<br>Introduction to Civil Engineering Technology | AMK10703<br>Geomatic                                         | AMK20303<br>Soil Mechanics                            | AMK20803<br>Construction Value Estimation                | AMK30303<br>Highway and Traffic Technology            | AMK30004<br>Bachelor's Degree Project I                    | AMK40006*<br>Bachelor's Degree Project II                   |                                 |
|                                                                                                 | AMK10402<br>Technical Drawing                            | AMK10802<br>Construction Drawing                             | AMK20403<br>Construction Material                     | AMK20903<br>Building Services II                         | AMK30402<br>Contract and Site Administration          | AMK30903<br>Basic Environmental Engineering and Management |                                                             |                                 |
|                                                                                                 |                                                          |                                                              | AMK20503<br>Building Services I                       | AMK21003<br>Management of Occupational Safety and Health | Elective I<br>AMK3XX03                                | Elective II<br>AMK3XX03                                    | Elective III<br>AMK4XX03                                    |                                 |
|                                                                                                 |                                                          |                                                              |                                                       | AMK21104*<br>Geotechnics                                 |                                                       |                                                            |                                                             |                                 |
| <b>COMMON CORE COURSES</b><br>(12 CREDITS)                                                      | QM11103<br>Mathematics for Engineering Technology I      | QM11203<br>Mathematics for Engineering Technology II         | QM12103<br>Mathematics for Engineering Technology III |                                                          | AMK31203<br>Civil Engineering Technologist in Society |                                                            |                                                             |                                 |
| <b>UNIVERSITY REQUIREMENT COURSES</b><br>(18 CREDITS)                                           | SMU13002<br>Philosophy and Current Issues                | SMB41002<br>University Malay Language <sup>[3]</sup>         | SMB31202<br>English for Technical Communication       | SMU13102<br>Appreciation of Ethics and Civilization      | SMU22402<br>Engineering Entrepreneurship              |                                                            |                                                             |                                 |
|                                                                                                 | SMU32202<br>Thinking Skills                              | SMB20102<br>English for General Communication <sup>[2]</sup> |                                                       |                                                          |                                                       |                                                            |                                                             |                                 |
|                                                                                                 | SMU12102<br>Integrity and Anti-Corruption <sup>[4]</sup> |                                                              |                                                       |                                                          |                                                       |                                                            |                                                             |                                 |
|                                                                                                 | SMZXXX01<br>Co-Curriculum I                              | SMZ2XX01<br>Co-Curriculum II                                 |                                                       |                                                          |                                                       |                                                            |                                                             |                                 |
| <b>TOTAL CREDITS</b><br>(140 CREDITS)                                                           | <b>19</b>                                                | <b>19</b>                                                    | <b>19</b>                                             | <b>20</b>                                                | <b>19</b>                                             | <b>16</b>                                                  | <b>16</b>                                                   | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                                            | SMB10102<br>Preparatory English <sup>[1]</sup>           |                                                              |                                                       |                                                          |                                                       |                                                            |                                                             |                                 |

Elective I : AMK30503 Financial & Human Resource Management, AMK30603 Building Survey

Elective II : AMK31003 Construction Technology of Highway & Bridge, AMK31103 Construction Risk Management

Elective III : AMK40303 Advanced Structural Design, AMK40403 Construction Technology of Highrise Building, AMK40503 Building Maintenance Information System, AMK40603 Structural Inspection and Repair

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

| **Course with prerequisite |              |
|----------------------------|--------------|
| Course                     | Prerequisite |
| AMK10503                   | AMK10102     |
| AMK20203                   | AMK10603     |
| AMK20602                   | AMK20102     |
| AMK21104                   | AMK20303     |
| AMK40006                   | AMK30004     |

**LIST OF COURSES:**

| COURSE CODE | COURSE NAME                                                                                   |
|-------------|-----------------------------------------------------------------------------------------------|
| AMK10102    | Asas Kejuruteraan Mekanik [Fundamental of Engineering Mechanics]                              |
| AMK10203    | Teknologi Fizik [Physic Technology]                                                           |
| AMK10302    | Pengenalan kepada Teknologi Kejuruteraan Awam [Introduction to Civil Engineering Technology]  |
| AMK10402    | Lukisan Teknikal [Technical Drawing]                                                          |
| AMK10503    | Asas Mekanik Pepejal [Fundamental of Solid Mechanics]                                         |
| AMK10603    | Asas Mekanik Bendalir [Fundamental of Fluid Mechanics]                                        |
| AMK10703    | Geomatik [Geomatic]                                                                           |
| AMK10802    | Lukisan Pembinaan [Construction Drawing]                                                      |
| AMK20102    | Teori Struktur [Structural Theory]                                                            |
| AMK20203    | Hidraulik dan Hidrologi [Hydrology and Hydraulic]                                             |
| AMK20303    | Mekanik Tanah [Soil Mechanics]                                                                |
| AMK20403    | Bahan Binaan [Construction Materials]                                                         |
| AMK20503    | Khidmat Bangunan I [Building Service I]                                                       |
| AMK20602    | Analisis Struktur [Structural Analysis]                                                       |
| AMK20703    | Pengurusan Projek Pembinaan [Construction Project Management]                                 |
| AMK20803    | Anggaran Nilai Pembinaan [Construction Value Estimation]                                      |
| AMK20903    | Khidmat Bangunan II [Building Service II]                                                     |
| AMK21003    | Pengurusan Keselamatan dan Kesihatan Pekerjaan [Management of Occupational Safety and Health] |

| COURSE CODE | COURSE NAME                                                                                    |
|-------------|------------------------------------------------------------------------------------------------|
| AMK21104    | Geoteknik [Geotechnics]                                                                        |
| AMK30103    | Rekabentuk Struktur I [Structural Design I]                                                    |
| AMK30203    | Teknologi Pembinaan I [Construction Technology I]                                              |
| AMK30303    | Teknologi Lebuhraya dan Lalulintas [Traffic and Highway Technology]                            |
| AMK30402    | Pentadbiran Kontrak dan Tapak [Contract and Site Administration]                               |
| AMK30503    | Pengurusan Kewangan dan Sumber Manusia [Financial and Human Resource Management]               |
| AMK30603    | Ukur Bangunan [Building Surveying]                                                             |
| AMK30703    | Rekabentuk Struktur II [Structural Design II]                                                  |
| AMK30803    | Teknologi Pembinaan II [Construction Technology II]                                            |
| AMK30004    | Projek Sarjana Muda I [Bachelor Degree Project I]                                              |
| AMK30903    | Asas Kejuruteraan dan Pengurusan Alam Sekitar [Basic Environmental Engineering and Management] |
| AMK31103    | Pengurusan Risiko Pembinaan [Construction Risk Management]                                     |
| AMK31203    | Juruteknologi Kejuruteraan Awam dalam Masyarakat [Civil Engineering Technologist in Society]   |
| AMK40103    | Teknologi Pembinaan Bangunan Berindustri [Industrial Building Construction Technology]         |
| AMK40204    | Teknologi Pembinaan Projek Bersepadu [Construction Technology Integrated Project]              |
| AMK40006    | Projek Sarjana Muda II [Bachelor Degree Project II]                                            |
| AMK40303    | Rekabentuk Struktur Termaju [Advanced Structure Design]                                        |
| AMK40403    | Teknologi Pembinaan Bangunan Tinggi [Construction Technology of Highrise Building]             |



| COURSE CODE | COURSE NAME                                                                        |
|-------------|------------------------------------------------------------------------------------|
| AMK40503    | Sistem Maklumat Penyelenggaraan Bangunan [Building Maintenance Information System] |
| AMK40603    | Pemeriksaan Dan Pembaikan Struktur [Structural Assessment and Repair]              |
| AMK49912    | Latihan Industri [Industrial Training]                                             |

**AMK10102 ASAS KEJURUTERAAN MEKANIK [FUNDAMENTAL OF ENGINEERING MECHANICS]****No of Credits: 2****Course Synopsis:**

The aim of this course is to introduce the students to principals of engineering mechanics. Two portion of engineering mechanics (static and dynamic) will be covered in this course. Force Vector, Equilibrium of particle and rigid body, moment of inertia and kinematic of particle are some of the major topics which will be taught in this course.

**Course Outcomes:**

1. Ability to analyse and apply knowledge of engineering mechanics to solve problem related to stationary objects.
2. Ability to analyse and apply knowledge of engineering mechanics to solve problem related to object in motion.

**AMK10203 TEKNOLOGI FIZIK [PHYSIC TECHNOLOGY]****No of Credit: 3****Course Synopsis:**

This course equips students with basic concept on physics and its application especially in construction field. At the end of this course students must be able to calculate and solve basic physics problems that related to heat, lighting, electricity, magnetism and acoustics. The students must be able to demonstrate the theory and its applications.

**Course Outcomes:**

1. Ability to differentiate the concept of magnetic field and electromagnetic force, Ohms law and Kirchhoff's law, basic mechanism of heat transfer and characteristic of sound.
2. Ability to evaluate the concept of magnetic field, electromagnetic force, interference of sound waves, Doppler effect, and the heat transfer by conduction through the flat the slab/wall, hollow cylinder, solid and so on.
3. Ability to perform the experiment according to the fundamental of electricity Application of measuring instrument (Ohms law), series circuits, parallel circuits, heat transfer (Thermal conductivity, Measuring light intensity and acoustics, sound and wave).

**AMK10302 PENGENALAN KEPADA TEKNOLOGI KEJURUTERAAN AWAM [INTRODUCTION TO CIVIL ENGINEERING TECHNOLOGY]****No of Credits: 2****Course Synopsis:**

Introduces basic skills and knowledge required for a career in civil engineering technology. This course is a cross section of topics in contemporary civil engineering with their routine works by providing neat sketches and illustrations with practical problems. The syllabus also introduces the requirement of authority liaison, construction business and value engineering for future challenges in construction industries.

**Course Outcomes:**

1. Ability to analyze role of Civil Engineering technology and DISCUSS on function for each of Civil Engineering branches and constructions.
2. Ability to justify the construction work of substructures, superstructure and infrastructure including M&E services in the building. Arrange and recommend construction process and management based on various condition.
3. Ability to construct a house model consists of structural elements and infrastructure based on drawing in a group activity
4. Ability to orally discuss sequence concept of construction work through presentation

**AMK10402 LUKISAN TEKNIK [TECHNICAL DRAWING]****No of Credits: 2****Course Synopsis:**

This course introduces student to the fundamental knowledge and skills on manual and computer aided drafting. Throughout the course, students will be exposed to the knowledge and techniques that relates to manual drafting on freehand sketching, lettering, geometry, projection, isometric and oblique drawing. Other than that, student will learnt on the fundamental techniques of using computer aided software in proving basic geometry and projection.

**Course Outcomes:**

1. Ability to carry out applicable techniques in completing the geometry drawing of manual drafting.
2. Ability to integrate the drawing information in completing the orthographic projection, isometric and oblique drawing of manual drafting
3. Ability to demonstrate the appropriate drafting techniques on preparing basic geometry and drawing projection by using computer aided software.

**AMK10503 ASAS MEKANIK PEPEJAL [FUNDAMENTAL OF SOLID MECHANICS]****No of Credits: 3****Course Synopsis:**

The aim of this course is to teach student to determine the stress, deformation and reaction of structural member under four basic external loads i.e. shear force, moment, torque and axial forces. This course only covers for prismatic cross section and homogeneous structural members in elastic condition. This knowledge is essential for civil engineering technology students before they can analyze more complex civil engineering structural system such as frames and truss that will be taught in structural theory and structural analysis.

**Course Outcomes:**

1. Ability to calculate the deformation, shear and bending moment, stress and strain reaction of structural member under axial load.
2. Ability to demonstrate experiment of Axial Forces in Truss, Euler's Strut, Torsion, Bending Moment in Beam, Flexural Behaviour of Beam and Support Reactions and Bending Moment in Frames by using Laboratory manual.
3. Ability to communicate verbally during laboratory interview session
4. Ability to cooperate in group activities for laboratory session

**AMK10603 ASAS MEKANIK BENDALIR [FUNDAMENTAL OF FLUID MECHANICS]****No of Credits: 3****Course Synopsis:**

This course provides student knowledge in the patterns of movement of fluid particles. By the end of this subject student will be expected to understand the basic characteristics of fluid mechanics and fluid statics, be able to analyze the hydrostatics and basic hydrodynamics in fluid. Student also will be able to analyze and differentiate between the flow in pipe and flow in open channels.

**Course Outcomes:**

1. Ability to assess various fluid properties, static theories, mechanic theories and pipeline system of fluids under rest condition and the application of the law of force and motion.
2. Ability to perform lab work/experiment of specific gravity of fluid, viscosity, center of pressure, buoyancy, bernoulli's theorem, and friction loss in pipes by using lab manual.
3. Ability to assist in a group activity during lab session with experiments involving specific gravity of fluid, viscosity, center of pressure, buoyancy, Bernoulli's theorem, and friction loss in pipes.
4. Ability to explain to instructor in presentation of mini project.

**AMK10703 GEOMATIK [GEOMATIC]****No of Credits: 3****Course Synopsis:**

This course introduces basic concepts of surveying including the basic of surveying, levelling, distance measurement, angle, and traverse survey. In keeping with the goal of providing an up-to-date presentation of surveying equipment and procedures, total stations are stressed as the instruments for making angle and distance observation as well as the Electronic Distance Measurement (EDM). In addition, practical skills on the use and care of geomatic instruments are essential to experience the real working environment.

**Course Outcomes:**

1. Ability to discuss in written and verbal, fundamental concept of geomatic consist of vertical and horizontal control, angle measurement, traversing, tacheometry and cut and fill
2. Ability to solve in written, geomatic measurement problem by applying appropriate technique in geomatic
3. Ability to conduct survey using appropriate geomatics instrument according to professional practice

**AMK10802 LUKISAN PEMBINAAN [CONSTRUCTION DRAWING]****No of Credits: 2****Course Synopsis:**

This course equips student with drafting skills in preparing the construction drawing either manually or by computer-aided software. Besides that, it enables student to interpret the details of construction drawing which has been used for the purpose of building construction process.

**Course Outcomes:**

1. Ability to interpret the construction drawing of a building.
2. Ability to adapt with Computer-Aided Software in preparing construction drawing of a building.

**AMK20102 TEORI STRUKTUR [STRUCTURAL THEORY]****No of credits: 2****Course Synopsis:**

This course provides students with a clear and thorough presentation of the theory and application of structural analysis as it applies to beams, trusses, and frames. It introduces analysis of statically determinate structures for beams, trusses and frames. Besides that, it also introduces deformations analysis of statically determinate structures using Virtual Work Method for trusses, beams and frames.

**Course Outcomes:**

1. Ability to evaluate the internal member forces and deformations for determinate structural systems.
2. Ability to build a sustainable bridge model based on determinate structural system of trusse

**AMK20203 HIDRAULIK DAN HIDROLOGI [HYDRAULIC AND HYDROLOGY]****No of credits: 3****Course Synopsis:**

This course builds on the fundamentals given in Fluid Mechanics and reinforces students' understanding of the behaviour of fluids, through the study of the flow of water in typical civil engineering applications. The course covers the study of steady incompressible flow in pipelines and pipe networks, uniform and non-uniform flow in open channels. This course also will be introduced the hydrology theory derived from the natural process of the hydrological cycle. Hydrology introduces the application of hydrological theory to solve the problem in water resources engineering. Planning, development, management, and design of water resources projects require knowledge in hydrology.

**Course Outcomes:**

1. Ability to analyze the concept of hydraulics and hydrology.
2. Ability to evaluate the problem related to hydraulics and hydrology using theories and principles.
3. Ability to perform the experiment associated with hydrology and hydraulics using lab manual.

**AMK20303 MEKANIK TANAH [SOIL MECHANICS]****No of credits: 3****Course Synopsis:**

The course introduces the students with the basic and background of the properties and behaviour of soil deposits and the applications of soil mechanics theory. It includes brief introduction on physical characteristics of soils. Also includes identification, classification and description of rock and soil for engineering purposes. Application of mechanics on soil such as phase relationship, compaction, permeability and seepage, stresses and effective stresses, shear strength and consolidation are also covered.

**Course Outcomes:**

1. Ability to analyse the fundamental concept consists in soil mechanics including soil characteristics, seepage, stress distribution, shear strength, compaction, and consolidation.
2. Ability to evaluate engineering problems related to soil using appropriate method and principal of soil mechanics.
3. Ability to perform experiment related to soil testing according to BS1377

**AMK20403 BAHAN BINAAN [CONSTRUCTION MATERIALS]****No of credits: 3****Course Synopsis:**

This course provides an introductory overview of the various materials used in construction. Common construction methods are introduced and building details are explored. Students have the opportunity to experience material capacity and behaviour as well as construction methods in demonstrations and lab experiments. Furthermore, material applications and detailing in structural and non-structural building components are explored. Resulting from this course, students will gain a comparative knowledge of material properties and possible applications in construction.

**Course Outcomes:**

1. Ability to determine and evaluate types of material used in concrete and their manufacturing process.
2. Ability to determine and evaluate, other construction material namely steel, timber, bricks, geopolymer and their properties.
3. Ability to perform and measures physical and mechanical properties of Construction Material by laboratorial testing.

**AMK20503 KHIDMAT BANGUNAN I [BUILDING SERVICE I]****No of credits: 3****Course Synopsis:**

To provide students with the basic concept, knowledge and skills in design, installation, operation and monitoring of the technical services in buildings especially mechanical services such as air conditioning, fire protection, cold water and sanitary plumbing, transportation in building, LPG and industrial gas, etc, assembly in developing them to be a good engineering technologist upon graduation. An overview on overall mechanical building services system and understanding its functionalities in building operation is the main objective in this course. Students must be able to explain the function of mechanical building services and how it's important to a building occupant safety and activities. Students also need to produce a mechanical report related to the building operation that is expected from a Building Engineering Technologist. The perspective that this course is focusing is on the construction point of view related to mechanical building services works. This will be an added advantage for the Building Engineering Technologist to function effectively in the multi-disciplinary team members in their career in future.

**Course Outcomes:**

1. Ability to EXECUTE the procedure, type, principle operation, terminologies, installation method and supervision of installation of mechanical building services components.
2. Ability to construct project documentation for mechanical building services equipment in the modern building.
3. Ability to design the mechanical building services system for building construction.
4. Ability to examine mechanical building services systems in terms of operation and maintenance using modern technologies and tools, ie IR 4.0

**AMK20602 ANALISIS STRUKTUR [STRUCTURAL ANALYSIS]****No of credits: 2****Course Synopsis:**

This course provides students with a clear and thorough presentation of the theory and application of structural analysis as it applies to beams, trusses and frames. It introduces analysis of statically indeterminate structures for beams, trusses, and frames. Two methods are introduced in this analysis of statically indeterminate structures using method of consistent deformations and moment distribution.

**Course Outcomes:**

1. Ability to evaluate the internal member forces of statically indeterminate

structure using method of consistent deformation and moment distribution method.

2. Ability to analyze indeterminate structural system by using software/computer approach based on stiffness method.

**AMK20703 PENGURUSAN PROJEK PEMBINAAN [CONSTRUCTION PROJECT MANAGEMENT]****No of credits: 3****Course Synopsis:**

This course aims to teach students on how to apply the project management skills throughout overall project life cycle. The role of engineering management is to assess the appropriateness of a given project, estimate its value, and justify it from an engineering standpoint. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineers relating to project management in project life cycle.

**Course Outcomes:**

1. Ability to evaluate the process of project management, work plans of the construction cycle, construction procurement and project cost estimation.
2. Ability to formulate project management activities using appropriate tools (Microsoft Project).
3. Ability to apply project management tools for coordinating all activities in site construction.
4. Ability to demonstrate proper project management activities with professional ethics and norms based on project management process.

**AMK20803 ANGGARAN KOS PEMBINAAN [CONSTRUCTION COST ESTIMATION]****No of credits: 3****Course Synopsis:**

This course will lead the students to be able to implement an appropriate technique to forecast the possible costs incurred for a building or construction project via systematic calculations employing various methods to control the construction project cost at the design stage before any drawings have embarked upon. The procedure is determined through an extensive analysis of data of a building that has an influence on its cost through understanding of construction methods, the general principle of measurement and pricing. At the end of the course, students will be able to determine and produce an accurate construction cost estimation before the construction take place.

**Course Outcomes:**

1. Ability to discuss the appropriate methods of estimating to predict the project cost and the general principles of measuring work and preparing the quantity take offs.
2. Ability to analyse the quantity and cost of the building elements based on the Standard Method of Measurement of Building Works (SMM) and Malaysian Civil Engineering Standard Method of Measurement (My-CESMM).
3. Ability to cooperate with the industry players in order to get the building elements price rates based on the materials, labours, machineries, profit and any related cost.
4. Ability to utilise the procedure and the process by using the ms-excel or any relevant software available.

**AMK20903 KHIDMAT BANGUNAN II [BUILDING SERVICE II]****No of credits: 3****Course Synopsis:**

To provide students with the basic concept, knowledge and skills in design, installation, operation and monitoring of the technical services in buildings especially electrical services such as electrical medium voltage, low voltage, extra low voltage, ICT, lightning protection, and earthing system etc, assembly in developing them to be a good engineering technologist upon graduation in understanding fundamental electrical building services system. An overview on overall electrical building services system and understanding its functionalities in building operation is the main objective in this course. Students must be able to explain the function of electrical building services and how it's important to a building occupant safety and activities. Students also need to produce a electrical report related to the building operation that is expected from a Building Engineering Technologist. The perspective that this course is focusing is on the construction point of view related to electrical building services works. This will be an added advantage for the Building Engineering Technologist to function effectively in the multi-disciplinary team members in their career in future.

**Course Outcomes:**

1. Ability to examine electrical building services systems in terms of operation and maintenance using modern technologies and tools ie IR 4.0
2. Ability to explain the type, principle operation, terminologies, installation method and supervision of installation of electrical building services components in relation to societal, health, safety, legal and cultural issues, and the consequent responsibilities relevant to electrical building services system.
3. Ability to design the electrical building services system for building construction by considering the environmental and sustainability issues for effective Building Services management.

4. Ability to construct project documentation for electrical building services equipment in the modern building.

**AMK21003 PENGURUSAN KESELAMATAN DAN KESIHATAN PEKERJAAN [MANAGEMENT OF OCCUPATIONAL SAFETY AND HEALTH]****No of credits: 3****Course Synopsis:**

This course will focus on the aspect of establishing safety culture with regards to construction industry. Students will be exposed to OSH management system as well as OSH laws that govern the industries in Malaysia (e.g. OSHA 1994 and FMA 1967) and other relevant acts (e.g. BOMBA, UBBL, EQA 1974). They will learn to interpret the requirements stipulated under these documents and be able to apply to working environment. This course will also provide students the necessary information in identifying hazards, perform risk assessment to determine the degree of hazard that may be harmful to humans in the workplace and lastly, develop mitigation plan/action to control or preventing the hazards and risks.

**Course Outcomes:**

1. Ability to analyze the legal requirement of occupational safety and health laws and regulations. And outline the OSH management system in managing the hazards and risks in the workplace.
2. Ability to assess the occupational hazards and associated risks at the workplace. And evaluate effective remedial or mitigation measures to control the hazards and risks at the workplace.
3. Ability to perform - OSH management system, OSH laws, HIRARC, and site safety assessment (e.g., ergonomics, noise, and chemical hazard assessment) in construction safety.
4. Ability to work effectively in group work.



**AMK21104 GEOTEKNIK [GEOTECHNICS]****No of credits: 4****Course Synopsis:**

This course provides further discussion and explanation related to soil engineering. The topics covered in this course includes site investigation, bearing capacity and design of shallow foundation and pile foundation, lateral earth pressure, and slope stability. At the end of the course, students should be able to apply theory and practical to solve problem related to geotechnical engineering.

**Course Outcomes:**

CO1 - Ability to explain main component in geotechnical engineering consist of site investigation, foundation, lateral earth pressure and slope stability.  
 CO2 - Ability to analyze soil bearing capacity, active and passive earth pressure, and slope stability.  
 CO3 - Ability to design foundation and earth retaining structure using principle of geotechnical engineering.  
 CO4 - Ability to conduct geotechnical laboratory test using appropriate instrument according to BS1377.

**AMK30103 REKABENTUK STRUKTUR I [STRUCTURAL DESIGN I]****No of credits: 3****Course Synopsis:**

This course introduces limit state design for reinforced concrete structure. The analyse of structure and section are introduced to assist in the design of reinforced concrete structure. At the end of the course, the students are expected to be able to design reinforced concrete structure according to Eurocode 2.

**Course Outcomes:**

1. Ability to analyse of structure and/or section at Limit State
2. Ability to design reinforced concrete structure according to Eurocode 2
3. Ability to perform in using modern tools for drawing, analysis and / or design of reinforced concrete structures

**AMK30203 TEKNOLOGI PEMBINAAN I [CONSTRUCTION TECHNOLOGY I]****No of credits: 3****Course Synopsis:**

Construction Technology I is a basic knowledge over the whole field of building

activities, to enable the technologist to hold and understand in the scope of work of carpentry, substructure & superstructure, framed building, finishes, internal fixtures and fittings, insulation, roofing, services, and plant and equipment in addition to Building Information Modelling (BIM).

**Course Outcomes:**

1. Ability to discuss building construction technology (masonry, carpentry, substructure & superstructure, framed building, finishes, internal fixtures and fittings, insulation, roofing, services and plant & equipment practices and procedures).
2. Ability to demonstrate Building Information Modeling (BIM) using appropriate tool
3. Ability to adapt Building Information Modeling (BIM) tool for coordinating & interfacing work in construction

**AMK30303 TEKNOLOGI LEBUHRAYA DAN LALULINTAS [TRAFFIC AND HIGHWAY TECHNOLOGY]****No of credits: 3****Course Synopsis:**

The course introduces the student with the basic and background of traffic, road, and highway technologies. The sub-topic discussed in road and highway technologies are pavement material design and evaluations, pavement construction technologies, pavement structural thickness design, pavement evaluation, and pavement maintenance. For traffic technologies, major topic includes driver behavior and traffic interactions, fundamental theory of speed-flow-density relationship, road performance analysis, traffic data collection & analysis, design of traffic signal control system, and highway geometric design.

**Course Outcomes:**

1. Ability to discuss main component in road/highway and traffic engineering technology using fundamental concept of design and construction for road/highway and traffic analysis.
2. Ability to design pavement structure and traffic signal-controlled system or road geometry using appropriate standard in Malaysia.
3. Ability to perform the experiment on road/highway and traffic according to appropriate standard and codes.

**AMK30402 PENTADBIRAN KONTRAK DAN TAPAK [CONTRACT AND SITE ADMINISTRATION]****No of credits: 2****Course Synopsis:**

This course introduces the administration of a project including award of the contract, progress claims, instructions, variations, certificates, claims, cash flow and disputes resolution. At the end of the course, the students are expected to be able to identify the use of various construction documents including the administrative process with relate to practice of value engineering and use their knowledge in site administration to promote ethical and better image of the construction industry.

**Course Outcomes:**

1. Ability to analyze the major types of contracts commonly adopted in the construction industry.
2. Ability to plan the use of various construction documents and the administrative process.
3. Ability to organize the construction documents provided by a construction manager including the practice of value engineering & constructability.

**AMK30503 PENGURUSAN KEWANGAN DAN SUMBER MANUSIA [FINANCIAL AND HUMAN RESOURCE MANAGEMENT]****No of credits: 3****Course Synopsis:**

This course aims to provide knowledge on financial and human resources management techniques and skills that are in line with the construction industry needs of competent construction players. This course will enable students to be exposed to the concept and foundation of decision making in financial and engineering economics such as economic equivalence, interest formula, and methods of evaluation such as present worth, annual worth, and rate of return analysis. In addition, students will be exposed to the related disciplines in human resources management as guidance for managing people in an organization.

**Course Outcomes:**

1. Ability to understand the concepts of human resources management and organizational behavior needs.
2. Ability to apply the related disciplines needed in order to manage people in the construction project organization.
3. Ability to analyze the project financial and engineering economics concept and principles in the construction project organization.
4. Ability to respond effectively the functions of financial and human resources

management in construction project organization planning.

**AMK30603 UKUR BANGUNAN [BUILDING SURVEYING]****No of credits: 3****Course Synopsis:**

In the present, practical guide in Building Surveying is important in construction industry. In this course, students will be taught to identify common defects in building structures, repairs which may be undertaken, methodology used based on the condition of the building. At the end of the semester, students shall be able to prepare a building survey report that includes investigations and recommendations to the existing building.

**Course Outcomes:**

1. Ability to classify the component in building surveying and explain the method of measurement based on equipment and procedures.
2. Ability to analyse the factors that will affect structural elements and identify the diagnosis pattern of insect attack to timber elements.
3. Ability to determine causes of failure based on defects on foundations and damp penetration. Assess condition of superstructures and building services system. Evaluate methods of remedy and prevention.
4. Ability to present the building surveying defects analysis that relates to particular phenomenon.

**AMK30703 REKABENTUK STRUKTUR II [STRUCTURAL DESIGN II]****No of credits: 3****Course Synopsis:**

This course aims to introduce students to the fundamental principles of structural behaviour and design criteria of steel and timber structure. This course delivers knowledge and understanding on both analysis and design aspects. Students will be able to design steel and timber axial member, flexural member, and connection for steel and timber element.

**Course Outcomes:**

1. Ability to manually analyse steel and timber structural elements subjected to permanent and variable actions as recommended by Eurocode 1
2. Ability to manually design steel and timber structural elements using Eurocode 3 and Eurocode 5
3. Ability to produce detail drawing by using computerized assisted software for steel and timber structural elements based on design calculation
4. Ability to present based on design and detail drawing for steel and timber structural element

**AMK30803 TEKNOLOGI PEMBINAAN II [CONSTRUCTION TECHNOLOGY II]****No of credits: 3****Course Synopsis:**

Construction Technology 2 is an instructional program that prepares an individual for employment or continued education in the drainage systems, Bridge Construction Technology, Railway Construction Technology, Highway Construction Technology, Machineries to launch beam and gantry, water reticulation and sewerage systems, ground treatment and slope stabilization, underground construction technology, Instrumentation, Non-Destructive Tests and Destructive Tests. Construction Technology 2 is a continuation of Construction Technology 1.

**Course Outcomes:**

1. Ability to evaluate developments and technologies related to various area in construction
2. Ability to demonstrate about Instrumentation for Scaffolding, Formwork construction, Rebar tying and coring works
3. Ability to PRESENT about Instrumentation for Scaffolding work, Formwork construction, Rebar tying & Coring work.

**AMK30004 PROJEK SARJANA MUDA I [BACHELOR DEGREE PROJECT I]****No of credits: 4****Course Synopsis:**

This course is an individual research project in connection with a special engineering problem. The project undertaken may fall under the following areas; experimental, computer simulation, hardware or software development, device fabrication and case/field study. Students will be given two semesters to work on the task that is related to their field of interest. At the end of the project, students are compulsory to prepare the report and present the findings of the project conducted.

**Course Outcomes:**

1. Ability to prepare literature review based on area of specification through written research proposal and reports.
2. Ability to propose analytical and critical thinking in identifying and solving problems that relates to the area of specification through written research proposal and progress report.
3. Ability to design suitable research method according to area of specification in the written research proposal and progress report.
4. Ability to adapts engineering tools in preparing standard requirements of research writing.

5. Ability to defend the research proposal and progress report.
6. Ability to arrange systematically and independently the research project with professional ethics and norms based on standard proceeding and protocols.

**AMK30903 ASAS KEJURUTERAAN DAN PENGURUSAN ALAM SEKITAR [BASIC ENVIRONMENTAL ENGINEERING AND MANAGEMENT]****No of credits: 3****Course Synopsis:**

This course focusses on basic elements of environmental engineering and management. Basic principles such as parameters and design consideration in environmental engineering for water and wastewater engineering, air and noise pollution engineering and solid waste management will be taught. Students will be introduced to Environmental Management System (EMS) and ISO 14000 and Environmental Impact Assessment (EIA) including Environmental Management Plan (EMP). Students will be also introduced to the environmental parameters measurement and monitoring systems in laboratory and field works.

**Course Outcomes:**

1. Ability to apply the basic principles in water and wastewater engineering, air & noise pollution engineering and solid waste management to solve environmental problems.
2. Ability to conduct lab work/ experiment for environmental quality monitoring
3. Ability to demonstrate the requirements in implementing an ISO 14001 and EMS in environmental management.
4. Ability to analyze EIA and & EMP processes & methods for environmental protection

**AMK31103 PENGURUSAN RISIKO PEMBINAAN [CONSTRUCTION RISK MANAGEMENT]****No of credits: 3****Course Synopsis:**

Managing risk is a critical function to ensure successful construction projects. This course will provide students a solid foundation in the concepts, tools and techniques of construction risk management. The course draws from perspective of the construction industry to give students a well-rounded approach to this process and an understanding of the rationale used in developing effective risk management systems.

**Course Outcomes:**

1. Ability to describe in detail the basic principles of risk management according to acknowledged standard.
2. Ability to thoroughly analyze the risk in construction projects according to established method.
3. Ability to critically elaborate the risk in construction projects according to project scenario and based on recognized risk management process and method.

**AMK31203 JURUTEKNOLOGI KEJURUTERAAN AWAM DALAM MASYARAKAT [CIVIL ENGINEERING TECHNOLOGIST IN SOCIETY]****No of credits: 3****Course Synopsis:**

This course aims to explain the main concepts in engineering and technology ethics and risk management as well as to expose the students to basic of law in the engineering and technology context. The course presents the introductory nature to enable technologists to appreciate factors that have to be taken into account in decision-making. Examine and assess issues and challenges faced by technologists relating to engineering and technology ethics, risk management and to understand the legal requirements related engineering and technology field.

**Course Outcomes:**

1. Ability to examine the issues and challenges of engineering and technology ethics.
2. Ability to assess hazards, the function of risk management and occupational safety and health (OSHA).
3. Ability to integrate professional Commitment aspects and procedures of legal in engineering and technology issues.

**AMK40103 TEKNOLOGI PEMBINAAN BANGUNAN BERINDUSTRI [INDUSTRIALISED BUILDING CONSTRUCTION TECHNOLOGY]****No of credits: 3****Course Synopsis:**

This course is designed to expose students to the concepts of IBS which includes the advantages and disadvantages using IBS in Construction, Roadmap of IBS and the usage of IBS. It also highlighted the concept of Score Calculation and submission, Principal of Modular Coordination in IBS and concepts of build ability. And also expose students the components and construction method of IBS. Student are also exposed to the IBS Pre-Cast Method which also involves the construction of high-rise buildings.

**Course Outcomes:**

1. Ability to carrying out the concept of IBS modern construction technology and several types of IBS structure
2. Ability to evaluate the component and construction method of IBS, Principle of Score calculation and Modular Coordination in IBS
3. Ability to identify the impact of IBS concept related to sustainability development.

**AMK40204 TEKNOLOGI PEMBINAAN PROJEK BERSEPADU [CONSTRUCTION TECHNOLOGY INTEGRATED PROJECT]****No of credits: 4****Course Synopsis:**

This course introduces the project related to construction technology in grouping work. The given project task is based on real construction project. All knowledges and practical skills including design, project management, modelling, and construction process which have been exposed in previous course in this programme, will be applied in this course to accomplish the given project. At the end of this course, the project proposal will be evaluated for each stages involved in the project. This will help student to understand the real construction project work that suit to technologist with good knowledge and skill in construction industry.

**Course Outcomes:**

1. Ability to design civil and structural component using engineering fundamentals and principles by referring to relevant codes and standards.
2. Ability to propose construction project management related problem that required specific needs with appropriate consideration and techniques.
3. Ability to suggest construction related problem that required specific needs with appropriate consideration for safety, health, societal and cultural issues with appropriate techniques.
4. Ability to perform appropriate experiment related to the construction project according to relevant codes and standards.
5. Ability to complete the project management and model using modern construction tools.
6. Ability to practice responsibility as individual, team and leader to ensure project successfully accomplished.

**AMK40006 PROJEK SARJANA MUDA II [BACHELOR DEGREE PROJECT II]****No of credits: 6****Course Synopsis:**

This course is the continuity of Bachelor Degree Project 1. With the aid of guidance from the supervisor (academic staff), the students will continue their research project which has been planned during the Bachelor Degree Project 1. In this course, student also exposed to journal writing. At the end of the project, each student prepares thesis report, presents and demonstrates research findings.

**Course Outcomes:**

1. Ability to defend the research components during presentation session.
2. Ability to prepare the research project with discipline, standard procedures and protocols.
3. Ability to demonstrate an understanding of the impact of research project on sustainable development in terms of economic, social, technology and environment.
4. Ability to outline the significance of research project in terms of commercialization value in the thesis and during presentation session.
5. Ability to produce thesis and technical report at the end of the course.

**AMK40303 REKABENTUK STRUKTUR TERMAJU [ADVANCED STRUCTURAL DESIGN]****No of credits: 3****Course Synopsis:**

This elective course provide additional knowledge on the effects of dynamic loads on structures, resonance, modal analysis, wind pressure, aerodynamic technologies, base shear force due to earthquake ground motions, response spectra, time history, structural damage classifications, energy dissipation for structures and structural health monitoring for structures under dynamic loads.

**Course Outcomes:**

1. Ability to revise the effects of dynamic loads on structures, resonance, modal analysis, wind pressure, aerodynamic technologies, base shear force due to earthquake ground motions, response spectra, time history, structural damage classifications, energy dissipation for structures and structural health monitoring for structures under dynamic loads.
2. Ability to dissect the structural performance analysis of structures under dynamic loads.
3. Ability to interpret fundamental performance and behavior of buildings under dynamic loads.

**AMK40403 TEKNOLOGI PEMBINAAN BANGUNAN TINGGI [CONSTRUCTION TECHNOLOGY OF HIGH RISE BUILDING]****No of credits: 3****Course Synopsis:**

This course is an introduction to the construction technology used to build high rise building. Construction technology related to structural concepts are discussed in relation to steel and concrete buildings. Design of high rise building due to wind loading will also be explained in this course. Besides that, the course will also explore the current technology and equipment applied in construction of high-rise building.

**Course Outcomes:**

1. Ability to categorise the lateral system by considering wind and seismic loading applied on high rise building
2. Ability to recommend the construction process technology towards sustainable development for high-rise building
3. Ability to defend the structural system/form through high-rise model in mini project assessment

**AMK40503 SISTEM MAKLUMAT PENYELENGGARAAN BANGUNAN [BUILDING MAINTENANCE INFORMATION SYSTEM]****No of credits: 3****Course Synopsis:**

This course is designed to introduce students to building maintenance and enhance their knowledge on management method that seems to become mislaid from time to time due to poor service delivery, inadequate finance, poor maintenance planning and maintenance backlogs. It will emphasize on the principles and practices relating to maintenance management in facilitating the assessment, planning and execution processes in relation to building facility. At the end of the course students should be able to apply, evaluate and develop the information system (i.e. database management) suitable for the building maintenance work on defect report and information transfer techniques with the aid of building information modelling technology.

**Course Outcomes:**

1. Ability to apply principles and practices relating to maintenance of building in construction engineering
2. Ability to evaluate effective method for building maintenance information system
3. Ability to build complex maintenance information system with the aid of modern engineering tools

**AMK40603 PEMERIKSAAN DAN PEMBAIKAN STRUKTUR [STRUCTURAL ASSESSMENT AND REPAIR]****No of credits: 3****Course Synopsis:**

This subject provides an understanding and ability to visualize and analyze the causes of distress in structures, to confirm the causes of distress and suggest suitable repair methods. Among the topics discussed are types and causes of distress in structures; corrosion - mechanism, assessment and repair; methods of testing of structures; semi-destructive and non-destructive testing; strength assessment techniques; durability assessment techniques; integrity assessment techniques; repair strategy and techniques; repair material selection; and strengthening techniques

**Course Outcomes:**

1. Ability to evaluate causes of defects in structures, methods to assess the defects and suitable techniques for repair.
2. Ability to demonstrate about assessment and repair techniques.
3. Ability to present about assessment and repair techniques.

**AMK49912 LATIHAN INDUSTRI [INDUSTRIAL TRAINING]****No of credits: 12****Course Synopsis:**

The practical-based course exposes students to a company technical functions and organizational structure and operation such as departmental function, work procedure, communication, technical skills and project management. During this course, the students will apply knowledge learned in the university and increased the related skills required in their future profession.

**Course Outcomes:**

1. Ability to combine technical knowledge and practical skills.
2. Ability to practice the health, safety, legal and cultural issues in working environment
3. Ability to interpret the impact of engineering technology solutions in societal and environmental context and display the need of sustainable development.
4. Ability to display good work performance and ethics during training period
5. Ability to perform as individual, a member or leader in diverse technical teams
6. Ability to display effective communication practice and operate assigned task given by host company
7. Ability to practice independent and lifelong learning in specialist technologies



## **UR6582001** **Bachelor of Technology in Building Construction with Honours**

### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

#### **PEO 1**

To produce building construction technologist that able to perform construction works related building technology.

#### **PEO 2**

To produce technopreneurs in building construction related technology.

#### **PEO 3**

To produce relevant, respected and referred professionals in building construction technology.

## PROGRAMME OUTCOMES (PO)

### P01

**Knowledge:** Apply knowledge of technology fundamentals to broadly-defined procedures, processes, systems and methodologies in building construction.

### P02

**Practical Skills and High Technology:** Able to suggest and apply latest tools and techniques to solve broadly-defined problems.

### P03

**Analytical, Critical Thinking and Scientific Approach:** Demonstrate strong analytical and critical thinking skills to solve broadly-defined problems in building construction.

### P04

**Communication Skills:** Able to communicate and articulate effectively in both verbal and written among technologist communities and society at large.

### P05

**Social Responsibility in Society and Technologist Community:** Demonstrate understanding of the societal related issues and the consequent responsibilities relevant to broadly-defined technology practices.

### P06

**Lifelong Learning and Information Management:** Recognize the needs for professional development and to engage independent lifelong learning in specialist technologists.

### P07

**Technopreneurship and Management Skills:** Demonstrate an awareness of management and technopreneurship practices in real perspective.

### P08

**Ethics and Professionalism:** Demonstrate professionalism and social and ethical consideration.

### P09

**Teamwork and Leadership:** Demonstrate leadership quality, mentoring and work effectively in diverse teams.

| CURRICULUM STRUCTURE<br>UR6582001 BACHELOR OF TECHNOLOGY IN BUILDING CONSTRUCTION WITH HONOURS INTAKE 2024/2025 |                                                              |                                                                 |                                                    |                                                                 |                                                                             |                                                  |          |                                 |
|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------|--------------------------------------------------|----------|---------------------------------|
| YEAR                                                                                                            | FIRST                                                        |                                                                 | SECOND                                             |                                                                 | THIRD                                                                       |                                                  |          | FOURTH                          |
| SEMESTER                                                                                                        | 1                                                            | 2                                                               | 3                                                  | 4                                                               | 5                                                                           | 6                                                | BREAK    | 7                               |
| <b>DISCIPLINE<br/>CORE &amp; ELECTIVE<br/>COURSES</b><br>(104 CREDITS)                                          | AMT10106<br>Building Technology 1                            | AMT10305<br>Building Technology 2                               | AMT20106<br>Project Quality<br>Management          | AMT20404<br>Human Resource and<br>Professional Ethics           | AMT30106<br>Demolition<br>Technique and<br>Construction Waste<br>Management | AMT30010<br>Bachelor Degree Project              |          | AMT40112<br>Industrial Training |
|                                                                                                                 | AMT10206<br>Building Services<br>Technology 1                | AMT10405<br>Building Service<br>Technology 2                    | AMT20206<br>Construction Project<br>Management     | AMT20504<br>Safety, Health And<br>Environmental<br>Management   | AMT30206<br>Building Information<br>Modelling                               | AMT30405<br>Building<br>Requirement and<br>Law   |          |                                 |
|                                                                                                                 |                                                              | AMT10503<br>Industrial Revolutions                              | AMT20303<br>Psychology in Industry                 | AMT20604<br>Construction Value<br>Estimation and<br>Procurement | AMT30304<br>Technopreneur<br>Project 2                                      | AMT30505<br>Building Assessment<br>and Reporting |          |                                 |
|                                                                                                                 |                                                              |                                                                 |                                                    | AMT20704<br>Technopreneur<br>Project 1                          |                                                                             |                                                  |          |                                 |
| <b>UNIVERSITY<br/>REQUIREMENT COURSES</b><br>(18 CREDITS)                                                       | SMZXXX01<br>Co-Curriculum I                                  | SMZXXX01<br>Co-Curriculum II                                    | SMB1XX02<br>Third Language <sup>[5]</sup>          | SMU22402<br>Engineering<br>Entrepreneurship                     | SMU13102<br>Appreciation of<br>Ethics and<br>Civilization                   |                                                  |          |                                 |
|                                                                                                                 | SMB41002<br>University Malay<br>Language <sup>[3]</sup>      | SMU13002<br>Philosophy and Current<br>Issue                     | SMB31202<br>English for Technical<br>Communication |                                                                 |                                                                             |                                                  |          |                                 |
|                                                                                                                 | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup> | SMB20102<br>English for General<br>Communication <sup>[2]</sup> |                                                    |                                                                 |                                                                             |                                                  |          |                                 |
| <b>TOTAL CREDITS</b><br>(122 CREDITS)                                                                           | <b>17</b>                                                    | <b>18</b>                                                       | <b>19</b>                                          | <b>18</b>                                                       | <b>18</b>                                                                   | <b>14</b>                                        | <b>6</b> | <b>12</b>                       |
| <b>AUDIT COURSES</b>                                                                                            | SMB10102<br>Preparatory English <sup>[1]</sup>               |                                                                 |                                                    |                                                                 |                                                                             |                                                  |          |                                 |

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.

[5] SMB1XX02: Thai, Arabic, Korean, Germany, Japanese, Mandarin

**LIST OF COURSES:**

| COURSE CODE | COURSE NAME                                                                                      |
|-------------|--------------------------------------------------------------------------------------------------|
| AMT10106    | Building Technology 1 [Teknologi Bangunan 1]                                                     |
| AMT10206    | Building Services Technology 1 [Teknologi Perkhidmatan Bangunan 1]                               |
| AMT10305    | Building Technology 2 [Teknologi Bangunan 2]                                                     |
| AMT10405    | Building Services Technology 2 [Teknologi Perkhidmatan Bangunan 2]                               |
| AMT10503    | Industrial Revolutions [Revolusi Perindustrian]                                                  |
| AMT20106    | Project Quality Management [Pengurusan Kualiti Projek]                                           |
| AMT20206    | Construction Project Management [Pengurusan Projek Pembinaan]                                    |
| AMT20303    | Psychology In Industry [Psikologi Dalam Industri]                                                |
| AMT20404    | Human Resource And Professional Ethics [Sumber Manusia Dan Etika Profesional]                    |
| AMT20504    | Safety, Health And Environmental Management [Pengurusan Keselamatan, Kesihatan Dan Alam Sekitar] |
| AMT20604    | Construction Value Estimation And Procurement [Anggaran Nilai Pembinaan Dan Perolehan]           |
| AMT20704    | Project Technopreneur 1 [Teknousahawan Projek 1]                                                 |
| AMT30106    | Demolition And Construction Waste Management [Pengurusan Perobohan Dan Sisa Pembinaan]           |
| AMT30206    | Building Information Modelling [Pemodelan Maklumat Bangunan]                                     |
| AMT30304    | Project Technopreneur 2 [Teknousahawan Projek 2]                                                 |
| AMT30405    | Building Requirements And Law [Keperluan Dan Undang-Undang Bangunan]                             |
| AMT30505    | Building Assessment And Reporting [Penilaian Dan Pelaporan Bangunan]                             |
| AMT30010    | Bachelor Degree Project [Projek Sarjana Muda]                                                    |
| AMT40112    | Industrial Training [Latihan Industri]                                                           |

**AMT10106 BUILDING TECHNOLOGY 1 [TEKNOLOGI BANGUNAN 1]****No of Credits: 6****Course Synopsis:**

Building Technology I, will introduce students the processes of construction and procedures. Students will learn about construction technology and construction materials. This course incorporates hands-on experience through labs that may be done on campus or at a building site. Students will learn the basics of technical drawing and plan reading, Standard specification of building works and building materials. Student also will be exposed to basic components of a building structure such as foundation, floors, walls, beams, columns, stair and roof.

**Course Outcomes:**

1. Ability to DESCRIBE basic procedure, methods, techniques, technology, and materials for building construction
2. Ability to PERFORM building technology skill in laboratory and various activities for building construction
3. Ability to DEMONSTRATES the idea and basic procedure, methods, techniques, technology, and materials for building construction

**AMT10206 BUILDING SERVICES TECHNOLOGY 1 [TEKNOLOGI PERKHIDMATAN BANGUNAN 1]****No of Credits: 6****Course Synopsis:**

To provide students with the basic concept, knowledge and skills in design, installation, operation, and monitoring of the technical services in buildings especially mechanical services such as air conditioning, fire protection, cold water and sanitary plumbing, transportation in building. Besides, knowledge on Liquidated Petroleum Gas (LPG) industrial gas is introduced, the assemble procedure is exposed to students to ensure the Building Technologist knowledge and practices has been gained by students. An overview on the overall mechanical building services system and understanding the functionalities in building operation is the main objective in this course. Students will be able to explain the function of mechanical building services and the importance to a building occupant's safety and activities. Students also need to produce a mechanical report related to the building operation as the required documents that Building Technologist shall produce.

**Course Outcomes:**

1. Ability to APPLY the procedure, type, principle operation, terminologies, installation method and supervision of mechanical building services

technologies

2. Ability to DEMONSTRATE mechanical building services equipment installation plan and operation using appropriate software in the modern building.
3. Ability to RECOMMEND the building services system plan in term of operation and maintenance in relation to building facilities problem and issues.
4. Ability to FORMULATE commissioning procedure for testing and commissioning mechanical building services equipment in the modern building in related to the current standard

**AMT10305 BUILDING TECHNOLOGY 2 [TEKNOLOGI BANGUNAN 2]****No of Credits: 5****Course Synopsis:**

Building Technology 2 introduces students to innovative solutions of construction processes and procedures towards higher productivity, greater sustainability, and enhanced affordability, leading to better build quality at lower costs. Students will learn about the concept of principles of modular coordination, concepts of buildability, IBS score calculation and submission, green building technology, smart/intelligent building, and adaptation of technology in highrise buildings. The content of the course aligns with Malaysia's national agenda for revolutionising the construction industry. The outcome of this course, the students will possess the knowledge and skill interm of productivity and environmental sustainability, nurturing globally competitive players while emphasising safety and quality standards.

**Course Outcomes:**

1. Ability to APPLY the knowledge, methods, techniques, standard and technology in innovative construction process towards higher construction productivity and sustainability.
2. Ability to INTEGRATE innovative construction skill towards higher construction productivity and sustainability by using suitable tool/equipment.
3. Ability to EXPLAIN by presenting knowledge, methods, techniques, standard and technology in innovative way towards higher construction productivity and sustainability concept in Malaysia, effectively.

**AMT10405 BUILDING SERVICES TECHNOLOGY 2 [TEKNOLOGI PERKHIDMATAN BANGUNAN 2]****No of Credits: 5****Course Synopsis:**

This course covers four main chapters that relates to integrated building services system including electrical supply system; mechanical system in buildings; mechanical and electrical services coordination and; current technologies in building services. This course will be conducted in lecture, and practical through lab activities. At the end of the course, the students are expected to acquire knowledge and skills as it relates to electrical systems, mechanical systems, building automation, as well as renewable energy.

**Course Outcomes:**

1. Ability to APPLY appropriate operation and maintenance solutions of integrated building services system problems & its application based on building requirements.
2. Ability to DEMONSTRATE appropriate procedures that relates to operation and maintenance of integrated building services system & its application by using appropriate tools and techniques.
3. Ability to DEMONSTRATE the responsibility to the society/community to resolve issues that relates to operation and maintenance of integrated building services system
4. Ability to EXPLAIN the appropriate conducts towards complying with the legislations, requirements and guidelines that relates to operation and maintenance of integrated building services system & its application.

**AMT10503 INDUSTRIAL REVOLUTIONS [REVOLUSI PERINDUSTRIAN]****No of Credits: 3****Course Synopsis:**

The aim of this course is to describe the Construction 4.0 framework and consequently highlight the resultant processes and practices that allow us to plan, design, deliver, and operate built environment assets more effectively and efficiently by focusing on the physical-to-digital transformation and then digital-to-physical transformation. This course will enable students to be exposed to the technological transformations related to industrial production, cyber-physical, and digital technologies which currently shape the construction industry.

**Course Outcomes:**

1. Ability to INTERPRET the information presented by drawing a logical conclusion in terms of technological revolution and its impact on the construction industry.

2. Ability to RELATE the evolution of technology advancement with application in the construction practice.
3. Ability to PRACTICE in using computer-aided software of current digital technologies towards fulfilling the requirement of professional establishment in specialist technology.
4. Ability to PRESENT the application of current technology advancement that relates to the construction industry.

**AMT20106 PROJECT QUALITY MANAGEMENT [PENGURUSAN KUALITI PROJEK]****No of Credits: 6****Course Synopsis:**

This course emphasizes on Project Quality Management which is a process of quality that is managed and maintained throughout a project. The course focuses on the context which implies the quality that leads to compliance with certain standards. In this course, students will be exposed to quality audit and quality control activities that will be conducted throughout the construction project life cycle.

**Course Outcomes:**

1. Ability to APPLY the fundamental and process of Project Quality Management
2. Ability to ANALYSE the problem based on project quality management system with standard required in construction industry
3. To SOLVE the problem in quality management using tools that apply in construction industry
4. project management via practical orientated method
5. To MANAGE project quality management in construction with effective communication skills and teamwork skills in handling construction project quality management



**AMT20206 CONSTRUCTION PROJECT MANAGEMENT [PENGURUSAN PROJEK PEMBINAAN]****No of Credits: 6****Course Synopsis:**

This course aims to provide the knowledge and skills of construction project management that in line with the industry needs of competent construction project managers. This course will enable students to be exposed to all disciplines and processes on construction project lifecycles such as project initiation, planning, execution, control, and monitoring, and also project closing as guidance for managing the successful construction project.

**Course Outcomes:**

1. Ability to APPLY all the possible disciplines needed in the construction project management.
2. Ability to ANALYSE the management process of construction project lifecycles. Ability to DEMONSTRATE the construction project management life cycles activities by using
3. Microsoft Project Software or other equivalent software.
4. Ability to ORGANISE the construction project management in handling construction project activities.

**AMT20303 PSYCHOLOGY IN INDUSTRY [PSIKOLOGI DALAM INDUSTRI]****No of Credits: 3****Course Synopsis:**

This course is concerned on the understanding of psychology in the workplace. The learning content focuses on organizational background, attitudes, behaviour, recruitment, issues, motivation, stress management, conflict, employee performance and healthy workplace. This course emphasized on people skills that encapsulated in between employers and employees collaborating to improve healthy workplace and sustain the organizational productivity.

**Course Outcomes:**

1. To analyse the psychological issues that relate to organizational workplace in construction industry
2. To organize psychological issues, organizational behaviour, and managing peoples in construction workplace.
3. To evaluate the psychological issues in organization to achieve healthy workplace environment

**AMT20404 HUMAN RESOURCE AND PROFESSIONAL ETHICS [SUMBER MANUSIA DAN ETIKA PROFESIONAL]****No of Credits: 4****Course Synopsis:**

This course aims to provide the knowledge of human resources and professional ethics skills focusing on construction perspective. This course will enable the students to be exposed to the concepts, processes, and functions in human resources management and professional ethics as guidance to lead companies or organizations effectively.

**Course Outcomes:**

1. Ability to APPLY the theories and concepts of human resource management and professional ethics in the organization.
2. Ability to EVALUATE the appropriate process and procedure in managing human resources with respect to professional ethics.
3. Ability to DISPLAY ethical awareness and professionalism in managing human resources organization.
4. Ability to RESPOND to the utilization of human resources development principles with respect to professional ethics in organizing an organization.

**AMT20504 SAFETY, HEALTH AND ENVIRONMENTAL MANAGEMENT [PENGURUSAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR]****No of Credits: 4****Course Synopsis:**

This course exposes students with necessary knowledge and skills that requires for managing the occupational safety, health, and environmental in the construction industry. Thus, this course covers elements of; legislation and requirements in relation with workplace safety and health, principles, concept, and application of safety, health and environmental management including hazard identification, risk assessment and risk control at the workplace. At the ends of the course, students will develop abilities to manage issues related to safety, health, and environment in effective and ethical way in construction industry.

**Course Outcomes:**

1. Ability to EXPLAIN in terms of principles, concept, and application of SHE in the workplace, in relation to construction industry
2. Ability to PERFORM workplace hazard and risk assessment at the working site by using appropriate techniques, tools and equipment.

**Course Outcomes:**

1. Ability to EXPLAIN in terms of principles, concept, and application of SHE in the workplace, in relation to construction industry
2. Ability to PERFORM workplace hazard and risk assessment at the working site by using appropriate techniques, tools and equipment.
3. Ability to DEMONSTRATE responsibilities in ensuring safe working environment by using safety and health assessment system.
4. Ability to PROPOSE appropriate interpersonal practise/conduct on risk control based on hazard identified at the workplace that relates to safety in the construction industry.

#### AMT20604 CONSTRUCTION VALUE ESTIMATION AND PROCUREMENT [ANGGARAN NILAI PEMBINAAN DAN PEROLEHAN]

**No of Credits: 4**

**Course Synopsis:**

This course expose on the construction value estimating, contractual tendering and procurement method in building construction project works. The concept of estimation preparation, tendering and decision making on the procurement approach will be introduced according to the current practise in construction industry. Other than that, the computer-aided estimation and e-procurement method will be exposed using the relevant software to improve the estimating, tendering and procurement decision making skills.

**Course Outcomes:**

Ability to APPLY the fundamental and proses of project estimating and procurement concept that is related to requirement in construction project  
 Ability to EVALUATE the procedure on construction estimating and procurement in respect to Standard Method of Measurement (SMM) and Form of Contracts  
 Ability to DEMONSTRATE proficiency using relevant computer aided estimation and e-procurement tools that is related to the requirement in construction projects  
 Ability to ORGANISE the project cost estimation and procurement management to fulfil the project's needs and requirements

#### AMT20704: PROJECT TECHNOPRENEUR 1 [TEKNOUSAHAWAN PROJEK 1]

**No of Credits: 4**

**Course Synopsis:**

Technopreneur Project 1 will introduce the students to the business organization and expose them to any available technology in the construction industry that have potential to become their business foundation. This course will expose the students on business creativity, technology integration, innovation, project

planning and business management related to the construction industry. Lastly, students will be enlightened to the business approach and negotiation.

**Course Outcomes:**

1. Ability to APPLY knowledge of business organization, business planning and management
2. Ability to PROPOSE creative and innovative technology integration as a business foundation.
3. Ability to DEMONSTRATE management and technopreneurship skills in completing project
4. Ability to DELIVER the effective communication skills in business approach and negotiation
5. Ability to ORGANISE the business organization with an active leadership in teamwork skills

#### AMT30106 DEMOLITION AND CONSTRUCTION WASTE MANAGEMENT [PENGURUSAN PEROBOHAN DAN SISA PEMBINAAN]

**No of Credits: 6**

**Course Synopsis:**

This course aims to provide knowledge and insights on building demolition techniques and construction waste management. This course will enable the students to be exposed to the preparation, process, and management of building demolition work planning and execution, safety and risk measures on building demolition work, and also with respect to environmental degradation resulting from demolition activities, one of the major concerns is the production of Construction and Demolition (C&D) wastes as guidance to managing the whole process of demolition towards minimizing waste and moving towards sustainable construction practices.

**Course Outcomes:**

1. Ability to APPLY the knowledge on building demolition and construction waste management.
2. Ability to EVALUATE the techniques of building demolition work and construction waste management in the construction sites.
3. Ability to PROPOSE suitable building demolition work planning with respect to the sustainability measures.
4. Ability to DISPLAY responsibilities of managing construction waste by using appropriate process activities in the Waste Management Plan (WMP).

**AMT30206 BUILDING INFORMATION MODELLING [PEMODELAN MAKLUMAT BANGUNAN]****No of Credits: 6****Course Synopsis:**

This course will guide the students through a step-by-step project-based workflow to learn and implement BIM using a real project data. The course is therefore designed practically hands-on where the participants are required to model a multiple storey building by focusing on architectural and structural element in a building. Finally, students will learn about coordination between BIM modelling which enable them to check the clashes of the model and prepare the report for the clashed model.

**Course Outcomes:**

1. Ability to DISPLAY proficiency of using BIM software in completing the projects
2. Ability to DERIVE the solution on the building modelling clashes based on the clash report generated
3. Ability to DEVELOP strategies to discover the relevant sources of information and overcome the obstacles to complete the task of modeling the building in terms of architectural and structural elements
4. Ability to DISPLAY cooperation in the group activities of modelling the architectural and structural elements for a building as well as during modelling coordination.

**AMT30304 PROJECT TECHNOPRENEUR 2 [TEKNOUSAHAWAN PROJEK 2]****No of Credits: 4****Course Synopsis:**

Technopreneur Project 2 course exposes students to the formation and management of the business related to the construction industry. These include approaches to securing start-up capital and venture financing. Students learn about basic accounting, essential financial indicators, the types of funds available, the different categories of investors, and the importance of intellectual property in securing finance. The financial details to be included in a business plan are required for investment purposes, valuation of the company, and the art of negotiation with investors.

**Course Outcomes:**

1. Ability to APPLY knowledge of various financial indicator and tools to prepare for financial information for a new business venture
2. Ability to ANALYSE business performance of construction company based on financial statement
3. Ability to COMMUNICATE effectively on the art of negotiation

4. Ability to DEMONSTRATE management and technopreneurship skills in completing mini project related to business models and revenue models

**AMT30405 BUILDING REQUIREMENTS AND LAW [KEPERLUAN DAN UNDANG-UNDANG BANGUNAN]****No of Credits: 5****Course Synopsis:**

This course will be exposed the students with the overview of building requirements and law that have been practiced in relation to the building projects. During the Work Based Learning, students will be provided with real-life work experiences where they can apply knowledge of building laws and any available building requirements related to the current practice.

**Course Outcomes:**

1. Ability to APPLY the fundamentals of provision and relevant requirements and law related to the building planning and development.
2. Ability to EVALUATE the compliance of related laws, regulations and requirements enforced by statutory bodies in relation to building planning and development.
3. Ability to MANAGE a building planning and development permission for approval by authorities with effective communication skills.
4. Ability to DISPLAYS self-reliance in working independently to ensure the compliance of related laws, regulations and requirements enforced by statutory bodies in relation to building planning and development.
5. Ability to ORGANISE a building planning and development permission for approval by authorities with an active leadership in teamwork skills.

**AMT30505 BUILDING ASSESSMENT AND REPORTING [PENILAIAN DAN PELAPORAN BANGUNAN]****No of Credits: 5****Course Synopsis:**

This course will be exposed the students on the Building Condition Assessment (BCA) implementation in area of building projects. The knowledge on building auditing and evaluation in term of process and procedure of BCA will be explained through on site oriented activities. Students will be understand the concept of BCA and will be able to produce audit report on the corrective measures to ensure the building meets the Malaysian Building Condition Assessment Rating System or equivalent.

**1. Course Outcomes:**

2. Ability to APPLY the fundamental of building condition assessment concept based on the physical state of the building
3. Ability to EVALUATE the preventive measures on the building condition elements according to construction industry standard
4. Ability to DELIVER the effective communication skills in Building Condition Assessment Rating Tools for building works
5. Ability to DEMONSTRATE the technique in assessing building condition using tools that apply in construction industry project management
6. Ability to ORGANISE the process of Building Condition Assessment for building works with an active leadership in teamwork skills

**AMT30010 BACHELOR DEGREE PROJECT [PROJEK SARJANA MUDA]****No of Credits: 10****Course Synopsis:**

The Bachelor Degree Project is one of the courses for this program which provides students an opportunity to undertake full end-to-end development of a substantial project by integrating and applying knowledge and skills they have acquired in their studies. This course requires students to conduct a project that relates to the building construction sector either a real-industry problem based or project-based or an applied research-oriented or software development. Students will be assisted by industry coach and university supervisors in conducting the project which requires students to identify the problem boundaries, investigate and propose possible solutions, explore the appropriate techniques and solve the problem identified in order to deliver the project aims. In addition, students will be exposed to the project reporting and skills in delivering the whole project findings.

**Course Outcomes:**

1. Ability to ANALYSE the project information and/or data towards solving the project problems that being identified in the early stage
2. Ability to PRESENT the project outcome during the presentation session within the allocated period
3. Ability to DISPLAY improvement of interpersonal skills in achieving better finished project
4. Ability to systematically CONDUCT the project activities with professional ethics based on the standard, procedures, protocols and requirement outline
5. Ability to DISPLAY proper use of technics and / or tools to improvise or solve project problem that being identified in the early stage.

**AMT40112 INDUSTRIAL TRAINING [LATIHAN INDUSRTI]****No of Credits: 12****Course Synopsis:**

This course expose on the practical based orientation conduct that enable students to explore on the company technical function and organisation. Besides that the company operational pattern that are comprised of departmental function, work procedure, safety procedure, industrial communication, technical skills and project management. During this course, students will adapt thories that has been learnt in university into and industrial practical based work task

**Course Outcomes:**

1. Ability to COMBINE technical knowledge and practical skills through training.
2. Ability to DISPLAY consistency towards society and environmental responsibility in terms of health, safety and legal issues.
3. Ability to DISPLAY working ethics consistency during training period.
4. Ability to PERFORM effectively as individual or leader in diverse teams.
5. Ability to DISPLAY effective communication during task orientation.
6. Ability to PRACTICE independent and life-long learning in specialist technologies for personal development.

# FACULTY OF BUSINESS & COMMUNICATION (FPK)

## Programmes Offered:

1. Bachelor of New Media Communication with Honours
2. Bachelor of Interactive Media Technology with Honours
3. Bachelor of Business (International Business) with Honours
4. Bachelor of Business (Engineering Entrepreneurship) with Honours

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## **UR6321001**

### **Bachelor of New Media Communication with Honours**

#### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

##### **PEO 1**

To educate and produce the graduates who have the knowledge and skills of professionals in the field of communication and social interaction,

##### **PEO 2**

To educate and produce the graduates who have the knowledge and skills of professionals in the field of new media,

##### **PEO 3**

To educate and produce graduates who have the knowledge and skills of professionals in the field of entrepreneurial management.

##### **PEO 4**

To train and produce skilled graduates in implementing and managing projects/research by integrating the latest information related to new media communication.

## PROGRAMME OUTCOMES (PO)

### P01

To demonstrate professional and research skills in communication and social interaction, new media, entrepreneurship and management.

### P02

To apply the model and the theory of communication and social interaction, new media, and entrepreneurial management through an understanding of the impact of such changes on society.

### P03

To interpret social issues, cultural, global, and environmental responsibility, and law and ethics to the practice fields of communication and social interaction, new media, and entrepreneurial management in their professional activities.

### P04

To identify the link between professionalism and human values in the areas of communication and social interaction, new media, and entrepreneurial management through a variety of practical applications and theoretical framework, methods and research techniques.

### P05

To communicate effectively, both individually and in group.

### P06

To demonstrate the ability to use hardware and software related to digital media, journalism, advertising, broadcasting, public relations, graphic design, multimedia, and photography.

### P07

To analyse and interpret research data of communication and social interaction, new media, and entrepreneurial management, and propose a solution and justify the measures to be taken.

### P08

To develop analytical and critical thinking skills that are appropriate in preparation for continuous learning.

### P09

To demonstrate an understanding of the impact of changing media and communications technologies, policies and structures on the social, cultural, economic and political environments;

### P010

To apply widely business activities in real-world perspective; and

### P011

To demonstrate social and entrepreneurship skills and inculcate a spirit of innovation.

| CURRICULUM STRUCTURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                       |                                                          |                                                                 |                                              |                                                             |                                                                                |                                 |
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| UR6321001 BACHELOR OF NEW MEDIA COMMUNICATION WITH HONOURS INTAKE 2024/2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                       |                                                          |                                                                 |                                              |                                                             |                                                                                |                                 |
| YEAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | FIRST                                                 |                                                          | SECOND                                                          |                                              | THIRD                                                       |                                                                                |                                 |
| SEMESTER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | I                                                     | II                                                       | III                                                             | IV                                           | V                                                           | VI                                                                             | BREAK                           |
| COMMON /DISCIPLINE<br>CORE/ELECTIVE COURSES<br>(105 credits)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | SMM1013<br>Introduction to<br>Communication<br>Theory | SMM10603<br>Visual Communication                         | SMM20203<br>Digital Photography                                 | SMM30303<br>Digital Marketing                | SMM40103<br>Public Relations and New<br>Media               | SMM40803<br>Event Management                                                   | SMM49906<br>Industrial Training |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SMM1023<br>Public Speaking                            | SMM20103<br>Organizational<br>Communication              | SMM20303<br>Graphic Design for<br>NewMedia                      | SMM30403<br>Digital Video<br>Production      | SMM40203<br>Ethics and Law in New<br>Media<br>Communication | SMM40903<br>New Media Issues &<br>Challenges                                   |                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SMM1033<br>Introduction to New Media                  | SMM10703<br>Innovative and Creative<br>Skills            | SMM20403<br>New Media Analysis                                  | SMM30503<br>Web Design and<br>Development    | SMM40303<br>Animation for Integrated<br>Media               | SMM41003<br>Skills in Organizational<br>Strategy and Performance<br>Management |                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SMM1043<br>Script Writing &Digital<br>Storyboard      | SMM 10803<br>Introduction to<br>Programming<br>Languages | SMM30103<br>Media Psychology                                    | SMM30603<br>New Media Arts                   | SMM40403<br>Digital Creative<br>Advertising                 | SMM41104<br>Final Year Project 2                                               |                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SMM1053<br>New Media Literacy                         | SMM1XXXX<br>Elective I                                   | SMM20503<br>New Era Management                                  | SMM30703<br>Data Reasoning                   | SMM31103<br>Electronic<br>Entrepreneurship                  |                                                                                |                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                       |                                                          | SMM30203<br>Research Method                                     | SMM3XXXX<br>Elective II                      | SMM40502<br>Final Year Project 1                            |                                                                                |                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                       |                                                          |                                                                 |                                              | SMM4XXXX<br>Elective III                                    |                                                                                |                                 |
| UNIVERSITY REQUIREMENT<br>COURSES<br>(16 credits)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SMB0XX02<br>Foreign Language                          | SMU13102<br>Appreciation of Ethics and<br>Civilization   | SMB20102<br>English for General<br>Communication <sup>[2]</sup> | SMB31302<br>English for Academic<br>Purposes |                                                             |                                                                                |                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SMU13002<br>Philosophy and Current<br>Issues          | SMB41002<br>University Malay<br>Language <sup>[3]</sup>  |                                                                 |                                              |                                                             | SMU32202<br>Thinking Skills                                                    |                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | SMZXXX01<br>Co-Curriculum 1                           | SMZ XXX01<br>Co-Curriculum 2                             |                                                                 |                                              |                                                             | SMU12102<br>Integrity and Anti<br>Corruption <sup>[4]</sup>                    |                                 |
| TOTAL CREDITS<br>(123 CREDITS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 20                                                    | 20                                                       | 20                                                              | 20                                           | 20                                                          | 17                                                                             | 6                               |
| AUDIT COURSES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                       | SMB10102<br>Preparatory English <sup>[1]</sup>           |                                                                 |                                              |                                                             |                                                                                |                                 |
| <b>Elective I</b> : SMM10903 Principles of Human Computer Interaction, SMM11003 Sociology in New Media<br><b>Elective II</b> : SMM30803 3D Modelling for Beginners/ SMM30903 Contemporary Photography, SMM31003 Industrial Psychology<br><b>Elective III</b> : SMM40603 Audio Design, SMM40703 Crisis Communication in New Media Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students).<br><sup>[1]</sup> Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.<br><sup>[2]</sup> Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.<br><sup>[3]</sup> International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.<br><sup>[4]</sup> International students should register SMU13202 Malaysian Studies |                                                       |                                                          |                                                                 |                                              |                                                             |                                                                                |                                 |

## **UR6213001**

### **Bachelor of Interactive Media Technology with Honours**

#### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

##### **PEO 1**

Analyse and relate broad knowledge of Interactive Media Technology concepts and principles to practices incorporating technical skills in relevant fields.

##### **PEO 2**

Commit to take responsibility to lead and deliver assigned tasks when leading, interacting and communicating with peers and stakeholders while ensuring ethical practices.

##### **PEO 3**

Demonstrate technical competency in the innovative and creative use of digital technology and apply numerical techniques in Interactive Media Technology.

##### **PEO 4**

Commit to life-long learning and demonstrate entrepreneurial skills for academic and career advancement in relevant industries.



## PROGRAMME OUTCOMES (PO)

### P01

Analyze and apply broad knowledge and skills including the use of numeracy techniques in related fields in Interactive Media Technology effectively for innovative practice.

### P02

Critically analyze historical, contextual, conceptual theory, and ethical considerations in the practice of Creative Multimedia Technology.

### P03

Create and develop ideas and innovations for practice in the field of Interactive Media Technology.

### P04

Articulate and convey ideas and concepts comprehensively in visual, written and verbal engagement.

### P05

Implement design concepts and cost analysis through the use of digital and other technologies for effective delivery.

### P06

Building Interactive Media Technologies, through reflection, commentary and evaluation.

### P07

Communicate and interact effectively with experts, peers, customers, superiors and the community under the relevant work environment and organization for the development of Creative Multimedia Technology.

### P08

Demonstrates commitment to leadership and accountability as well as commitment to professional and ethical practice, including compliance with legal requirements and organizational functions.

### P09

Demonstrate a commitment to lifelong learning for academic and career development and an entrepreneurial mindset in the application of Creative Multimedia Technology.

| CURRICULUM STRUCTURE<br>UR6213001 BACHELOR IN INTERACTIVE MEDIA TECHNOLOGY WITH HONOURS INTAKE 2024/2025 |                                                      |                                                              |                                                     |                                                                |                                     |                                                              |                                                  |                                   |
|----------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------|--------------------------------------------------|-----------------------------------|
| YEAR                                                                                                     | FIRST                                                |                                                              | SECOND                                              |                                                                | THIRD                               |                                                              | FOURTH                                           |                                   |
| SEM                                                                                                      | 1                                                    | 2                                                            | 3                                                   | 4                                                              | 5                                   | 6                                                            | 7                                                | 8                                 |
| <b>COMMON /DISCIPLINE<br/>CORE/ELECTIVE<br/>COURSES<br/>(82 credits)</b>                                 | SMT10103<br>Principle of Design                      | SMM10603<br>Visual Communication                             | SMM10703<br>Creative and Innovative Skills          | SMT20603<br>Media History and Culture                          | SMT40103<br>Creative Advertising    | SMT 40503<br>Law in Creative Industries                      |                                                  |                                   |
|                                                                                                          | SMT10203<br>Fundamental Drawing                      | SMT20103<br>Graphic Design for Interactive Media             | SMT20303<br>Fundamental 3D Modelling                | SMT30103<br>Interactive 3D Development                         | SMT40203<br>Interactive Media Arts  | SMT40603<br>Digital Media Content management                 |                                                  |                                   |
|                                                                                                          | SMT10303<br>Introduction to Scripting Programming    | SMT10503<br>Web Design & Development                         | SMT 20403<br>Video production for interactive media | SMT30203<br>Audio Production                                   | SMT40303<br>Mobile Apps Development | SMT40703<br>Interactive Media Design and Development Methods |                                                  |                                   |
|                                                                                                          | SMT10403<br>Introduction to Interactive Media        | SMT20203<br>Photography for Interactive Media                | SMT20503<br>Motion Graphic for Interactive Media    | SMT30303<br>User experiences (UX) & User Interface (UI) design | SMM30303<br>Digital Marketing       | SMT40803<br>Big data Management                              |                                                  |                                   |
|                                                                                                          | SMM10403<br>Script Writing & Digital Storyboard      | SMT10603<br>Introduction 2D Animation                        |                                                     |                                                                |                                     | SMT 41104<br>FYP 1 Interactive Media Technology              |                                                  |                                   |
| <b>WBL<br/>(24 credits)</b>                                                                              |                                                      |                                                              |                                                     |                                                                |                                     |                                                              | SMT41212 *<br>FYP 2 Interactive Media Technology |                                   |
|                                                                                                          |                                                      |                                                              |                                                     |                                                                |                                     |                                                              |                                                  | **SMT41012<br>Industrial Training |
| <b>UNIVERSITY<br/>REQUIREMENT<br/>COURSES<br/>(16 credits)</b>                                           | SMB41002<br>University Malay Language <sup>[3]</sup> | SMB20102<br>English for General Communication <sup>[2]</sup> | SMB31302<br>English for Academic Purposes           |                                                                | SMU32202<br>Thinking Skills         | SMU12102<br>Integrity and Anti Corruption <sup>[4]</sup>     |                                                  |                                   |
|                                                                                                          | SMZXXX01<br>Co-Curriculum 1                          | SMZXXX01<br>Co-Curriculum 2                                  | SMU13102<br>Appreciation of Ethics and Civilization | SMU13002<br>Philosophy and Current Issues                      |                                     |                                                              |                                                  |                                   |
| <b>TOTAL CREDITS<br/>(122 CREDITS)</b>                                                                   | <b>18</b>                                            | <b>18</b>                                                    | <b>16</b>                                           | <b>14</b>                                                      | <b>14</b>                           | <b>18</b>                                                    | <b>12</b>                                        | <b>12</b>                         |
| <b>AUDIT COURSES</b>                                                                                     | SMB10102<br>Preparatory English <sup>[1]</sup>       |                                                              |                                                     |                                                                |                                     |                                                              |                                                  |                                   |

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies

**UR6340001**

**Bachelor of Business (International Business) with Honours**

### **PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1**

Graduates who are managers.

**PEO 2**

Graduates who are business leaders experienced in global/international business environment

**PEO 3**

Graduates who pursue continuous educational opportunities.

**PEO 4**

Graduates who contribute to society.

**PEO 5**

Graduates who contribute through research and development

**KONVOKESYEN 18**  
**UNIVERSITI MALAYSIA PERLIS**

**18 – 21 NOVEMBER 2023**  
DEWAN ILMU, KAMPUS ALAM UNIMAP, PAUH PUTRA

## PROGRAMME OUTCOMES (PO)

### PO 1

Ability to apply the theories and concepts of international business management in the work environment.

### PO 2

Ability to analyse problems and enhance their problem solving and decision making skills.

### PO 3

Ability to adapt business operation practices and principles currently used in professional business environment

### PO 4

Ability to collaborate professionally and ethically with multidisciplinary business teams.

### PO 5

Ability to communicate effectively in business and work environment.

### PO 6

Ability to use appropriate information and communication technology to engage in lifelong learning.

### PO 7

Ability to propose solution for international business issues base on analysing numerical data and information.

### PO 8

Ability to demonstrate leadership skills and responsibility in international business environments.

### PO 9

Ability to identify international business opportunities by analysing global business trend.

### PO 10

Ability to demonstrate professional entrepreneurship skills and innovativeness required for sustainable development.

### PO 11

Ability to adopt professionally and ethically the social, cultural and environmental responsibilities and issues from a global perspective

| CURRICULUM STRUCTURE<br>UR6340001 BACHELOR OF BUSINESS (INTERNATIONAL BUSINESS) WITH HONOURS INTAKE 2024/2025 |                                                   |                                                        |                                                                 |                                                                                            |                                 |                                              |                                                        |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------------|--------------------------------------------------------|
| YEAR                                                                                                          | FIRST                                             |                                                        | SECOND                                                          |                                                                                            |                                 | THIRD                                        |                                                        |
| SEMESTER                                                                                                      | I                                                 | II                                                     | III                                                             | IV                                                                                         | Break                           | V                                            | VI                                                     |
| <b>BUSINESS COMMON<br/>/DISCIPLINE CORE<br/>COURSES<br/>(108 credits)</b>                                     | SMP10803<br>Principles of Marketing               | SMP11503<br>Principles of<br>Entrepreneurship          | SMP20203<br>International Business<br>Management                | SMP22203<br>Managerial<br>Accounting                                                       | SMP29204<br>Industrial Training | SMP33803<br>Strategic<br>Management          | SMP35103<br>Final Year Project                         |
|                                                                                                               | SMP10903<br>Principles of Management              | SMP15503<br>Business Ethics                            | SMP22403<br>Business<br>Communication                           | SMP31603<br>Leadership in<br>Organisation                                                  |                                 | SMP22603<br>Sales Management                 | SMP33703<br>International<br>Marketing                 |
|                                                                                                               | SMP10103<br>Principles of Economics               | SMP11603<br>Management<br>Information System           | SMP22303<br>Human Resource<br>Management                        | SMP22103<br>Operations<br>Management                                                       |                                 | SMP31803<br>Research<br>Methodology          | SMP30503<br>International Human<br>Resource Management |
|                                                                                                               | SMP10603<br>Principles of Accounting              | SMP11003<br>Organisational<br>Behaviour                | SMP22503<br>Digital Business                                    | SMP25503<br>Digital Marketing                                                              |                                 | SMP20403<br>International Finance            | SMP33503<br>International Business<br>Environment      |
|                                                                                                               | SMP10703<br>Principles of Finance                 | SMP15903<br>Financial Technology                       | SMP31403<br>Cross-Cultural<br>Management                        | SMP20303<br>International<br>Economics                                                     |                                 | SMP34503<br>Global Economic<br>Issues        | SMP36003<br>International Business<br>Strategy         |
|                                                                                                               | SMP15603<br>Principles of Business<br>Analytics   | SMP32103<br>Services Marketing                         |                                                                 | SMB10002<br>Foreign Language                                                               |                                 | SMP20103<br>International<br>Accounting      | SMP34403<br>Export Import<br>Management                |
| <b>UNIVERSITY<br/>REQUIREMENT COURSES<br/>(16 credits)</b>                                                    | SMU13002<br>Philosophy and Current<br>Issues      | SMU13102<br>Appreciation of Ethics and<br>Civilization | SMB20102<br>English for General<br>Communication <sup>[2]</sup> |                                                                                            |                                 | SMB31302<br>English for Academic<br>Purposes | SMU32202<br>Thinking Skills                            |
|                                                                                                               |                                                   |                                                        | SMU12102<br>Integrity and Anti<br>Corruption <sup>[4]</sup>     | SMB41002<br>University Malay Language<br><sup>[3]</sup> / SMB11002 Basic Malay<br>Language |                                 |                                              |                                                        |
|                                                                                                               |                                                   |                                                        | SMZXXX01<br>Co-Curriculum 1                                     | SMZ XXX01<br>Co-Curriculum 2                                                               |                                 |                                              |                                                        |
| <b>TOTAL CREDITS<br/>[124 credits]</b>                                                                        | <b>20</b>                                         | <b>20</b>                                              | <b>20</b>                                                       | <b>20</b>                                                                                  | <b>4</b>                        | <b>20</b>                                    | <b>20</b>                                              |
| <b>AUDIT COURSES</b>                                                                                          | SMB10102<br>Preparatory<br>English <sup>[1]</sup> |                                                        |                                                                 |                                                                                            |                                 |                                              |                                                        |

[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.

[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.

[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.

[4] International students should register SMU13202 Malaysian Studies.



**UR6340002**  
**Bachelor Of Business (Engineering Entrepreneurship) With Honours**

**PROGRAMME EDUCATIONAL OBJECTIVES (PEO)**

**PEO 1**

Graduates who are entrepreneurs.

**PEO 2**

Graduates who are entrepreneurial leaders in the chosen field as demonstrated through career advancement

**PEO 3**

Graduates who pursue continuous educational opportunities

**PEO 4**

Graduates who contribute to society.

**PEO 5**

Graduates who contribute through research and development.



## PROGRAMME OUTCOMES (PO)

### P01

Ability to apply the theories and concepts of engineering entrepreneurship in the work environment.

### P02

Ability to analyse problems and enhance their problem solving and decision making skills

### P03

Ability to adapt business operation practices and principles currently used in professional business environment.

### P04

Ability to collaborate professionally and ethically with multidisciplinary business teams.

### P05

Ability to communicate effectively in business and work environment

### P06

Ability to use appropriate information and communication technology to engage in lifelong learning.

### P07

Ability to propose solution for engineering entrepreneurship issues base on analysing numerical data and information.

### P08

Ability to demonstrate leadership skills and responsibility in international business environments.

### P09

Ability to identify engineering entrepreneurship opportunities by analysing global business trend.

### P010

Ability to demonstrate professional entrepreneurship skills and innovativeness required for sustainable development.

### P011

Ability to adopt professionally and ethically the social, cultural and environmental responsibilities and issues from a global perspective.

| CURRICULUM STRUCTURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                        |                                                                 |                                                         |                                                          |                               |                                                        |                                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------|-------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------|
| UR6340002 BACHELOR OF BUSINESS (ENGINEERING ENTREPRENEURSHIP) WITH HONOURS INTAKE 2024/2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                        |                                                                 |                                                         |                                                          |                               |                                                        |                                                                          |
| YEAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | FIRST                                                  |                                                                 | SECOND                                                  |                                                          |                               | THIRD                                                  |                                                                          |
| SEMESTER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | I                                                      | II                                                              | III                                                     | IV                                                       | BREAK                         | V                                                      | VI                                                                       |
| BUSINESS PROGRAM<br>COMMON CORE/<br>DISCIPLINE CORE/<br>SPECIALIZATION<br>COURSES<br>(106 credits)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SMP10803<br>Principles of Marketing                    | SMP11003<br>Organisational Behaviour                            | SMP22303<br>Human Resource<br>Management                | SMP22003<br>Technology<br>Entrepreneurship               | SMP29104<br>Incubator Program | SMP22603<br>Sales Management                           | SMP33803<br>Strategic Management                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | SMP10903<br>Principles of Management                   | SMP27203<br>Creativity &<br>Business Innovation                 | SMP25603<br>Engineering Drawing for<br>Product Design   | SMP22103<br>Operations Management                        |                               | SMP25303<br>Entrepreneurial Marketing                  | SMP21503<br>Entrepreneurial Finance                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | SMP11503<br>Principles of<br>Entrepreneurship          | SMP14203<br>Introduction to<br>Engineering<br>Technology        | SMP15503<br>Business Ethics                             | SMP11603<br>Management Information<br>System             |                               | SMP32203<br>Supply Chain<br>Management                 | SMP36203<br>Business Plan for<br>Engineering<br>Entrepreneurship Project |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | SMP15603<br>Principles of Business<br>Analytics        | SMP10103<br>Principles of<br>Economics                          | SMP32103<br>Services Marketing                          | SMP22203<br>Managerial Accounting                        |                               | SMP21903<br>Product Design and<br>Development          | SMP35803<br>Quality Assurance in<br>Manufacturing Process                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | SMP10603<br>Principles of Accounting                   | SMP22403<br>Business Communication                              | SMP21303<br>Business Venture<br>Management              | SMP25703<br>Data Analytics for<br>Engineering Management |                               | SMP20203<br>International Business<br>Management       | SMP32603<br>Project Management                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                        |                                                                 | SMP10703<br>Principles of Finance                       | SMP25503<br>Digital Marketing                            |                               | SMP31803<br>Research Methodology                       | SMP22503<br>Digital Business                                             |
| UNIVERSITY REQUIREMENT<br>COURSES<br>(16 credits)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | SMU13002<br>Philosophy and Current<br>Issues           | SMU12102<br>Integrity and Anti-<br>Corruption <sup>[4]</sup>    | SMB41002<br>University Malay<br>Language <sup>[3]</sup> | SMB31302<br>English for Academic<br>Purposes             |                               | SMU13102<br>Appreciation of Ethics<br>and Civilization | SMU32202<br>Thinking Skills                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | SMZXXX01<br>Co-Curriculum 1                            | SMZ XXX01<br>Co-Curriculum 2                                    |                                                         |                                                          |                               |                                                        |                                                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | SMU13102<br>Appreciation of Ethics and<br>Civilization | SMB20102<br>English for General<br>Communication <sup>[2]</sup> |                                                         |                                                          |                               |                                                        |                                                                          |
| TOTAL CREDITS<br>[122 credits]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 18                                                     | 20                                                              | 20                                                      | 20                                                       | 4                             | 20                                                     | 20                                                                       |
| <p>[1] Compulsory to students with MUET 2.5 and below (local students) or TOEFL 4.5/IELTS 4.0 and below (international students). SMB10102 Preparatory English is an Audit course.</p> <p>[2] Exemption to students with MUET 4.0 and above (local students) or TOEFL 8.0/IELTS 5.5 and above (international students) but must take any other Optional Course with 2 credits.</p> <p>[3] International students other than Indonesia, Singapore and Brunei need to register the SMB11002 Basic Malay Language course.</p> <p>[4] International students should register SMU13202 Malaysian Studies.</p> |                                                        |                                                                 |                                                         |                                                          |                               |                                                        |                                                                          |

**LIST OF COURSES**

| COURSE CODE | COURSE NAME                                                                           |
|-------------|---------------------------------------------------------------------------------------|
| SMM10103    | Introduction To Communication Theory [Pengenalan Kepada Teori Komunikasi]             |
| SMM10203    | Public Speaking [Perucapan Awam]                                                      |
| SMM10303    | Introduction To New Media [Pengenalan Kepada Media Baharu]                            |
| SMM10403    | Script Writing & Digital Storyboard (Penulisan Skrip Dan Papan Cerita Digital)        |
| SMM10503    | New Media Literacy [Literasi Media Baharu]                                            |
| SMM10603    | Visual Communication [Komunikasi Visual]                                              |
| SMM10703    | Innovative And Creative Skills [Kemahiran Kreatif Dan Inovatif]                       |
| SMM10803    | Introduction To Programming Languages [Pengenalan Kepada Bahasa Pengaturcaraan]       |
| SMM10903    | Principles of Human Computer Interaction (Prinsip-Prinsip Interaksi Manusia-Komputer) |
| SMM11003    | Sociology In New Media [Sosiologi Dalam Media Baharu]                                 |
| SMM20103    | Organizational Communication [Komunikasi Organisasi]                                  |
| SMM20203    | Digital Photography [Fotografi Digital]                                               |
| SMM20303    | Graphic Design For New Media [Reka Bentuk Grafik Untuk Media Baharu]                  |
| SMM20403    | New Media Analysis [Analisis Media Baharu]                                            |
| SMM20503    | New Era Management [Pengurusan Era Baru]                                              |
| SMM30103    | Media Psychology [Psikologi Media]                                                    |
| SMM30203    | Research Methodology [Kaedah Penyelidikan]                                            |
| SMM30303    | Digital Marketing [Pemasaran Digital]                                                 |
| SMM30403    | Digital Video Production [Penerbitan Video Digital]                                   |

| COURSE CODE | COURSE NAME                                                                                               |
|-------------|-----------------------------------------------------------------------------------------------------------|
| SMM30503    | Web Design And Development [Reka Bentuk Dan Pembangunan Web]                                              |
| SMM30603    | New Media Arts (Seni Media Baharu)                                                                        |
| SMM30703    | Data Reasoning [Penaakulan Data]                                                                          |
| SMM30803    | 3D Modelling For Beginners [Asas Pemodelan 3d]                                                            |
| SMM30903    | Contemporary Photography [Fotografi Kontemporari]                                                         |
| SMM31003    | Industrial Psychology [Psikologi Industri]                                                                |
| SMM31103    | Electronic Entrepreneurship [Keusahawanan Elektronik]                                                     |
| SMM40103    | Public Relations And New Media [Perhubungan Awam Dan Media Baharu]                                        |
| SMM40203    | Ethics And Law In New Media Communication [Undang-Undang Dan Etika Dalam Komunikasi Media Baharu]         |
| SMM40303    | Animation For Integrated Media [Animasi Untuk Media Bersepadu]                                            |
| SMM40403    | Digital Creative Advertising [Pengiklanan Kreatif Digital]                                                |
| SMM40502    | Final Year Project 1 [Projek Tahun Akhir 1]                                                               |
| SMM40603    | Audio Design [Reka Bentuk Audio]                                                                          |
| SMM40703    | Crisis Communication In New Media [Komunikasi Krisis Dalam Media Baharu]                                  |
| SMM40803    | Event Management [Pengurusan Acara]                                                                       |
| SMM40903    | New Media Issues & Challenges [Isu Dan Cabaran Media Baharu]                                              |
| SMM41003    | Skills In Organizational Strategy And Performance [Kemahiran Pengurusan Strategi Dan Prestasi Organisasi] |
| SMM41104    | Final Year Project 2 [Projek Tahun Akhir 2]                                                               |
| SMM49906    | Industrial Training [Latihan Industri]                                                                    |

| COURSE CODE | COURSE NAME                                                                                                          |
|-------------|----------------------------------------------------------------------------------------------------------------------|
| SMT10103    | Principle of Design (Prinsip Reka Bentuk)                                                                            |
| SMT10203    | Fundamental Drawing (Asas Lukisan)                                                                                   |
| SMT10303    | Introduction to Scripting Programming (Pengenalan kepada Pengaturcaraan Skrip)                                       |
| SMT10403    | Introduction to Interactive Media (Pengenalan kepada Media Interaktif)                                               |
| SMT20103    | Graphic Design for Interactive Media (Reka Bentuk Grafik untuk Media Interaktif)                                     |
| SMT10503    | Web Design & Development (Reka Bentuk Grafik untuk Media Interaktif)                                                 |
| SMT20203    | Photography for Interactive Media (Fotografi untuk Media Interaktif)                                                 |
| SMT10603    | Introduction 2D Animation (Pengenalan Animasi 2D)                                                                    |
| SMT20303    | Fundamental 3D Modelling (Asas Pemodelan 3D)                                                                         |
| SMT 20403   | Video production for interactive media (Penerbitan Video untuk Media Interaktif)                                     |
| SMT20503    | Motion Graphic for Interactive Media (Grafik Bergerak untuk Media Interaktif)                                        |
| SMT20603    | Media History and Culture (Sejarah dan Budaya Media)                                                                 |
| SMT30103    | Interactive 3D Development (Pembangunan 3D Interaktif)                                                               |
| SMT30203    | Audio Production (Penerbitan Audio)                                                                                  |
| SMT30303    | User experiences (UX) & User Interface (UI) Design (Reka Bentuk Pengalaman Pengguna (UX) & Antaramuka Pengguna (UI)) |
| SMT40103    | Creative Advertising (Pengiklanan Kreatif)                                                                           |
| SMT 40503   | Law in Creative Industries (Undang-undang dalam Industri Kreatif)                                                    |
| SMT40203    | Interactive Media Arts (Seni Media Interaktif)                                                                       |

| COURSE CODE | COURSE NAME                                                                                            |
|-------------|--------------------------------------------------------------------------------------------------------|
| SMT40603    | Digital Media Content management (Pengurusan Kandungan Media Digital)                                  |
| SMT40303    | Mobile Apps Development (Pembangunan Aplikasi Mudah Alih)                                              |
| SMT40703    | Interactive Media Design and Development Methods (Kaedah Reka Bentuk dan Pembangunan Media Interaktif) |
| SMT40803    | Big data Management (Pengurusan Data Besar)                                                            |
| SMT41104    | FYP 1 Interactive Media Technology (FYP 1 Teknologi Media Interaktif)                                  |
| SMT41212    | FYP 2 Interactive Media Technology (FYP 2 Teknologi Media Interaktif)                                  |
| SMT41012    | Industrial Training (Latihan Industri)                                                                 |
| SMP10103    | Prinsip Ekonomi [Principle of Economics]                                                               |
| SMP10603    | Prinsip-prinsip Perakaunan [Principles of Accounting]                                                  |
| SMP10803    | Prinsip-prinsip Pemasaran [Principles of Marketing]                                                    |
| SMP10903    | Prinsip-prinsip Pengurusan [Principles of Management]                                                  |
| SMP15603    | Prinsip-prinsip Analitik Perniagaan [Principles Of Business Analytics]                                 |
| SMP11003    | Tingkah Laku Organisasi [Organisational Behaviour]                                                     |
| SMP27203    | Creativity & Business Innovation                                                                       |
| SMP22403    | Komunikasi Perniagaan [Business Communication]                                                         |
| SMP11503    | Prinsip-prinsip Keusahawanan [Principles of Entrepreneurship]                                          |
| SMP14203    | Introduction to Engineering Technology                                                                 |
| SMP 22303   | Pengurusan Sumber Manusia [Human Resource Management]                                                  |
| SMP25603    | Engineering Drawing for Product Design                                                                 |



| COURSE CODE | COURSE NAME                                                            |
|-------------|------------------------------------------------------------------------|
| SMP15503    | Etika Perniagaan [Business Ethics]                                     |
| SMP32103    | Pemasaran Perkhidmatan [Services Marketing]                            |
| SMP21303    | Business Venture Management                                            |
| SMP10703    | Prinsip-Prinsip Kewangan [Principles of Finance]                       |
| SMP22003    | Keusahawanan Teknologi [Technology Entrepreneurship]                   |
| SMP22103    | Pengurusan Operasi [Operations Management]                             |
| SMP11603    | Pengurusan Sistem Maklumat [Management Information System]             |
| SMP25703    | Data Analytics for Engineering Management                              |
| SMP25503    | Pemasaran Digital [Digital Marketing]                                  |
| SMP22603    | Pengurusan Jualan [Sales Management]                                   |
| SMP25303    | Entrepreneurial Marketing                                              |
| SMP32203    | Supply Chain Management                                                |
| SMP21903    | Product Design and Development                                         |
| SMP20203    | Pengurusan Perniagaan Antarabangsa [International Business Management] |
| SMP31803    | Kaedah Penyelidikan [Research Methodology]                             |
| SMP33803    | Pengurusan Strategik [Strategic Management]                            |
| SMP21503    | Entrepreneurial Finance                                                |
| SMP36203    | Business Plan for Engineering Entrepreneurship Project                 |

| COURSE CODE | COURSE NAME                                                               |
|-------------|---------------------------------------------------------------------------|
| SMP35803    | Quality Assurance in Manufacturing Process                                |
| SMP22203    | Perakaunan Pengurusan [Managerial Accounting]                             |
| SMP32603    | Project Management                                                        |
| SMP22503    | Perniagaan Digital [Digital Business]                                     |
| SMP31403    | Pengurusan Silang Budaya [Cross-Cultural Management]                      |
| SMP20303    | Ekonomi Antarabangsa [International Economics]                            |
| SMP31603    | Kepimpinan Dalam Organisasi [Leadership in Organisation]                  |
| SMP20403    | Kewangan Antarabangsa [International Finance]                             |
| SMP34503    | Isu-isu Ekonomi Global [Global Economic Issues]                           |
| SMP20103    | Perakaunan Antarabangsa [International Accounting]                        |
| SMP15903    | Teknologi Kewangan [Financial Technology]                                 |
| SMP35103    | Projek Tahun Akhir [Final Year Project]                                   |
| SMP33703    | Pemasaran Antarabangsa [International Marketing]                          |
| SMP30503    | International Human Resource Management                                   |
| SMP33503    | Persekitaran Perniagaan Antarabangsa [International Business Environment] |
| SMP36003    | Strategi Perniagaan Antarabangsa [International Business Strategy]        |
| SMP34403    | Pengurusan Eksport Import [Export Import Management]                      |
| SMP29204    | Latihan Industri [Industrial Training]                                    |
| SMU13002    | Falsafah Dan Isu Semasa [Philosophy And Current Issues]                   |

| COURSE CODE | COURSE NAME                                                                     |
|-------------|---------------------------------------------------------------------------------|
| SMU13102    | Penghayatan Etika Dan Peradaban [Appreciation Of Ethics And Civilization]       |
| SMU12102    | Integriti Dan Anti Rasuah [Integrity And Anti-corruption]                       |
| SMU22402    | Keusahawanan Kejuruteraan [Engineering Entrepreneurship]                        |
| SMU32202    | Kemahiran Berfikir [Thinking Skills]                                            |
| SMU12502    | Komunikasi Korporat [Corporate Communication]                                   |
| SMU12202    | Kemahiran Komunikasi Dan Teknologi [Communication Skills And Technology]        |
| SMU12602    | Psikologi Industri [Industrial Psychology]                                      |
| SMU12702    | Komunikasi Dan Pengurusan Konflik [Communication And Conflict Management]       |
| SMU12802    | Pengurusan Sumber Manusia [Human Resource Management]                           |
| SMU13202    | Pengajian Malaysia [Malaysian Studies]                                          |
| SMB11002    | Bahasa Melayu Asas [Basic Malay Language]                                       |
| SMB41002    | Bahasa Melayu Universiti [University Malay Language]                            |
| SMB10102    | Preparatory English [Bahasa Inggeris Persediaan]                                |
| SMB20102    | English For General Communication [Bahasa Inggeris Untuk Komunikasi Umum]       |
| SMB31202    | English For Technical Communication [Bahasa Inggeris Untuk Komunikasi Teknikal] |
| SMB31302    | English For Academic Purposes [Bahasa Inggeris Akademik]                        |
| SMB01402    | Mandarin Language For Beginners [Bahasa Mandarin Permulaan]                     |
| SMB11402    | Preparatory Mandarin Language [Bahasa Mandarin Persediaan]                      |
| SMB01502    | Thai Language For Beginners [Bahasa Thai Asas]                                  |

| COURSE CODE | COURSE NAME                                              |
|-------------|----------------------------------------------------------|
| SMB11502    | Preparatory Thai Language [Bahasa Thai Persediaan]       |
| SMB01602    | Arabic Language For Beginners [Bahasa Arab Permulaan]    |
| SMB11602    | Preparatory Arabic Language [Bahasa Arab Persediaan]     |
| SMB01702    | Japanese Language For Beginners [Bahasa Jepun Permulaan] |
| SMB11702    | Japanese Language Preparatory [Bahasa Jepun Persediaan]  |
| SMB21702    | Elementary Japanese Language 1 [Bahasa Jepun Asas 1]     |
| SMB31702    | Elementary Japanese Language 2 [Bahasa Jepun Asas 2]     |
| SMB01802    | German Language For Beginners [Bahasa Jerman Asas]       |
| SMB11802    | Preparatory German Language [Bahasa Jerman Persediaan]   |
| SMB01902    | Korean Language For Beginners [Bahasa Korea Asas]        |
| SMB11902    | Preparatory Korean Language [Bahasa Korea Persediaan]    |

**SMM10103 INTRODUCTION TO COMMUNICATION THEORY [PENGENALAN KEPADA TEORI KOMUNIKASI]****No of Credits: 3****Course Synopsis:**

The course aims to expose the students to the basic concepts of human communications, theory and basic communication theories. Several definitions, the models, elements, functions and contexts of human communication will be explained. Description on several basic concepts, features and attributes of theory and the domain/families of theory will be the other focus of this course. Discussion on several basic theories of communication in its relevant contexts will be utilized to strengthen students' understanding.

**Course Outcomes:**

1. Ability to explain the concepts, models, elements, functions and contexts of communication.
2. Ability to apply the features, attributes and functions of theory in the context of new media communication.
3. Ability to evaluate the communication theories based on contexts.

**SMM10203 PUBLIC SPEAKING [PERUCAPAN AWAM]****No of Credits: 3****Course Synopsis:**

This course covers both the theoretical and practical aspects of public speaking. Students will learn how to adapt a speech for various circumstances and audiences, how to successfully support ideas, how to select and organise resources for a speech, and how to use multimedia technologies in presentations. Students should be able to demonstrate speaking and be effective communicators in academic contexts, the workplace, and the community by the end of this course.

**Course Outcomes:**

1. Ability to describe the vital ideas related to public speaking.
2. Ability to apply knowledge in the preparation of a speech.
3. Ability to perform a public speech in front of the audiences, according to the situation and the event.
4. Ability to evaluate and criticise speeches and presentations verbally.

**SMM10303 INTRODUCTION TO NEW MEDIA [PENGENALAN KEPADA MEDIA BAHARU]****No of Credits: 3****Course Synopsis:**

This course provides an insight into modern cyberculture, including various forms of human communication mediated by the creative application of computer technology, and the developments that have enabled this exploding phenomenon. This course studies the practice of new media in the current networked society; the implications of the technology; and the societal implications of the new connectedness. Second and third-generation web-based media such as social networks, blogs, wikis, and web pages are also introduced to the students.

**Course Outcomes:**

1. Ability to explain the concepts, functions, and characteristics of new media.
2. Ability to distinguish computer hardware, software, communication media, its functions, and characteristics.
3. Ability to analyse the new media tools used in producing/publishing new media content.

**SMM10403 SCRIPT WRITING & DIGITAL STORYBOARD [PENULISAN SKRIP DAN PAPAN CERITA DIGITAL]****No of Credits: 3****Course Synopsis:**

The purpose of this course is to expose students to their writing skills and their methods in the new media publication. Students will learn the interactive pattern of online writing as compared to traditional writing. This course will help students to upgrade their understanding of the method of new media writing by appreciating the relevant concepts and will be able to apply them in the organizational situation.

**Course Outcomes:**

1. Ability to explain the concepts of new media scriptwriting & digital storyboard.
2. Ability to demonstrate scriptwriting and storyboard development skills for the new media content.
3. Ability to justify creative ideas in new media writing and storyboard development.

**SMM10503 NEW MEDIA LITERACY [LITERASI MEDIA BAHARU]****No of Credits: 3****Course Synopsis:**

This course aims to familiarise students with the fundamental concepts, issues, genres and technologies of new media. By taking something as fundamental as our experiences of space, at times our mobility has become severely restricted. Structural and visualisation design assignments are used to analyse these contemporary communication issues.

**Course Outcomes:**

1. Ability to explain the concepts of new media literacy and the technologies related to it.
2. Ability to apply basic media technologies in our society.
3. Ability to analyse the existing tools of media technologies with probable solutions that can accommodate future lifestyle.

**SMM10603 VISUAL COMMUNICATION [KOMUNIKASI VISUAL]****No of Credits: 3****Course Synopsis:**

This course will guide students to understand the basic principles of visual communication and relationship with publishing products. This course will guide students to produce visual projects based on various concepts of visual perspective, the history of visual communication and its development, its importance from the perspective of different cultures' understanding. It will help students to become more critical and sensitive in the use of color, layout, design and selection of tones in attracting attention and leaving a meaning to the audience.

**Course Outcomes:**

1. Ability to explain the concepts, theories and principles of visual communication with a suitable approach.
2. Ability to analyse the elements of visual communication of the product creation.
3. Ability to produce communication products that emphasize on the aspects of visual communication.

**SMM10703 INNOVATIVE AND CREATIVE SKILLS [KEMAHIRAN KREATIF DAN INOVATIF]****No of Credits: 3****Course Synopsis:**

This course aims to build students' knowledge and understanding of theories and processes related to creative thinking and innovative skills. Ultimately, the course can make students think and act creatively and innovatively in problem solving to make them more competitive either as individuals or members of organizations.

**Course Outcomes:**

1. Ability to identify the basic concepts for thinking creatively and innovatively
2. Ability to solve problems creatively and innovatively.
3. Ability to analyse innovation activities in different organizations and environments

**SMM10803 INTRODUCTION TO PROGRAMMING LANGUAGES [PENGENALAN KEPADA BAHASA PENGATURCARAAN]****No of Credits: 3****Course Synopsis:**

This course aims to familiarise students with the various programming languages. It is also to provide some knowledge and necessary skills to develop basic programming/coding. Coding and debugging exercises are used to develop students' ease of learning and understanding; problem-solving skills; transferable skills across almost any industry; and opportunities for invention and innovation.

**Course Outcomes:**

1. Ability to describe the concepts of related programming languages (program style/formatting and self-documenting code, and familiar with the debugging process).
2. Ability to apply basic programming solutions in various contexts.
3. Ability to develop a simple application using related programming languages.



**SMM10903 PRINCIPLES OF HUMAN COMPUTER INTERACTION (PRINSIP-PRINSIP INTERAKSI MANUSIA-KOMPUTER)****No of Credits: 3****Course Synopsis:**

This course provides an overview of the principles of human-computer interaction (HCI) that are applicable to the New Media Communication Programme. HCI is an interdisciplinary field that integrates theories and methodologies from computer science, cognitive psychology, design and many other areas. The course readings span current theory and practice in interface specification, design and evaluation in HCI. Students will work on the group report and group presentation to design, implement and evaluate computer interfaces. They should be able to explore the HCI in their projects, and analyse its relevance and usage for managerial usage and decision making.

**Course Outcomes:**

1. Ability to identify the principles of human-computer interaction to relate with today's activities.
2. Ability to analyse the application that related to principles of human-computer interaction.
3. Ability to propose various human-computer interaction features that can be used by society.

**SMM11003 SOCIOLOGY IN NEW MEDIA [SOSIOLOGI DALAM MEDIA BAHARU]****No of Credits: 3****Course Synopsis:**

This course provides an overview of the study of the relationship between humans and society in the context of new media. This course will allow students to examine how economics, politics, religion, race, gender, family, and the environment interact to shape people's lives. Students will learn to analyse social problems to discover their causes and possible solutions. This course also prepares the students for employment in social service, recreation, teaching, and preparation for pre-professional studies

**Course Outcomes:**

1. Ability to explain the concepts related to sociology.
2. Ability to analyse how social change factors affect individuals and society
3. Ability to propose solutions using sociological perspectives to solve problems on the impact of media towards society.

**SMM20103 ORGANIZATIONAL COMMUNICATION [KOMUNIKASI ORGANISASI]****No of Credits: 3****Course Synopsis:**

This course provides an introduction to contemporary theory and intellectual traditions applied to the study of organizations, including the role of organizations in society and cultural practices. Whatever your career goals, the knowledge you gain from participating in this course will help you make sense of how communication is integral to the organizational experience.

**Course Outcomes:**

1. Ability to explain organizational communication elements and processes.
2. Ability to analyse communication problems in organizational contexts.
3. Ability to develop strategies based on the organizational communication issues and problems

**SMM20203 DIGITAL PHOTOGRAPHY [FOTOGRAFI DIGITAL]****No of Credits: 3****Course Synopsis:**

In this course, students learn the basic principles of the photographic media, basic camera functions, become familiar with various settings and presets on camera, explore the photographic process from pre-visualization, taking images, digital storage media and transfer of images, to adjusting and manipulation of digital images, output to print and creating digital portfolio. Emphasis is placed on learning design principles, composition, and fundamental history and theory of photographic media. Through a number of projects students approach various subjects to create images that are personal and expressive.

**Course Outcomes:**

1. Ability to analyse the notion of digital photography as an art form
2. Ability to practice camera techniques necessary for using digital photography as a creative tool.
3. Ability to demonstrate professional images editing software and apply proper digital workflow.

**SMM20303 GRAPHIC DESIGN FOR NEW MEDIA [REKA BENTUK GRAFIK UNTUK MEDIA BAHARU]****No of Credits: 3****Course Synopsis:**

This course is designed upon creative industry needs nowadays for every graphic designer. The students will learn the skills in using Adobe software, fundamentals of design, and how to solve a design problem in the real world. Covering every aspect of fundamentals include Design Principle, Elements of Arts, Stages of Design and many more. At the end of this course, students should be able to demonstrate the skill of using Adobe software, the fundamentals and problem solving in design.

**Course Outcomes:**

1. Ability to analyze the key ideas related to Graphic Design.
2. Ability to demonstrate technical skills by using graphic software to produce creative projects
3. Ability to perform the creative process and design strategies in solving design problem

**SMM20403 NEW MEDIA ANALYSIS [ANALISIS MEDIA BAHARU]****No of Credits: 3****Course Synopsis:**

This course is designed to help students develop an informed, critical, and practical understanding of new communication media including analysis of digital media. This course enables students to demonstrate their understanding of the key concepts of media languages, representation, audience, production, skills and processes as well as express their creativity and originality.

**Course Outcomes:**

1. Ability to explain the process and technique of new media analysis
2. Ability to analyse processes and techniques to create media works.
3. Ability to create media content for different contexts, audiences and purposes.

**SMM30103 MEDIA PSYCHOLOGY [PSIKOLOGI MEDIA]****No of Credits: 3****Course Synopsis:**

Media psychology is concerned with the interaction between people and media technology on a cognitive, affective, and behavioral level. This course will help to improve the students' ability to comprehend the concepts related to media psychology that can be used to discuss issues related with human behaviour and media. The main concern in this course is to help students to use their understanding of media psychology to recommend a solution to neutralize the possible impact of vast development in media technology to humans.

**Course Outcomes:**

1. Ability to explain the concepts related to media psychology
2. Ability to evaluate issues related with interaction of human behavior and media technology
3. Ability to propose solutions using psychology elements to solve problems on a media basis.

**SMM20503 NEW ERA MANAGEMENT [PENGURUSAN ERA BARU]****No of Credits: 3****Course Synopsis:**

This course aims to expose students to the basic concepts and skills for managing organizations in the new era. Specifically, the course focuses on managerial functions in organizations such as planning, organizing, leading, controlling and monitoring organizations either locally or globally based on new era management driven by the strength of information technology and innovation.

**Course Outcomes:**

1. Ability to explain the concepts related to new era management.
2. Ability to analyse the management aspects of the new era in local and international organizations
3. Ability to propose solutions in managing the organizations facing contemporary challenges led by the power of innovation and information technology.

**SMM30203 RESEARCH METHODOLOGY [KAEDAH PENYELIDIKAN]****No of Credits: 3****Course Synopsis:**

This course focuses on the processes involved in conducting research in the field of social sciences particularly in new media and communication. It aims at providing the experience for students to apply selected research designs to conduct research focused in the field of new media and communication. In addition, it develops research exposure in collecting, analyzing and interpreting research data. The course will enable students to apply research format to prepare a research proposal.

**Course Outcomes:**

1. Ability to explain the concepts and research processes in new media communication
2. Ability to distinguish research design to conduct research in the field of new media and communication.
3. Ability to prepare a research proposal.

**SMM30303 DIGITAL MARKETING [PEMASARAN DIGITAL]****No of Credits: 3****Course Synopsis:**

Digital marketing is an exciting area of marketing practice. In this course, we will cover the what, why, and how of major current approaches, including online listening and monitoring, website traffic analytics, search engine optimization, search and display ads, affiliates, email marketing, and social media. Digital marketers approach their jobs with a curiosity about how new technologies will change business, with an insistence that strategy drive tactics, and with a measurement mindset. The course is designed to get the student to think like a digital marketing professional.

**Course Outcomes:**

1. Ability to explain the concepts and frameworks used in Digital marketing.
2. Ability to evaluate digital marketing concepts in business.
3. Ability to produce effective digital marketing strategies in business.

**SMM30403 DIGITAL VIDEO PRODUCTION [PENERBITAN VIDEO DIGITAL]****No of Credits: 3****Course Synopsis:**

This course introduces students to the fundamentals of digital video production. Students will learn how to produce short videos, including storyboarding, directing, lighting and shooting, sound recording, and will finish productions using current video and sound-editing software. Particular attention is paid to the skills required to successfully bring a mediated story or message to an audience. Students will learn to analyse and respond critically to a variety of audio/visual productions.

**Course Outcomes:**

1. Ability to demonstrate various concepts in operating digital video production.
2. Ability to interpret audio/visual productions and respond critically.
3. Ability to evaluate technical and aesthetic qualities of digital video productions in the context of contemporary video making trends.

**SMM30503 WEB DESIGN AND DEVELOPMENT [REKA BENTUK DAN PEMBANGUNAN WEB]****No of Credits: 3****Course Synopsis:**

This course provides the knowledge and basic skills in creating, coding and posting basic HTML and CSS files to the Internet. Equipped with standard design guidelines to ensure strong website presentation, the students will have a foundational knowledge of website creation and apply it to the planning, design and development of their own web page over the course of the semester. Critical thinking will be encouraged through class interactions, projects, and online postings.

**Course Outcomes:**

1. Ability to develop HTML, CSS code and website designs.
2. Ability to perform the skills of applying new media elements on websites.
3. Ability to design a functioning prototype website.

**SMM30603****NEW MEDIA ARTS (SENI MEDIA BAHARU)****No of Credits: 3****Course Synopsis:**

This course offers an overview of and exposure to visual and media arts through a theoretical, aesthetic, and practical framework. Students will be introduced to media concepts and techniques in creating creative media artwork which will create an interactive digital media, hologram, digital painting, and projection mapping. As a result, students will be equipped to build their own creative media artwork. The practical component of the course will emphasize the creative process from conception of idea and writing through production and postproduction. Students will be given a series of assignments in which they will produce interactive digital media, hologram, digital painting and projection mapping projects in all genres discussed.

**Course Outcomes:**

1. Ability to Interpret the key ideas related to the new media art.
2. Ability to apply technical skills by using various graphic software to produce creative new media artwork.
3. Ability to prepare and deliver coherent and structured both written and artwork development research reports.

**SMM30703****DATA REASONING [PENAAKULAN DATA]****No of Credits: 3****Course Synopsis:**

This course provides to students the process of evaluating data using analytical and logical reasoning to examine each component of the data provided. Data from various sources is gathered, reviewed, and then analysed using a variety of specific data analysis methods with the goal of discovering useful information or supporting decision-making and learning to use data to make reasonable, useful conclusions and to write the results and reports in effective and convincing ways.

**Course Outcomes:**

1. Ability to understand the concepts and terms related to the basics of statistical analysis.
2. Ability to use software for data entry and mining.
3. Ability to analyse research data based on quantitative and qualitative.
4. Ability to interpret findings and develop a meaningful conclusion.

**SMM30803****3D MODELLING FOR BEGINNERS [ASAS PEMODELAN 3D]****No of Credits: 3****Course Synopsis:**

This course aims to expose the students to the skills of practical in basic 3D modelling through providing in-depth experience of 3D modelling practices and applications. Object manipulation, lighting and rendering techniques, and specialized components, such as characters, are addressed at various levels. Students completing the class will have a foundational understanding of, and practical experience in creating three-dimensional animated text, graphics, and characters that can be used in games, multimedia, and transmedia applications.

**Course Outcomes:**

1. Ability to produce simple 3D models and environments.
2. Ability to demonstrate materials for 3D models (Texturing).
3. Ability to compose effective & rendering of 3D environments.

**SMM30903 CONTEMPORARY PHOTOGRAPHY [FOTOGRAFI KONTEMPORARI]****No of Credits: 3****Course Synopsis:**

The course will begin in a project directed framework but will develop towards independent research as it progresses. Students will develop a sound critical dialogue within the disciplines of photography, progressing into more independent practical solutions for a series of challenging projects. Students begin to construct a platform of individual study in discussion with their personal tutor and informed by peer discussions.

**Course Outcomes:**

1. Ability to demonstrate descriptive and analytical skills with reference to advanced visual analysis of photographic images.
2. Ability to demonstrate independent judgements with reference to the study of contemporary photography.
3. Ability to develop a multi-tasking and multi-skilled approach to professional practices.

**SMM31003 INDUSTRIAL PSYCHOLOGY [PSIKOLOGI INDUSTRI]****No of Credits: 3****Course Synopsis:**

This course focuses both on understanding the psychological bases of work behavior and on the organizational practices used to create a good fit between people's characteristics and work demands. During this course, we will cover a number of topics including personnel selection, placement, training, work motivation, job satisfaction, leadership, teamwork, and work-family balance.

**Course Outcomes:**

1. Ability to explain the science of human behavior is used to select, develop, and manage employees.
2. Ability to evaluate the major content areas and vital foundational components of Industrial Psychology.
3. Ability to propose solutions to the problems relevant to Industrial Psychology.

**SMM31103 ELECTRONIC ENTREPRENEURSHIP [KEUSAHAWANAN ELEKTRONIK]****No of Credits: 3****Course Synopsis:**

Learn how entrepreneurial ventures use digital technology to design and offer new products and services, acquire and retain customers, analyze customer data, and provide satisfying user experiences online. Learn how to identify and exploit business opportunities online. Learn how to test new business ideas on real customers. Be able to exploit modern business technology trends and experimental business. Digital products and services will be the norm going forward for businesses. This course will help you begin to understand this new reality, and to develop the skills needed to deliver and manage digital business offerings.

**Course Outcomes:**

1. Ability to explain the theories and concepts that are relevant to electronic entrepreneurship.
2. Ability to analyse the process of electronics entrepreneurship in a real business environment.
3. Ability to develop and propose a business plan and demonstrate the main elements of digital business design.

**SMM40103 PUBLIC RELATIONS AND NEW MEDIA [PERHUBUNGAN AWAM DAN MEDIA BAHARU]****No of Credits: 3****Course Synopsis:**

The course is designed to provide students with the theory and knowledge, understanding, skills and experience in applying new and emerging media technologies to public relations. Students will learn how new media technologies are used by public relations professionals to develop online strategies.

**Course Outcomes:**

1. Ability to explain the various ways, new and emerging media technologies are shaping and changing PR practices and activities.
2. Ability to analyse how social media and new media technologies are applied to PR practices and activities.
3. Ability to apply and demonstrate various new media technologies to PR practices and activities.
4. Ability to evaluate and recommend the solution to the PR issues in a new media context.

**SMM40203 ETHICS AND LAW IN NEW MEDIA COMMUNICATION [UNDANG-UNDANG DAN ETIKA DALAM KOMUNIKASI MEDIA BAHARU]****No of Credits: 3****Course Synopsis:**

This course aims to enhance students' understanding and knowledge about policies, laws, and ethics related to communication and new media. Students will develop an understanding and appreciation of issues related to policies, law, and ethics in new media. The case study approach will be used, with an emphasis on the principles and philosophy that underlie the various aspects of communications. At the end of this course, students should be able to analyse the important law and ethical issues involved with the new media scenarios.

**Course Outcomes:**

1. Ability to explain the policies, laws, and ethics that are relevant to the field of communications and new media
2. Ability Interpret law and ethics related to communication and new media
3. Ability to evaluate the law and ethics related to communication and new media issues

**SMM40303 ANIMATION FOR INTEGRATED MEDIA [ANIMASI UNTUK MEDIA BERSEPADU]****No of Credits: 3****Course Synopsis:**

This course provides the students with the familiarization of the Adobe Flash and Adobe After Effects. It also will cover the fundamental programming concepts in addition to the flash and aftereffects environment. The course also covers principles of interface design, measurement as it applies to embedded items, and requires the writing of an instructional design document. Students finishing this course will have at least one basic Animation and After Effects project for their portfolios demonstrating a strong knowledge of the software.

**Course Outcomes:**

1. Ability to apply the principles of animation in new media.
2. Ability to design animate vector graphics for new media.
3. Ability to design and compose themed animation for new media.

**SMM40403 DIGITAL CREATIVE ADVERTISING [PENGIKLANAN KREATIF DIGITAL]****No of Credits: 3****Course Synopsis:**

This course focuses on creative thinking and exploration, creative strategy, realization and experience which encourages students to become independent learners with the ability to synthesize and reflect. It covers specialized courses of study in creative advertising in copywriting, art direction and practices that develop students' capability to articulate their learning to enter professional new media and advertising practice in the creative industry.

**Course Outcomes:**

1. Ability to create creative ideas and skills to communicate through media with audiences.
2. Ability to evaluate methods and manage projects in response to well-defined problems, communicating effectively in the discipline.
3. Ability to evaluate the capacity of producing work that follows the creative process from research through ideation to execution using a variety of media production technologies.

**SMM40502 FINAL YEAR PROJECT 1 [PROJEK TAHUN AKHIR 1]****No of Credits: 2****Course Synopsis:**

This course comprises the first phase of the final year project and provides the opportunity to apply knowledge and skills in planning and managing projects. At the end of the semester, the students will defend their project proposal before a full project execution in the next semester.

**Course Outcomes:**

1. Ability to formulate project planning, implementation and prepare a project proposal
2. Ability to practice ethical and professional norms for the implementation of the projects.
3. Ability to present and justify the project's proposal.

**SMM40603 AUDIO DESIGN [REKA BENTUK AUDIO]****No of Credits: 3****Course Synopsis:**

Audio Design is an area that is closely related to the maintenance and handling of sound equipment and recording equipment. A comprehensive hands-on study of the post-production sound workflow in the video production process, with emphasis on sound editing, sound design and multitrack mixing. The course is project-based learning.

**Course Outcomes:**

1. Ability to demonstrate proficiency of the skills basic to audio production, including recording and mixing.
2. Ability to create solutions, integrating technical knowledge and design principles for Audio products and projects.
3. Ability to revise digital audio projects through a three-step process of description, analysis and evaluation.



**SMM40703 CRISIS COMMUNICATION IN NEW MEDIA [KOMUNIKASI KRISIS DALAM MEDIA BAHARU]****No of Credits: 3****Course Synopsis:**

The potential risks in modern-day business are greater, more dynamic, and less predictable than ever before. The greatest exposure does not lie within these risks. Rather, it lies in having a team that is not prepared to anticipate, foresee, or respond to a rising threat, and its impact on your reputation, revenue, and relationships in real-time. In this course the students will examine theories and concepts that lay at the intersections of communication, business, social psychology, and interpersonal relationships. This course will also address historic and contemporary examples of crises in order to give the students both theoretical and hands-on approach to crisis communication and an understanding of how it relates to our daily world.

**Course Outcomes:**

1. Ability to critically analyse crisis communication in new media case studies
2. Ability to critically discuss crisis communication and management strategies and tactics for detection, prevention, preparation, containment, and recovery.
3. Ability to recommend the application of learned new media crisis communication and management skills to a real-world context.

**SMM40803 EVENT MANAGEMENT [PENGURUSAN ACARA]****No of Credits: 3****Course Synopsis:**

This course covers the various types and ranges of events, as well as the project nature of events and the unique set of skills required for a successful event project. This course combines theoretical and practical applications in the development of skills and knowledge in the administration of many types of event planning, both locally and globally. Students should be able to organize, implement, and conduct the real event by the end of this course.

**Course Outcomes:**

1. Ability to develop an enhanced understanding of professionalism in event management.
2. Ability to analyze and manage the risks of an event.
3. Ability to organize a full range of resources to ensure successful event management.
4. Ability to organize an event project.

**SMM40903 NEW MEDIA ISSUES & CHALLENGES [ISU DAN CABARAN MEDIA BAHARU]****No of Credits: 3****Course Synopsis:**

This course provides a forum for students to discuss and generate ideas (prepare, practice and present) on issues related to a variety of applied new media communication. Students will conduct a project or a study of a research topic of their choice, discuss these issues with experts in the field of project or research selected, work in discussion groups, debate and problem solve on selected issues. The students will be given an opportunity to integrate their knowledge, skills and practical experience gained in the program. This course seeks to improve their skills, confidence, and long-term success by focusing on critical thinking, writing, and speaking; on building community; and on engaging with institutional, intellectual, and social culture.

**Course Outcomes:**

1. Ability to determine the strategies to exploit information resources effectively, efficiently and ethically.
2. Ability to write appropriate information related to current new media issues and challenges
3. Ability to perform a sharing session by communicating intelligently with audiences, and to collaborate effectively.

**SMM41003 SKILLS IN ORGANIZATIONAL STRATEGY AND PERFORMANCE [KEMAHIRAN PENGURUSAN STRATEGI DAN PRESTASI ORGANISASI]****No of Credits: 3****Course Synopsis:**

This course is designed to explore the basic knowledge and skills to formulate a strategy and organizational performance. Students will learn the basic concepts of strategy and organizational performance and hone skills on how to formulate the strategy of an organization such as mission and vision, scanning the environment, set the theme and the success of strategic, strategic objectives, strategic map, performance measures, strategic initiatives, and implementation of strategies and performance automation.

**Course Outcomes:**

1. Ability to explain the concepts and elements related to organizational strategy and /or performance management.
2. Ability to formulate the organizational strategy and performance Measures step by step.
3. Ability to produce organizational strategic and performance plan documents.

**SMM41104 FINAL YEAR PROJECT 2 [PROJEK TAHUN AKHIR 2]****No of Credits: 4****Course Synopsis:**

This course comprises the second phase of the final year project and provides the opportunity to apply knowledge and skills in managing and implementing projects. At the end of the semester, the students will present their project reports in a seminar.

**Course Outcomes:**

1. Ability to execute project and management of their selected project.
2. Ability to practice ethical and professional norms for the implementation of the projects.
3. Ability to present and justify the projects.

**SMM49906 INDUSTRIAL TRAINING [LATIHAN INDUSTRI]****No of Credits: 5****Course Synopsis:**

Students are required to undergo industrial training at a selected industry or organization for 12 weeks. During the training, there will be a visit from the faculty panel to monitor their work progress and to get feedback from their industrial supervisor. This training will expose students to technical and professional as well skills such as communication, leadership, and management. At the end of the training, students must prepare and submit a report regarding their work.

**Course Outcomes:**

1. Ability to display good work performance and adapt to the working environment during the training period.
2. Ability to demonstrate good communications and work ethics during the training period.
3. Ability to perform assigned tasks given by the host company.

**SMT10103 PRINCIPLE OF DESIGN (PRINSIP REKA BENTUK)****No of Credits: 3****Course Synopsis:**

The course aims to develop Multimedia Specialists by integrating content and theory and encouraging real-world problem-solving to ensure relevance and readiness for the professional field. The course offers a comprehensive foundation in design principles and their practical applications within the context of interactive media.

**Course Outcomes:**

1. Ability to explain the principle of design in interactive media.
2. Ability to analyse design works based on appropriate principles of design.
3. Ability to prepare design work based on appropriate principles of design

**SMT10203 FUNDAMENTAL DRAWING (ASAS LUKISAN)****No of Credits: 3****Course Synopsis:**

This course introduces students to classical and contemporary drawing techniques and concepts, with emphasis on the understanding of their formal language and the fundamentals of artistic expression. Even though previous drawing experience is not a prerequisite for this course, the vigorous training provided will prepare students for going into a professional fine art career. Drawing of still-life, landscape, and life models from observation are geared towards realism; at the same time, various other drawing styles might be explored. Linear perspective, pictorial composition, figure/ground relationships, shading techniques, tonal value, visual perception, spatial concepts, and critical thinking skills are all emphasized extensively.

**Course Outcomes:**

1. Ability to interpret key fundamental of principle of art
2. Ability to sketch by using basic drawing techniques through artwork
3. Ability to demonstrate drawing skills in multimedia that synthesize core observational drawing concept and techniques

**SMT10303 INTRODUCTION TO SCRIPTING PROGRAMMING (PENGENALAN KEPADA PENGATURCARAAN SKRIP)****No of Credits: 3****Course Synopsis:**

The objective of this course is to provide students with practical and theoretical foundations to explore computational coding relevant to the representation of application interface design, architectural forms and design knowledge. Students will learn basic concepts in a script-level computer programming language and acquire practical skills to develop their software tools or be able to develop an application. This course is an introduction to scripting languages. The purpose of the course is to prepare students for building scripts that control a sequence of program steps such as those used in developing testing and deploying software. A modern scripting language is used as an example of a scripting language.

**Course Outcomes:**

1. Ability to apply the basic techniques used in programming.
2. Ability to produce the programming algorithms / flowchart in a various context
3. Ability to construct basic computer application using appropriate programming scripts

**SMT10403 INTRODUCTION TO INTERACTIVE MEDIA (PENGENALAN KEPADA MEDIA INTERAKTIF)****No of Credits: 3****Course Synopsis:**

This course intends to give students fair knowledge of power system engineering which covers the topics of generation, transmission and distribution systems. The subtopics that will be emphasized are such as the per-unit system, transmission line parameters and models, load characteristics, fault and protection system.

**Course Outcomes:**

1. Ability to identify the fundamentals of interactive media. (C1, PLO2)
2. Ability to analyze fundamental of interactive media in media production (C4, PLO7)
3. Ability to use media editing software in interactive media production (P3, PLO6)

**SMT10503 WEB DESIGN & DEVELOPMENT (REKA BENTUK GRAFIK UNTUK MEDIA INTERAKTIF)****No of Credits: 3****Course Synopsis:**

This course provides the knowledge and basic skills in creating, coding and posting basic HTML and CSS files to the Internet. Equipped with standard design guidelines to ensure strong website presentation, the students will have a foundational knowledge of website creation and apply it to the planning, design and development of their own web page over the course of the semester.

**Course Outcomes:**

1. Ability to write HTML and CSS code for website designs.
2. Ability to apply web design principles in developing websites.
3. Ability to design a basic website containing Interactive Media

**SMT10603 INTRODUCTION 2D ANIMATION (PENGENALAN ANIMASI 2D)****No of Credits: 3****Course Synopsis:**

2D animation serves as a fundamental building block for understanding the principles of animation. By starting with 2D animation, students grasp essential concepts such as timing, spacing, and movement, which form the basis of all animation techniques.

Despite the rise of 3D animation, 2D animation continues to be widely used in various industries, including film, television, advertising, gaming, and web design. Learning 2D animation techniques prepares students for a range of career opportunities in these sectors.

**Course Outcomes:**

1. Ability to explain the principles of animation in interactive media
2. Ability to produce an animatic storyboard for interactive media
3. Ability to prepare 2D animation for interactive media using Principle of animation

**SMT20103 GRAPHIC DESIGN FOR INTERACTIVE MEDIA (REKA BENTUK GRAFIK UNTUK MEDIA INTERAKTIF)****No of Credits: 3****Course Synopsis:**

The subject Graphic Design for Interactive Media is a dynamic exploration into the principles, techniques, and applications of graphic design within the context of interactive digital experiences. This course is meticulously crafted to provide students with the skills necessary to create visually engaging and user-centric designs that enhance interactivity across various digital platforms. At the end of this course, students should be able to demonstrate the basic skill of Adobe software and basic knowledge about graphic design for both academic settings and industrial workplaces.

**Course Outcomes:**

1. Ability to analyse the key ideas related to graphic design
2. Ability to demonstrate technical skills by using graphic software to produce creative projects
3. Ability to prepare graphic media using principle of graphic design

**SMT20203 PHOTOGRAPHY FOR INTERACTIVE MEDIA (FOTOGRAFI UNTUK MEDIA INTERAKTIF)****No of Credits: 3****Course Synopsis:**

In this course, students learn the basic principles of the photographic media, basic camera functions, become familiar with various settings and presets on camera, explore the photographic process from pre-visualization, taking images, digital storage media and transfer of images, to adjusting and manipulation of digital images, output to print and creating digital portfolio. Emphasis is placed on learning design principles, composition, and fundamental history and theory of photographic media. Through a number of projects students approach various subjects to create images that are personal and expressive

**Course Outcomes:**

1. Ability to analyse the notion of digital photography as an art form.
2. Ability to practice camera techniques necessary for using digital photography as a creative tool.
3. Ability to demonstrate professional images, editing software and proper digital

**SMT20303 FUNDAMENTAL 3D MODELLING (ASAS PEMODELAN 3D)****No of Credits: 3****Course Synopsis:**

This course aims to expose the students to the skills of practical in basic 3D modelling through providing in-depth experience of 3D modelling practices and applications. Object manipulation, lighting and rendering techniques, and specialized components, such as characters, are addressed at various levels. Students completing the class will have a foundational understanding of, and practical experience in creating three-dimensional animated text, graphics, and characters that can be used in games, multimedia and transmedia applications.

**Course Outcomes:**

1. Ability to prepare proper 3D models
2. Ability to apply suitable materials design for 3D models
3. Ability to design and render 3D environments

**SMT20403 VIDEO PRODUCTION FOR INTERACTIVE MEDIA (PENERBITAN VIDEO UNTUK MEDIA INTERAKTIF)****No of Credits: 3****Course Synopsis:**

This course is designed to familiarise students with single-camera digital video production and basic editing. Students will learn about the technology, art, and practices involved in compelling visual storytelling. In this course, students will have a foundational understanding of and practical experience in writing, producing, directing, shooting, and editing digital interactive media--both live-action and graphical--that can be used in multimedia and transmedia distribution applications.

**Course Outcomes:**

1. Ability to demonstrate basic audio production skills. (P4, PLO3)
2. Ability to synthesizes audio visual product based on audio visual principles (A4,PLO5)
3. Ability to analyze technical and non-technical aspects of audio visual content (C4, PLO1)

**SMT20503 MOTION GRAPHIC FOR INTERACTIVE MEDIA (GRAFIK BERGERAK UNTUK MEDIA INTERAKTIF)****No of Credits: 3****Course Synopsis:**

This is an introductory course in motion graphics utilising digital video and various graphics file formats. The course includes lectures, demonstration, critiques and hands-on practices. Projects will cover basic practices in animation and visual effects in broadcast design, film titles, video design and effects. The course will utilise industry standard visual effects software including After Effects and Premiere.

**Course Outcomes:**

1. Ability to apply the principles of motion graphic
2. Ability to produce storyboard for motion graphic
3. Ability to prepare motion graphic for interactive media

**SMT20603 MEDIA HISTORY AND CULTURE (SEJARAH DAN BUDAYA MEDIA)****No of Credits: 3****Course Synopsis:**

This course delves into the historical progression and cultural significance of media, preparing university students to navigate its complexities. Through analysis of media's evolution, societal impact, and cultural representations, students gain essential skills for critical engagement in contemporary media landscapes, enriching their academic and professional pursuits.

**Course Outcomes:**

1. Ability to explain historical and cultural development of media technologiesAbility to analyse historical events and cultural practices in media field
2. Ability to evaluate the issues related to the media history and culture

**SMT30103 INTERACTIVE 3D DEVELOPMENT (PEMBANGUNAN 3D INTERAKTIF)****No of Credits: 3****Course Synopsis:**

Interactive 3D Development is a comprehensive course that focuses on the principles and techniques of creating interactive 3D experiences. The course covers the fundamentals of 3D graphics, game development, and interactive applications. Students will gain hands-on experience in creating interactive 3D content using industry-standard tools and technologies.

**Course Outcomes:**

1. Ability to create basic virtual 3D environment (P4, PLO3)
2. Ability to create basic augmented reality application (P4, PLO3)
3. Ability to prepare an interactive 3d application (A4, PLO5)

**SMT30203 AUDIO PRODUCTION (PENERBITAN AUDIO)****No of Credits: 3****Course Synopsis:**

Audio Production provides an introduction to the field of audio production for video and television, along with post-production audio techniques. In this course students will learn and practice techniques for recording, editing, mixing and exhibiting video and television sound. Students receive hands-on practice in digital music production in a state of the art production lab.

**Course Outcomes:**

1. Ability to demonstrate basic audio production skills. (P4, PLO3)
2. Ability to synthesizes audio visual product based on audio visual principles (A4, PLO5)
3. Ability to analyze technical and non-technical aspects of audio visual content (C4, PLO1)

**SMT30303 USER EXPERIENCES (UX) & USER INTERFACE (UI) DESIGN (REKA BENTUK PENGALAMAN PENGGUNA (UX) & ANTARAMUKA PENGGUNA (UI))****No of Credits: 3****Course Synopsis:**

This course explains user interface and user experience principles. User Interface (UI) design refers to the way the computer user interface visual appearance and layout of its elements. User Experience (UX) design tackles how it feels to use the product. This course teaches the principles and practices of UI/UX design in human computer interface development.

**Course Outcomes:**

1. Ability to identify the principles of UI and UX (C1, PLO1)
2. Ability to apply the principles of UI and UX in designing user interface design (C3, PLO1)
3. Ability to develop prototype user interface (P7, PLO6)

**SMT40103 CREATIVE ADVERTISING (PENGIKLANAN KREATIF)****No of Credits: 3****Course Synopsis:**

This course focuses on creative thinking and exploration, creative strategy, realization and experience which encourages students to become independent learners with the ability to synthesize and reflect. It covers specialized courses of study in creative advertising in copywriting, branding, art direction and practical that develops student's capability to articulate their learning to enter professional new media and advertising practice in the creative industry.

**Course Outcomes:**

1. Ability to produce creative advertisement for marketing and promotion
2. Ability to prepare methods in response to well defined problems
3. Ability to manage cross-media advertising projects

**SMT40203 INTERACTIVE MEDIA ARTS (SENI MEDIA INTERAKTIF)****No of Credits: 3****Course Synopsis:**

This course explores the world of interactive media arts, combining elements of digital media, visual arts, and technology. Students will learn to create interactive and immersive experiences through a variety of mediums, including websites,

mobile apps, digital art, and interactive installations.

**Course Outcomes:**

1. Ability to explain the key fundamental of interactive media design
2. Ability to apply the fundamental of design in interactive media production
3. Ability to produce interactive media arts

**SMT40303 MOBILE APPS DEVELOPMENT (PEMBANGUNAN APLIKASI MUDAH ALIH)****No of Credits: 3****Course Synopsis:**

The course heavily emphasises the creation and development of mobile applications through the utilisation of specialised technology and tools. It comprises, among other things, mobile database management, networking, mobile application development, and mobile applications. The aim of this course is to provide students with the essential skills required to create and execute mobile applications that manage a series of programmatic processes similar to those involved in the creation, testing, and deployment of software. A modern programming language will be used as an example of a programming language built for mobile applications.

**Course Outcomes:**

1. Ability to explain the mobile application development process
2. Ability to demonstrate technical skills by using mobile application development software
3. Ability to produce mobile applications prototype



**SMT40503 LAW IN CREATIVE INDUSTRIES (UNDANG-UNDANG DALAM INDUSTRI KREATIF)****No of Credits: 3****Course Synopsis:**

This course aims to enhance students' understanding and knowledge about policies, law and ethics related to communication and new media. Students will develop an understanding and appreciation of issues related to policies, law and ethics in new media. The case study approach will be used, with an emphasis on the principles and philosophy that underlie the various aspects of communications. At the end of this course, students should be able to analyze the important legal and ethical issues involved with the new media scenarios.

**Course Outcomes:**

1. Ability to explain the policies, laws, and ethics that are relevant to the field of creative industries
2. Ability interpret law and ethics related to creative industries
3. Ability to evaluate the law and ethics related to creative industries

**SMT40603 DIGITAL MEDIA CONTENT MANAGEMENT (PENGURUSAN KANDUNGAN MEDIA DIGITAL)****No of Credits: 3****Course Synopsis:**

This course provides an insight into a comprehensive exploration of Digital Media Content Management. From understanding metadata and taxonomy to crafting effective social media content, this course navigates the landscape of content organization, rights management, and emerging trends. The students will gain essential skills to succeed in the dynamic world of digital media management.

**Course Outcomes:**

1. Ability to explain principles and characteristics of content management.
2. Ability to prepare the digital content framework.
3. Ability to compose social media content within specific contexts of use.

**SMT40703 INTERACTIVE MEDIA DESIGN AND DEVELOPMENT METHODS (KAEDAH REKA BENTUK DAN PEMBANGUNAN MEDIA INTERAKTIF)****No of Credits: 3****Course Synopsis:**

The course "Interactive Media Design and Development Methods" within the

Bachelor of Interactive Media Technology program emphasizes a comprehensive approach to product development in the interactive media domain. Students will delve into fundamental concepts, design principles, and development technologies, with a particular focus on user interface and experience design. The curriculum incorporates hands-on projects and real-world applications to reinforce theoretical knowledge, emphasizing the application of product development methodologies. Key topics include interactive storytelling, game design, responsive design, and emerging technologies, all within the context of ethical considerations and effective project management. By the course's conclusion, students will have acquired the skills and knowledge necessary for successful and ethical interactive media product development aligned with industry standards and user expectations.

**Course Outcomes:**

1. Ability to identify the concepts and research processes in media interactive (C1, PLO2)
2. Ability to differentiate product design approach in product development (C4, PLO2)
3. Ability to prepare a product design and development proposal (C6, PLO6)

**SMT40803 BIG DATA MANAGEMENT (PENGURUSAN DATA BESAR)****No of Credits: 3****Course Synopsis:**

This course will introduce students to the analysis and management of big data using current techniques and open source software tools. Data and case studies will be drawn from diverse sources including health and informatics, life sciences, web traffic and etc. The general principles of analysis, investigation, and reporting will be covered. Students will be encouraged to validate and critically assess the results of the analysis.

**Course Outcomes:**

1. Ability to identify with applicable government regulations and maintain the security of Big Data.
2. Ability to organize appropriate architectures and storage for Big Data applications.
3. Ability to analyze data held within typical Big Data systems.

**SMT41104 FYP 1 INTERACTIVE MEDIA TECHNOLOGY (FYP 1 TEKNOLOGI MEDIA INTERAKTIF)****No of Credits: 4****Course Synopsis:**

Final year projects provide students with an opportunity to integrate the knowledge and skills they have acquired throughout their academic journey in Interactive Media Technology.

By working on a comprehensive project, students can demonstrate their proficiency in various concepts, tools, and techniques within the field.

**Course Outcomes:**

1. Ability to report project development, testing and evaluate project
2. Ability to practice ethical and professional norms for the development of the projects.
3. Ability to present the final product

**SMT41212 FYP 2 INTERACTIVE MEDIA TECHNOLOGY (FYP 2 TEKNOLOGI MEDIA INTERAKTIF)****No of Credits: 12****Course Synopsis:**

Final year projects provide students with an opportunity to integrate the knowledge and skills they have acquired throughout their academic journey in Interactive Media Technology.

By working on a comprehensive project, students can demonstrate their proficiency in various concepts, tools, and techniques within the field.

**Course Outcomes:**

1. Ability to report project development, testing and evaluate project
2. Ability to practice ethical and professional norms for the development of the projects.
3. Ability to present the final product

**SMT41012 INDUSTRIAL TRAINING (LATIHAN INDUSTRI)****No of Credits: 12****Course Synopsis:**

The subject "Industrial Training " is a pivotal component in the curriculum, designed to provide students with an immersive and practical experience within a professional environment. This course is a bridge between academic knowledge and real-world application, allowing students to integrate theoretical concepts with hands-on skills while gaining valuable insights into the interactive media technology industry.

**Course Outcomes:**

1. Ability to display good work performance and adapt to the working environment during the training period
2. Ability to demonstrate good communications and work ethics during the training period
3. Ability to perform assigned task given by host company

**SMP11503 PRINSIP-PRINSIP KEUSAHAWANAN [PRINCIPLES OF ENTREPRENEURSHIP]****Course Synopsis**

This course addresses the concept of entrepreneurship which includes individual components of entrepreneurship and its implications to the society. It introduces the basics of planning and launching a business by identifying problems and opportunities, creative problem solving, developing a viable business model and entrepreneurial ethics. Students will develop an understanding of successes, opportunities and risks of entrepreneurship.

**Course Outcome**

1. Ability to explain the nature and dynamic role of entrepreneurship.
2. Ability to recognise business opportunity and creative solutions.
3. Ability to formulate a feasible business model

**SMP10103 PRINCIPLES OF ECONOMICS [PRINSIP EKONOMI]****No of Credits: 3****Course Synopsis:**

This course covers two branches of economics, namely microeconomics and macroeconomics. The study of microeconomics involves basic economics concepts, demand, supply, market equilibrium, production costs, and market structures. Macroeconomics concerns business cycles, national income accounting, aggregate demand, aggregate supply, government policies and national debt.

**Course Outcomes:**

1. The ability to demonstrate detailed knowledge of economic analysis in business.
2. The ability to analyse business issues and appropriate economic tools.
3. The ability to evaluate economic analysis and the complexity of business issues.

**SMP10603 PRINCIPLES OF ACCOUNTING [PRINSIP-PRINSIP PERAKAUNAN]****No of Credits: 3****Course Synopsis:**

This course is an introductory course that provides students with the accounting concepts, principles, and assumptions that are essential to the preparation and presentation of financial statements. Students will also prepare financial statements based on accounting standards. In addition, this course provides students with the skills of interpreting financial statements.

**Course Outcomes:**

1. Ability to apply the basic concepts of accounting as well as principles and procedures.
2. Ability to classify accounting information in the financial statements to present the information to the internal and external users.
3. Ability to analyse the accounting information for companies to make the best decision for the organization as a whole.

**SMP10703 PRINCIPLES OF FINANCE [PRINSIP-PRINSIP KEWANGAN]****No of Credits: 3****Course Synopsis:**

This course focuses on the methods of valuation for financial assets, investments in long-term assets, capital structure, dividends policy of the company and emphasize practical methods for the management of working capital and business finance of a company. It is related to understanding the concept and scope of the financial management environment, the method of financing a company, decision making in an investment focusing on the private business management sector in Malaysia particularly. This approach is based on the theory and practical approach to make financial decisions for a firm. At the end of this course, students are expected to understand and be able to apply the financial decision-making methods that can increase the economic value of a firm.

**Course Outcomes:**

1. Ability to interpret financial information tools on the financial problem.
2. Ability to analyse using various techniques for short-term, long-term financing, and investment decisions.
3. Ability to evaluate the financial information in making financial decisions.

**SMP10803 PRINCIPLES OF MARKETING [PRINSIP-PRINSIP PEMASARAN]****No of Credits: 3****Course Synopsis:**

The course deals with the study and analysis of the basic principles, theories, problems, and practices of marketing in an ever-changing economic environment. Emphasis is placed on the marketing functions, planning, and the distribution of goods and services from the producer to the ultimate consumer. The marketing mix (product, price, place, and promotion) is presented as a controllable variable to target market segments. They have unmet needs and wants that a firm can satisfy and be profitable. Market research and information tools of the marketing manager are explored.

**Course Outcomes:**

1. Ability to determine the marketing concepts and its related environments.
2. Ability to analyse issues and challenges in marketing.
3. Ability to evaluate marketing strategies and techniques.

**SMP10903 PRINCIPLES OF MANAGEMENT [PRINSIP PENGURUSAN]****No of Credits: 3****Course Synopsis:**

This course presents thorough and systematic coverage of management theory and practice. It focuses on the management's fundamental roles, skills, and functions, particularly attention to managerial responsibility for the effective and efficient achievement of goals.

**Course Outcomes:**

1. Ability to explain the fundamental concepts management.
2. Ability to analyse the managerial process of planning, organizing, leading, and controlling in the organizational context.
3. Ability to analyse the interaction between the environment, technology, human, and organization to achieve organizational objectives.

**SMP11003 ORGANISATIONAL BEHAVIOUR [GELAGAT ORGANISASI]****No of Credits: 3****Course Synopsis:**

This course discusses the role of organisational behaviour including individual values and perception, team dynamics, power, politics, conflict, organisational culture and change management. The learning outcomes of this course allow graduates to assess the importance of understanding organisational behaviour, propose solutions and create functional organisations based on the structure and culture of an organisation.

**Course Outcomes:**

1. Ability to explain the importance of organisational behaviour and individual differences in the workplace.
2. Ability to apply the theories and concepts of motivation and leadership.
3. Ability to analyse the influence of groups and teams, power, influence and politics, culture and change to organisational behaviour.

**SMP11603 MANAGEMENT INFORMATION SYSTEM [PENGURUSAN SISTEM MAKLUMAT]****No of Credits: 3****Course Synopsis:**

This course will expose students to the Management Information System (MIS) topics like organisations, management, infrastructures, and applications for managing the information system.

**Course Outcomes:**

1. Ability to explain principles and role of Management Information Systems (MIS) in business organizations.
2. Ability to analyse tools and techniques of the information system hardware, software, database, and networking technologies.
3. Ability to examine the core information system applications to improve operational excellence and decision making.

**SMP15503 BUSINESS ETHICS [ETIKA PERNIAGAAN]****No of Credits: 3****Course Synopsis:**

Ethics refers to well-founded standards of right and wrong that prescribe what humans ought to do, usually in terms of rights, obligations, benefits to society, fairness, or specific virtues. However, business ethics is one of the important branches of applied ethics. Business ethics is the application of general ethical ideas to business. Ethics in business is concerned with collective action problems among dispersed investors and the reconciliation of conflicts of interest between various corporate stakeholders. Business ethics and corporate governance of an organization go hand in hand. In fact, an organization that follows ethical practices in all its activities will, in all probability, follow best corporate governance practices as well. The purpose of this course is to give an overview of the concept of business ethics, theories of ethics and ethical principles in business as well as theories, principles and regulations related to corporate business environment.

**Course Outcomes:**

1. Ability to apply the importance of business ethics as a system of interlinked concepts derived from management and social science.
2. Ability to analyse solution for transformation of ethical code of conduct responsibilities in business environmental.
3. Ability to evaluate the outcome of business ethics programme in contemporary social business reasoning.

**SMP15603 PRICIPLES OF BUSINESS ANALYTICS [PRINSIP-PRINSIP ANALITIK PERNIAGAAN]****No of Credits: 3****Course Synopsis:**

This course is an application-oriented study of statistical concepts and techniques. It provides statistical methods for decision-making in business problems. This course will introduce some statistical techniques that can help in the decision-making process and analyze the output accurately.

**Course Outcomes:**

1. Ability to describe the statistical concept in business problems.
2. Ability to apply the appropriate statistical methods to business problems.
3. Ability to analyze the solutions for business problems using statistical methods.

**SMP20203 INTERNATIONAL BUSINESS MANAGEMENT [PENGURUSAN PERNIAGAAN ANTARABANGSA]****No of Credits: 3****Course Synopsis:**

This course will expose students to globalization and internationalization issues, cross-cultural business, political economy, international business ethics, economic development of nations, international trade theory, international trade and investment, international trade organization, trade policy, regional economic integration, international business strategy, selecting and managing international entry modes and other related to international business management activities. Students will be able to describe the opportunities and threats in the international business environment.

**Course Outcomes:**

1. Ability to recognize the issues and trends of international business.
2. Ability to discuss international business theories and practices.
3. Ability to describe opportunities and threats in the international business environment.

**SMP22103 OPERATIONS MANAGEMENT [PENGURUSAN OPERASI]****No of Credits: 3****Course Synopsis:**

The purpose of Operations Management course is to ensure students gain an understanding of the managerial processes for effective operations in both goods-producing and service-rendering organizations. This course is an introduction to the concepts, principles, problems, and practices of operations management. This course intends to provide students in gaining knowledge and understanding on the importance of operations management existence in organizations and expose students to the planning and control of manufacturing and service operations at local and international level.

**Course Outcomes:**

1. Ability to apply the Operations Management theories and concepts.
2. Ability to analyse a range of organisational problems and issues concerning the operations management field.
3. Ability to evaluate models and tools in Operations Management in solving organisational problems and issues.

**SMP22203 MANAGERIAL ACCOUNTING [PERAKAUNAN PENGURUSAN]****No of Credits: 3****Course Synopsis:**

This course provides an understanding of the importance of an organization's managerial accounting information in planning, controlling, and decision-making; enables the students to apply costing and budgeting methods which will provide useful information to the organization's internal users.

**Course Outcomes:**

1. Ability to apply various cost behaviour, performance measurement and costing methods in managing internal business and making business decisions.
2. Ability to adapts relevant costing and decision-making concepts in a variety of business environments.
3. Ability to evaluate various budgeting methods to plan, control and make a decision for internal business.

**SMP22303 HUMAN RESOURCE MANAGEMENT [PENGURUSAN SUMBER MANUSIA]****No of Credits: 3****Course Synopsis:**

The course is developed to enhance the knowledge and understanding related to the managing human resource in the organization. The course covers the concepts and practices of human resources management (HRM) functions to ensure both employers and employees are managed effectively and efficiently to achieve common goals. The human resource activities that will be discussed are introduction of human resource management, legal environment in HRM, job analysis and design, staffing, human resource development, performance appraisal, compensation management, occupational safety and health, industrial relations and employee rights and discipline.

**Course Outcomes:**

1. Ability to explain the definition of human resource management and its functions in the workplace.
2. Ability to apply the legal Acts in Malaysia which influence human resource management practices in Malaysia.
3. Ability to analyse the effects of human resource management functions to the individual and organisation.

**SMP22403 BUSINESS COMMUNICATION [KOMUNIKASI PERNIAGAAN]****No of Credits: 3****Course Synopsis:**

Communication is one of the most vital skills to success, especially in business. This course is designed to help students understand various aspects of business communication and to acquire the skills and competencies of good oral and written business communication, that will help them communicate and develop a communication strategy effectively.

**Course Outcomes:**

1. Ability to apply the skills of business communication in appropriate business situation.
2. Ability to establish the concept of communication in business contexts.
3. Ability to relate the concepts and theories of communication in business environment.

**SMP22503 DIGITAL BUSINESS [PERNIAGAAN DIGITAL]****No of Credits: 3****Course Synopsis:**

This course is a comprehensive guide to identify the driving forces of a digital business. The course analyzes the key concepts of digital business such as digital supply chain management, procurement and infrastructure. This course will also guide students to design a proper marketing campaign that is complemented by proper digital customer relationship management.

**Course Outcomes:**

1. Ability to identify the scope of digital business in driving business opportunities for companies.
2. Ability to analyze the potential components of digital business such as digital supply chain management, procurement, and infrastructure.
3. Ability to design a digital marketing campaign with improved elements of digital customer relation management concepts of digital marketing.

**SMP22603 SALES MANAGEMENT [PENGURUSAN JUALAN]****No of Credits: 3****Course Synopsis:**

This course emphasises on duties of professional salesperson on the way to develop the sales presentations. It also covers the entire sales management process from prospecting to follow up, and the importance of the proper use and management of one's time and sales territory coverage. This course provides students with the ability to analyse the sales opportunity based on business activities. It also exposes students on the ability to evaluate the elements of sales application towards supplier and customer.

**Course Outcomes:**

1. Ability to explain the sales management principles in empowering the selling strategies and techniques.
2. Ability to apply the sales management concept based on business activities.
3. Ability to analyse the sales opportunity using the personal selling strategies and techniques.



**SMU13002 FALSAFAH DAN ISU SEMASA [PHILOSOPHY AND CURRENT ISSUES]****No of Credits: 2****Course Synopsis:**

This course focuses on basic ideas and questions in philosophy which emphasizes on noble way of life within the intellectual thinking. The aim of this course is to give students a way to think more maturely in dealing with problems and issues in life. Students will be able to comprehend philosophy and its importance in building identity, moral responsibility, human relations and relationship with nature within the formation of Malaysian value systems.

**Course Outcomes:**

1. Ability to comprehend current issues base on philosophical knowledge and National Education Philosophy with "Rukun Negara".
2. Ability to explain current issues base on the main stream of various philosophical school of thought.
3. Ability to discuss current issues through comparison of philosophical perspectives to understand the integration of culture.

**SMU13102 PENGHAYATAN ETIKA DAN PERADABAN [APPRECIATION OF ETHICS AND CIVILIZATION]****No of Credits: 2****Course Synopsis:**

This course explains ethics from the perspective of different civilizations in Malaysia by identifying ethnic's system, level of development, progress, and culture in strengthening social cohesion. The goal of this course is to expose students to relevant knowledge in parsing and discussing contemporary issues related to economics, politics, social, culture, and the environment from a civilizational standpoint which hopefully will instill ethical perceptions and behaviour among students. The delivery of this course makes use of appropriate high-impact educational practices (HEIPs).

**Course Outcomes:**

1. Ability to comprehend the ethical concepts of different civilizations.
2. Ability to compare systems, levels of development, social and cultural progress across ethnic groups.
3. Ability to explain contemporary issues issues related to economics, politics, society, culture and the environment from an ethical and civilizational perspective.

**SMU12102 INTEGRITI DAN ANTI RASUAH [INTEGRITY AND ANTI-CORRUPTION]****No of Credits: 2****Course Synopsis:**

This course covers basic concepts on the value of Integrity, forms of corruption and abuse of power in daily life. This does not only happen in society but also involves existing organizations in the country. Therefore, methods to prevent corruption as well as identify real cases of corruption found in this life will be discussed in the learning session.

**Course Outcomes:**

1. Ability to identify and understand the value concepts of integrity and corruption.
2. Ability to analyze the value of integrity and corrupt behavior in life and organizations.
3. Ability to discuss and evaluate integrity and acts of corruption through any type of media observation/ case study/ community service.

**SMU22402 KEUSAHAWANAN KEJURUTERAAN [ENGINEERING ENTREPRENEURSHIP]****No of Credits: 2****Course Synopsis:**

This course introduces the basic concepts and theories of entrepreneurship. Students will be taught to develop a creative and innovative entrepreneurship ideas and business plan. The aim of this course is to instil entrepreneurial mindset among students in conducting daily activities.

**Course Outcomes:**

1. Ability to comprehend the elements and the concept of entrepreneurship based on selected case study.
2. Ability to create a creative and innovative entrepreneurship idea.
3. Ability to develop a business plan.

**SMP25503 DIGITAL MARKETING [PEMASARAN DIGITAL]****No of Credits: 3****Course Synopsis:**

This course provides the most comprehensive guide to all aspects of using the Internet, digital media, and marketing technology to achieve the goals of integrated multichannel marketing. The emerging trends in marketing through social media and digital platforms are gathered and informatively explained. With the growing use of digital comes an increasing demand for employees who have strategic and practical digital marketing skills like search engine optimization, social media and creating effective websites.

**1. Course Outcomes:**

1. Ability to apply digital competency to enhance the marketing techniques.
2. Ability to correlate ordinary or conventional marketing into digital marketing methods.
3. Ability to plan digital marketing programmes for related projects.

**SMP32103 SERVICES MARKETING [PEMASARAN PERKHIDMATAN]****No of Credits: 3****Course Synopsis:**

This course will explain about the characteristics of the service, how to understand the service, how consumer behavior is related to the service and how to market the service. This course will facilitate understanding to learn about services and also how one can be a part of a successful service marketer. The course will also cover on the development of the concept and value of services, also explain about the products, distribution, pricing and communication strategies necessary to develop a successful business model.

**Course Outcomes:**

1. Ability to discuss the service product consumers and markets in the new market perspectives.
2. Ability to explain the 4Ps of marketing to services and identify the role of marketing communication.
3. Ability to analyse the managing service processes and relate the service environment.

**SMP31803 RESEARCH METHODOLOGY [KAEDAH PENYELIDIKAN]****No of Credits: 3****Course Synopsis:**

To successfully conduct a business research, students must develop a foundation of their understanding with regards to the key elements of the process and procedure in completing their research project. This course emphasizes the basic knowledge for business students in developing their strategies to produce impactful research project.

**Course Outcomes:**

1. Ability to analyse the main key terms of research methodology based on existing research articles.
2. Ability to formulate a systematic research project by understanding the flow of the research process.
3. Ability to explain the concept of the whole research process.

**SMP33803 STRATEGIC MANAGEMENT [PENGURUSAN STRATEGIK]****No of Credits: 3****Course Synopsis:**

Strategic management educates aspiring managers on how to deal with uncertainty and achieve organisational goals. Strategic management requires ongoing analysis of the environment, strategy formulation, strategy implementation, and performance evaluation. The corporation focuses on its capabilities to maximise environmental potential. Strategic management as a capstone-multidisciplinary course analyses business, management, and strategic direction issues.

**Course Outcomes:**

1. Ability to analyse business environments to determine strategic factors that are Ability to formulate and implement strategies to achieve competitive advantages for the organization.
2. Ability to assess the appropriateness of strategies implemented and take corrective actions to get the organization back on track to attain goals and objectives.

**SMP27203 CREATIVITY & BUSINESS INNOVATION****Course Synopsis**

This course is designed for students to develop their creative and innovative thinking skills in solving problems. They will learn about the creativity and innovation in the context of entrepreneurship. The students will be exposed to various aspects of business innovation and innovation management. At the end of the course, the students are expected to be able to use the creativity tools to generate ideas as well as to use methods and processes to build an innovative organization.

**Course Outcome**

1. Ability to analyze the concepts of creativity and innovation in entrepreneurship.
2. Ability to develop ideas using creative tools.
3. Ability to adapt methods in managing innovation.

**SMP14203 INTRODUCTION TO ENGINEERING TECHNOLOGY****Course Synopsis**

This course is designed to expose students to the fields or disciplines of Engineering and Manufacturing Technology and Processes. In the first part of the course, teaching and learning will begin with explanation about the functions of an engineer with a breakdown of engineering fields or disciplines. Furthermore, the second part of the subject will deal with manufacturing technologies and its processes. Whereas, students will totally focus on the processing and assembly operations. At the end of this course, students will have a clear understanding of the roles, responsibilities and gain knowledge related to operations and processes in the manufacturing sector.

**Course Outcome**

1. Ability to APPLY knowledge about areas of expertise, disciplines and responsibilities in the engineering profession with any related activities.
2. Ability to CORRELATE the processing and assembly operations in manufacturing activities with applicable situations.
3. The ability to ANALYSE manufacturing technologies and processes to produce a product or in applicable engineering activities

**SMP25603 ENGINEERING DRAWING FOR PRODUCT DESIGN****Course Synopsis**

The aims of the course are to further the ability to communicate technical information by graphical means, using CAD software packages to develop technical products. This will be achieved through the ability to visualize and understand spatial/3-dimensional relationships, and the ability to select and use appropriate graphical methods for representing specifications, object forms, and sizes. The course will comprise of visualization and graphical theory, drawing standards and conventions, CAD drawing tools, and the use of drawings in engineering applications. By the end of the course, the students will be able to draw, visualize and read specifications of any engineering parts and components in engineering drawings using CAD software.

**Course Outcome**

1. Ability to analyze standard language and symbols used in engineering drawing.
2. Ability to manipulate CAD software interfaces, and tools with proper engineering drafting methods and standards.
3. Ability to evaluate graphical objects for communication of concepts, ideas, and design of engineering components or products through CAD drawings.

**SMP21303 BUSINESS VENTURE MANAGEMENT****Course Synopsis**

This course introduces to the students about the stages in the entrepreneurial process such as decision to become an entrepreneur, developing successful business ideas, moving from an idea to an entrepreneurial firm and managing and growing an entrepreneurial firm. The focus will be on the start up phase in which the individual decides to become an entrepreneur and goes through the opportunity discovery, exploitation and allocation of resources.

**Course Outcome**

1. Ability to analyse the entrepreneurial process for new venture creation.
2. Ability to express opportunity-driven business ideas using appropriate methodology.
3. Ability to organize resources in new business ventures.

**SMP22003 TECHNOLOGY ENTREPRENEURSHIP****Course Synopsis**

This course will give exposure to the process of innovative transformation of knowledge into commercial product and service. Students will assess real technologies for the commercial potential in terms of licensing and for venture development. The course begins by examining concepts associated with technology commercialisation. Concepts are introduced to improve and accelerate the commercialisation process, from decisions made by scientists at the research bench, through development, intellectual property protection, to the formation of technology-based ventures.

**Course Outcome**

1. Ability to **analyse** key concepts in technology entrepreneurship and commercialisation.
2. Ability to **adopt** a model for technology commercialization.
3. Ability to **conceptualize** technology opportunities.

**SMP25703 DATA ANALYTICS FOR ENGINEERING MANAGEMENT****Course Synopsis**

This course is designed as a preparation for meaningful opportunities in the future with respect to data analytics. This course will introduce the data analytics and describes the important phases of data analytics project. It will further guide students to use different functions of spreadsheets regarding data analytics. Next, Pivot tables and their use in data analytics will be introduced. The students will learn the way to represent data using charts and tables, as well as analyse the visualised data in the Data Visualization phase. This course also allows students to build project according to case study and producing final deliverables. At the end of this course, students will be introduced to some optimization techniques used in data analytics to improve decision making.

**Course Outcome**

1. Ability to understand the phases of data analytics project and other related optimization techniques in data analytics
2. Ability to apply basic operations and formatting as well as different formulae and functions in spreadsheets.
3. Ability to analyze the visualized data in spreadsheets.

**SMP32203 SUPPLY CHAIN MANAGEMENT****Course Synopsis**

Supply chain management is a highly-detailed system used by small and large organizations alike to get products to consumers, from obtaining raw materials, manufacturing and delivering the final product to the customer. A well-organized supply chain management system involves optimizing operations functionality to be fast and efficient.

**Course Outcome**

1. Ability to analyse the general concepts and processes involve in supply chain management.
2. Ability to evaluate supply chain model.
3. Ability to design effective supply chain in a business environment.

**SMP21903 PRODUCT DESIGN AND DEVELOPMENT****Course Synopsis**

The aims of the course are to further the students ability to plan and propose product design solutions/concepts using proper product development processes, tools and methods. In addition, students will be exposed to three main disciplines and their functions in a product design and development project. Student will experience on how to design and develop product from the earliest planning stage and finished with a final proposal of design concept and its specifications. These are done by having an individual and a group design project. At the end of the course, students are expected to be ready and able to manage and participate in a multidisciplinary product design and development project.

**Course Outcome**

1. Ability to integrate the nature and role of multidisciplinary product development team tasks and their responsibilities in the process of developing a product
2. Ability to classify appropriate design strategies at different stages in the product development process.
3. Ability to analyze design factors using proper product design and development methods and tools for different types of products

**SMP36203 BUSINESS PLAN FOR ENGINEERING PROJECT****Course Synopsis**

This course is a capstone final year project, which provides exposure to the students in culminating their learning of business, basic engineering, and technology. Students will apply their learning theory into practice, by developing a business plan for their new start-up business, in a specific format and for a specific product or project.

**Course Outcome**

1. Ability to organize concepts into practice.
2. Ability to develop opportunity-driven business ideas using appropriate business tools.
3. Ability independently create a business plan for an engineering project

**SMP35803 QUALITY ASSURANCE IN MANUFACTURING PROCESS****Course Synopsis**

The aims of the course are to further the ability to perform thorough product assessments using total quality management. A fully implemented quality management system in the manufacturing industry ensures better control of processes and workflows to deliver a quality product. An end-to-end quality management system boosts the overall effectiveness of any manufacturing unit, maintaining consistency with the resources. Better control also indicates the implementation of best practices in the system, processes, as well as product. By the end of the course, the students will be able to evaluate appropriate quality management tools to improve the quality of processes while ensuring customer satisfaction at the end.

**Course Outcome**

1. Ability to analyze appropriate quality management knowledge for detecting manufacturing process problems.
2. Ability to appraise quality management tools for manufacturing process
3. Ability to develop solutions for quality monitoring in manufacturing processes.

**SMP32603 PROJECT MANAGEMENT****Course Synopsis**

In this course, students will study basic concepts and models that will enhance successful management of projects in engineering and technology. Topics will include a structured approach to project management, project life cycle, project selection and evaluation, organizational concepts in project management, project planning, conflict and negotiation, budgeting and cost estimation, scheduling, resource allocation, monitoring, information systems and project evaluation and control, project reviewing and project termination.

**Course Outcome**

1. Ability to define and discuss organizational issues and management methods that are necessary for successful project management.
2. Ability to understand and apply organizational concepts and project planning, including conflict and negotiation in project management.
3. Ability to analyse and evaluate budgeting and cost estimation, project scheduling, resources allocation, project monitoring, information systems and project evaluation, project reviewing and project termination.

**SMP21503 ENTREPRENEURIAL FINANCE****Course Synopsis**

Entrepreneurial finance is the study of value and resource allocation, applied to new ventures and the questions which confront all entrepreneurs pertaining to the amount of funding that can and should be raised, the timing to raise funding, the suitable sources of funding that should be approached, valuing a startup worth, and structuring funding contracts and exit decisions.

**Course Outcome**

1. Ability to analyse financial information for the development of the firm's financial plan
2. Ability to explain the financial concepts in relation to the entrepreneurial process.
3. Ability to express solutions to entrepreneurial finance problems using appropriate financial tools.

**SMP15903 FINANCIAL TECHNOLOGY [TEKNOLOGI KEWANGAN]****No of Credits: 3****Course Synopsis:**

This course acquaints students with the fundamentals of financial technology and how it functions and fits into the organization. Using a cycle approach, the course introduces internal control procedures, covers the basic elements of the procedures, covers the basic elements of the revenue and expense cycles, and enables students to become proficient with documentation techniques, such as flowcharting. The course focuses on the needs and responsibilities of accountants as users and developers of information technology and as auditors. Students will explore the capabilities of accounting software and undertake a course related project.

**Course Outcomes:**

1. Ability to synthesize the role, purpose and importance of an accounting information system.
2. Ability to apply common tools in financial accounting information systems as a basis of decision-making.
3. Ability to demonstrate higher quality of accounting services (financial statements) based on the security, confidentiality, privacy, processing integrity and availability suggested by accounting bodies.

**SMP20103 INTERNATIONAL ACCOUNTING [PERAKAUNAN ANTARABANGSA]****No of Credits: 3****Course Synopsis:**

International accounting is a vital component of the overall profession in the current economy. Students are expected to understand the international differences in financial accounting theory and practice, harmonization and convergence of accounting standards. Analysing the foreign currency market and accounting for foreign currency transactions and translation. Ultimately to demonstrate the knowledge of international accounting issues related to financial reporting, international taxation and international transfer pricing that lead to decision making role in the real world.

**Course Outcomes:**

1. Ability to explain the international differences in financial accounting theory and practice, harmonization and convergence of accounting standard.
2. Ability to analyse the foreign currency market and accounting for foreign currency transactions and translation.
3. Ability to demonstrate knowledge of international accounting issues related to additional financial reporting, international taxation and international transfer pricing.

**SMP20303 INTERNATIONAL ECONOMICS [EKONOMI ANTARABANGSA]****No of Credits: 3****Course Synopsis:**

Students will learn the ideas and perspectives of economic theory and thinking that build International Economics. They will also learn critical ideas in understanding the three main components of International Economics: International Trade, International Finance, and the International Financial System. Then students will apply concepts and theories to understand issues and criticisms in the global economy.

**Course Outcomes:**

1. Ability to define the basic concepts of International Economics and differentiate the economic thoughts of various economists.
2. Ability to analyse issues related to the International Trade, International Finance and International Monetary System.
3. Ability to interpret the theories and economic thoughts of International Economics with regards to the current global economic issues.

**SMP20403 INTERNATIONAL FINANCE [KEWANGAN ANTARABANGSA]****No of Credits: 3****Course Synopsis:**

The subject matter of international finance consists of issues raised by the special problems of economic interaction between sovereign states. This course will introduce the main concepts and theories of international finance and illustrates them with applications drawn from the real world. It will address a wide range of issues, including the balance of payments, exchange rate determination, international policy coordination, and the international capital market. The international finance course will focus on the monetary side of the international economy and international financial transactions.

**Course Outcomes:**

1. Ability to identify the general multinational corporations' operations and the international financial environment and its components.
2. Ability to analyze the critical relationship involving exchange rates i.e. exchange rates movement, interest rate parity, and purchasing power parity.
3. Ability to prepare the various function to involve in the management of exchange rate risk and apply the techniques for performance forecasting and hedging.



**SMP29204 INDUSTRIAL TRAINING [LATIHAN INDUSTRI]****No of Credits: 4****Course Synopsis:**

Industrial Training is a practical-oriented course where students will go for attachment at industries or some related organizations for certain period of time. During industrial training, the students will be exposed to the real working environment where they will learn about the company operations, department functions, works and safety procedures, project management, technical skills, communication, administration, etc. The students are also required to submit their logbook and final report at the end of the Industrial Training period.

**Course Outcomes:**

1. Ability to display good work performance and adapt to the working environment during training period.
2. Ability to practice good communication skills and work ethics during training period.
3. Ability to demonstrate leadership, autonomy and responsibility to the assigned task given by the host company.

**SMP31403 CROSS-CULTURAL MANAGEMENT [PENGURUSAN SILANG BUDAYA]****No of Credits: 3****Course Synopsis:**

This course covers the cultural aspect of leadership, corporate strategy, change in organizations, marketing, business communication across culture and its barriers, negotiation and international teams, and cultural conflicts. The Cross-culture management course also explains the cross-cultural management theories and concepts in the international business setting. Cross-cultural competencies are exposed the students to work effectively in international business organizations.

**Course Outcomes:**

1. Ability to explain the cross-cultural management theories and concepts in international business setting.
2. Ability to identify the suitability of cultural knowledge, theories, and concepts for international business opportunities.
3. Ability to propose solutions based on cross-cultural theories and concepts for solving international business problems.

**SMP31603 LEADERSHIP IN ORGANISATION [KEPIMPINAN DALAM ORGANISASI]****No of Credits: 3****Course Synopsis:**

This course is designed to enhance students' understanding and widen their perspective, knowledge and conceptions of leadership theories, styles, effectiveness and practical applications for their career in business, government and non-profit organizations. The main focus of this course is on managerial leadership effectiveness and what makes a person an effective leader. The syllabus covers leadership approaches, behavioural tendencies of leaders, teamwork, uses of power, participation, delegation, and empowerment, effective change, developing leaderships skills, cross-cultural leadership and other topics related to leadership in organization.

**Course Outcomes:**

1. Ability to explain the meaning of leadership, its concepts and various theories that have been developed and practiced in organization today.
2. Ability to analyse effective leadership skills in communication, building strong teams, creating effective change, motivation and persuasion to increase followers' commitment and loyalty.
3. Ability to investigate the leader, follower and situational factors that affect the leadership styles and behaviours in organization.

**SMP33503 INTERNATIONAL BUSINESS ENVIRONMENT [PERSEKITARAN PERNIAGAAN ANTARABANGSA]****No of Credits: 3****Course Synopsis:**

This course will describe the PESTLE+C analysis which is used as a base for theories and concept evaluation of the international business environment with a focus on global politics, economics, social, technology, legal, environmental, and competition forces to international business activities.

**Course Outcomes:**

1. Ability to describe the impact of global political, economic, social, technological, legal and environmental changes from an international business perspective.
2. Ability to explain international business theories and concepts in the global business environment.
3. Ability to propose solutions for international business problems, based on the current information.

**SMP33703 INTERNATIONAL MARKETING [PEMASARAN ANTARABANGSA]****No of Credits: 3****Course Synopsis:**

This course will expose students to issues involved in international marketing, the market strategy for a product and a service in every country, general examples and frameworks of international marketing through the text, lecture and discussion and also, specific and in-depth examples of how to market a product/service in a country.

**Course Outcomes:**

1. Ability to explain the importance of international marketing theories and concepts.
2. Ability to apply theories and models in international marketing.
3. Ability to analyse the outputs from the application of the models and tools in international marketing.

**SMP34403 EXPORT IMPORT MANAGEMENT [PENGURUSAN EKSPORT IMPORT]****No of Credits: 3****Course Synopsis:**

This course focuses on the knowledge, skills and experience base needed to manage the import and export business activities either as comprehensive trading company or a department in the company with import and export activities. This course will also expose students to the responsibilities of a manager in the import and export and develop students' mental preparation for working in the field of international business. Exposure includes knowledge of the rules, procedures and organizations involved in the import and export business.

**Course Outcomes:**

1. Ability to explain the application of primary documents and procedures in export and import, and INCOTERMS in international business.
2. Ability to identify the various export and import business processes and procedures in international business.
3. Ability to evaluate various export and import documentation based on the mode of international transportation.

**SMP34503 GLOBAL ECONOMIC ISSUES [ISU-ISU EKONOMI GLOBAL]****No of Credits: 3****Course Synopsis:**

This course will focus on major global economic issues that characterise the state of our current world. Students will be exposed to topics relating to global economic issues, world economy evolution, economic cooperation among the nations, demographics, geopolitics, giant economic powers, industrial revolutions, world hunger and poverty, sustainable development and current issues evolved. Students of this course will be able to discuss and argue on the current economic problems and issues and intellectually find ways to resolve the issues discussed.

**Course Outcomes:**

1. Ability to apply the basic concepts of global economic issues.
2. Ability to analyse the importance of cooperation amongst nations, demographics, geopolitics and powers.
3. Ability to evaluate the impacts of global economic issues connected on current social, political, cultural and environmental responsibilities.

**SMP35103 FINAL YEAR PROJECT [PROJEK TAHUN AKHIR]****No of Credits: 3****Course Synopsis:**

This course applies theory into practice; it will start with identifies the business or management issues, develops understanding base on theory and past literature, structuring the independent and dependent variables, applies research methodology, interprets collecting data, and provides structured and organize information to support the decision-making process.

**Course Outcomes:**

1. Ability to conduct and manage research.
2. Ability to organize research works and research reports independently.
3. Ability to decide appropriate and accurate methods in data analysis.
4. Ability to propose conclusions and recommendations to support the decision-making process.

**SMP36003 INTERNATIONAL BUSINESS STRATEGY [STRATEGI PERNIAGAAN ANTARABANGSA]****No of Credits: 3****Course Synopsis:**

This course is designed to explore the basic knowledge and skills to formulate international business strategy. It highlights for students the process that multinational companies engage in when deciding to compete in the global economy and the management consequences of these strategic choices. Students will learn the basic concepts of international business strategy that provide essential background on the nature of multinational management, how multinational companies formulate successful strategies to compete internationally, the management systems used to implement multinational strategies, the adaptation of international human resource practices across cultures and strategy implementation at the level of the individual in the organization.

**Course Outcomes:**

1. Ability to explain the concepts and elements related to international business strategy.
2. Ability to formulate successful strategies to compete internationally.
3. Ability to solve international business strategy case study.

**SMU32202 KEMAHIRAN BERFIKIR [THINKING SKILLS]****No of Credits: 2****Course Synopsis:**

This course highlights the basic knowledge and understanding of thinking skills. Students will be able to understand and comprehend the related thinking skills philosophies, theories and concepts in local and western perspectives. Students will be able to choose, apply and discuss the appropriate and suitable thinking skill concepts and strategies in lateral and logical thinking in problem solving and decision-making processes.

**Course Outcomes:**

1. Ability to comprehend the concepts, theories and processes of thinking skills.
2. Ability to analyze the suitable and appropriate concepts, theories and processes of thinking skills in any given contexts.
3. Ability to discuss the suitable and appropriate concepts, theories and processes of thinking skills in any given contexts.

**SMU12502 KOMUNIKASI KORPORAT [CORPORATE COMMUNICATION]****No of Credits: 2****Course Synopsis:**

This course introduces the definition, theories and basic concepts of corporate communication. The aim of this course is to expose to relevant knowledge of theories, concepts and practice of corporate communication within internal and external of an organization.

**Course Outcomes:**

1. Ability to comprehend the concepts and theories of corporate communication.
2. Ability to analyze the suitable and appropriate concept and theories of corporate communication within corporate communication contexts.
3. Ability to discuss the suitable and appropriate concept and theories of corporate communication within corporate communication contexts.

**SMU12202 KEMAHIRAN KOMUNIKASI DAN TEKNOLOGI [COMMUNICATION SKILLS AND TECHNOLOGY]****No of Credits: 2****Course Synopsis:**

This course introduces students to the basic concepts and theories of communication, the use of technology in communication and introduction to the principle of public speaking. The aim of this course is to be exposed to relevant knowledge of concepts and theories of communication and the use of technology in communication within various contexts.

**Course Outcomes:**

1. Ability to comprehend the concepts and theories of communication and technology in communication in various contexts.
2. Ability to analyze the concepts and theories of communication and technology in communication in various contexts.
3. Ability to discuss the concepts and theories of communication and technology in communication in various contexts.

**SMU12602 PSIKOLOGI INDUSTRI [INDUSTRIAL PSYCHOLOGY]****No of Credits: 2****Course Synopsis:**

The Industrial Psychology course offered to provide students an exposure to relevant knowledge of conventional and contemporary theories and practices in public and private sectors. Students will be able to comprehend, analyze and discuss the current issues on industrial psychology activities through a well-organized teaching and learning module.

**Course Outcomes:**

1. Ability to comprehend the concept, theories and process of human resource management.
2. Ability to analyze the suitable and appropriate concept, theories and process of human resource management within any given issues.
3. Ability to discuss the suitable and appropriate concepts, theories and process of human resource management within any given contexts.

**SMU12702 KOMUNIKASI DAN PENGURUSAN KONFLIK [COMMUNICATION AND CONFLICT MANAGEMENT]****No of Credits: 2****Course Synopsis:**

Students will be able to comprehend and analyze the definition, type of conflicts occurs, the approaches to deal and manage conflict and communication. Students will also be exposed to the knowledge of managing conflict with competence communication in the contexts of interpersonal conflict; organizational conflict and intercultural conflict.

**Course Outcomes:**

1. Ability to comprehend the concept, theories, process and management of conflict and communication.
2. Ability to analyze the suitable and appropriate concept, theories, process of communication in managing and resolving conflicts within any given contexts.
3. Ability to discuss the suitable and appropriate concepts, theories, process of communication in managing and resolving conflicts within any given contexts.

**SMU12802 PENGURUSAN SUMBER MANUSIA [HUMAN RESOURCE MANAGEMENT]****No of Credits: 2****Course Synopsis:**

Students will be exposed to relevant knowledge of theories, concepts and practice of human resource management in organization. Students will be able to recognize, comprehend and analyze the issues in human resource management.

**Course Outcomes:**

1. Ability to comprehend the concept, theories and process of human resource management.
2. Ability to analyze the suitable and appropriate concept, theories and process of human resource management within any given issues.
3. Ability to discuss the suitable and appropriate concepts, theories and process of human resource management within any given contexts.

**SMU13202 PENGAJIAN MALAYSIA [MALAYSIAN STUDIES]****No of Credits: 2****Course Synopsis:**

The Malaysian Studies course emphasizes on the political, economic, and social aspects of the country's formation and growth. It contains details on the background history of ancient and Indian Southeast Asian kingdoms. Additionally, it covers Malacca's earliest known population, Malay Sultanate, Malay Kingship traditions, the rise and fall of Malacca, the nationalistic era, and the path to independence. Along with a brief history of Perlis, it also addresses topics such as foreign policy, globalization challenges, democratic and administrative characteristics.

**Course Outcomes:**

1. Ability to explain Malaysian historical background, nationalism, development, and growth to reach independence.
2. Ability to analyze the Malaysian process of democracy and system of administration.
3. Ability to discuss Malaysian issues and challenges in the era of globalization

**SMB11002 BAHASA MELAYU ASAS [BASIC MALAY LANGUAGE]****No of Credits: 2****Sinopsis Kursus:**

Kursus ini dapat mengasah kemahiran berbahasa yang asas sehingga pelajar berkebolehan untuk menulis dan bertutur dalam bahasa Melayu. Kandungan kursus ini dapat memberi nilai tambah kepada kemahiran menulis dan bertutur dengan kosa kata asas dalam perbualan harian dan pembacaan teks mudah. Tatabahasa asas diterapkan untuk menyokong kemahiran berbahasa secara tepat.

**Course Outcomes:**

1. Kebolehan untuk memahami struktur asas tatabahasa dalam penulisan bahasa Melayu.
2. Kebolehan untuk mengaplikasi perkataan dan ayat mudah secara lisan dalam bahasa Melayu.
3. Kebolehan untuk menganalisis teks secara lisan dalam bahasa Melayu.

**SMB41002 BAHASA MELAYU UNIVERSITI [UNIVERSITY MALAY LANGUAGE]****No of Credits: 2****Sinopsis Kursus:**

Secara amnya kursus ini menekankan empat elemen dalam berbahasa, iaitu kemahiran mendengar, bertutur, membaca dan menulis. Pelajar mendapat pendedahan tentang konsep pemilihan kata, kesantunan berbahasa, penggunaan laras bahasa dan bahasa sapaan. Topik perancangan bahasa menyentuh sistem ejaan dan pembentukan kata dalam konteks rasmi. Pelajar akan didedahkan dengan penggunaan bahasa tidak formal, terutamanya dalam dialek geografi dan dialek sosial. Tugasan penulisan memberikan peluang kepada pelajar mempelajari proses-proses analisis disiplin bahasa dari segi fonologi, morfologi, leksikal, semantik dan sintaksis melalui penghuraian idea secara lisan dan tulisan.

**Course Outcomes:**

1. Kebolehan untuk memahami aspek-aspek kemahiran berbahasa dalam lisan dan tulisan.
2. Kebolehan untuk menganalisis penggunaan bahasa dan tatabahasa mengikut konteks.
3. Kebolehan untuk berhujah dengan menggunakan bahasa yang kritis dan analitis.

**SMB10102 PREPARATORY ENGLISH [BAHASA INGGERIS PERSEDIAAN]****No of Credits: 2****Course Synopsis:**

This course aims to enhance students English Language proficiency level on a variety of familiar subjects within their fields of interest. The learning of productive and receptive language skills are integrated within communicative approaches.

**Course Outcomes:**

1. Ability to interpret texts on the subjects related to their field of interest.
2. Ability to express straightforward descriptions or opinions with reasons on a variety of familiar subjects within their field of interest.
3. Ability to write reflectively on a range of familiar subjects within their field of interest using targeted grammatical items correctly.

**SMB20102 ENGLISH FOR GENERAL COMMUNICATION [BAHASA INGGERIS KOMUNIKASI UMUM]****No of Credits: 2****Course Synopsis:**

This course focuses on productive skills with some emphasis on receptive skills using semi-authentic and authentic content on a variety of subjects related to their field of interest. Students are exposed to evaluating information and arguments by applying appropriate grammatical items. This learner-centered course adopts language in context and skills-based approaches.

**Course Outcomes:**

1. Ability to identify the main ideas of complex texts in both concrete and abstract topics.
2. Ability to discuss critically on a wide range of subjects related to their field of interest, expanding and supporting ideas with subsidiary points and relevant examples.
3. Ability to argue on a variety of subjects related to their field of interest; evaluating information and arguments by applying appropriate grammatical items.

**SMB31202 ENGLISH FOR TECHNICAL COMMUNICATION [BAHASA INGGERIS UNTUK KOMUNIKASI TEKNIKAL]****No of Credits: 2****Course Synopsis:**

This course is designed to build students' competency in technical writing. Various fundamentals of technical communication will be introduced throughout this course. Students will learn how to write clearly and concisely. Students will also be exposed to primary and secondary research, techniques of analyzing and interpreting information. At the end of the semester, students are required to participate in discussions on a given topic related to the technical discipline.

**Course Outcomes:**

1. Ability to understand the fundamentals of technical communication.
2. Ability to produce clear, well-structured technical document based on the fundamentals of technical communication and supported with appropriate examples.
3. Ability to discuss critically and express agreement and disagreement within a group on a variety of topics related to the technical discipline.

**SMB31302 ENGLISH FOR ACADEMIC PURPOSES [BAHASA INGGERIS AKADEMIK]****No of Credits: 2****Course Synopsis:**

This course is aimed at preparing students to improve their general academic writing skills by familiarising them with the fundamentals of academic writing. Students will be expected to perform tasks in academic contexts on topics from various disciplines such as conducting primary and secondary research, writing a project paper, applying the correct form of APA style referencing in their writings, and critically analyse reading texts. This course also places some emphasis on reading and speaking skills.

**Course Outcomes:**

1. Ability to analyse complex academic texts critically from various disciplines.
2. Ability to produce well-structured academic writing by applying information gathered from primary and secondary sources using APA referencing.
3. Ability to argue in a discussion of topics from various disciplines convincingly.

**SMB01402 MANDARIN LANGUAGE FOR BEGINNERS [BAHASA MANDARIN PERMULAAN]****No of Credits: 2****Course Synopsis:**

This course is designed for beginners with no prior knowledge of Mandarin. This course focuses on developing the learner's basic listening, speaking and reading skills. Students will acquire the correct Mandarin pronunciation using Pinyin, to enable them to interact in various everyday situations. Simple conversations such as self-introduction, introducing one self to others, describing objects/people and expressing everyday activities are taught. In addition, students will be exposed to the basic elements of Chinese culture via the topics covered in the syllabus.

**Course Outcomes:**

1. Ability to identify basic simple words, phrases and short texts using Pinyin transliteration.
2. Ability to respond to everyday expressions & activities dealing with everyday needs in very short, slow, and repeated speech.
3. Ability to describe personal information (e.g., name, age, nationality, spoken language) using short phrases and simple dialogues.

**SMB11402 PREPARATORY MANDARIN LANGUAGE [BAHASA MANDARIN PERSEDIAAN]****No of Credits: 2****Course Synopsis:**

This course is designed for students who have no prior background in Mandarin language. The course focus on receptive and productive skills. The student will be introduced to Chinese Character and Pinyin, read and write short simple sentences using Chinese characters with reference to pin yin, and learn daily expressions in Mandarin language.

**Course Outcomes:**

1. Ability to comprehend words and phrases in simple informational texts.
2. Ability to reproduce personal information and details using simple phrases and short sentences using Chinese characters with reference to pin yin.
3. Ability to respond to repeated speech in everyday expressions & activities dealing with daily needs.
4. Ability to describe themselves and personal information (e.g., name, age, nationality, spoken language) using short phrases and simple dialogues



**SMB01502 THAI LANGUAGE FOR BEGINNERS [BAHASA THAI ASAS]****No of Credits: 2****Course Synopsis:**

This course is designed for beginners with no prior knowledge of Thai language. This course focuses on developing the learner's basic listening, speaking and reading skills. Students will acquire the correct Thai language pronunciation using Thai transliteration, to enable them to interact in various everyday situations. Simple conversations such as self introduction, introducing one self to others, describing objects/people and expressing everyday activities are taught. In addition, students will be exposed to the basic elements of Thai culture via the topics covered in the syllabus.

**Course Outcomes:**

1. Ability to identify basic simple words, phrases and short texts using Thai transliteration.
2. Ability to respond to everyday expressions & activities dealing with everyday needs in very short, slow, and repeated speech.
3. Ability to describe personal information (e.g., name, age, nationality, spoken language) using short phrases and simple dialogues.

**SMB11502 PREPARATORY THAI LANGUAGE [BAHASA THAI PERSEDIAAN]****No of Credits: 2**

**Course Synopsis:** This course is designed for students who have no prior background in Thai language. The course focus on receptive and productive skills. Student will be introduced to Thai phonetic transcriptions, read and write short simple sentences using Thai Scripts, and learn daily expressions.

**Course Outcomes:**

1. Ability to comprehend words and phrases in simple informational texts.
2. Ability to reproduce personal information and details using simple phrases and short sentences.
3. Ability to respond to repeated speech in everyday expressions & activities dealing with daily needs.
4. Ability to describe themselves and personal information (e.g., name, age, nationality, spoken language) using short phrases and simple dialogues.
5. language on workplace related topics and contexts.

**SMB01602 ARABIC LANGUAGE FOR BEGINNERS [BAHASA ARAB PERMULAAN]****No of Credits: 2****Course Synopsis:**

This course is designed for beginners with no prior knowledge of Arabic language. This course focuses on developing the learner's basic listening, speaking and reading skills. Students will acquire the correct Arabic language pronunciation using Romanized transliteration, to enable them to interact in various everyday situations. Simple conversations such as self introduction, introducing one self to others, describing objects/people and expressing everyday activities are taught. In addition, students will be exposed to the basic elements of Arabic culture via the topics covered in the syllabus.

**Course Outcomes:**

1. Ability to identify basic simple words, phrases and short texts using Romanized transliteration.
2. Ability to respond to everyday expressions & activities dealing with everyday needs in very short, slow, and repeated speech.
3. Ability to describe personal information (e.g., name, age, nationality, spoken language) using short phrases and simple dialogues.

**SMB11602 PREPARATORY ARABIC LANGUAGE [BAHASA ARAB PERSEDIAAN]****No of Credits: 2****Course Synopsis:**

This course is designed for students who have no prior background in Arabic language. The course focuses on receptive and productive skills. Student will be introduced to Arabic phonetic transcriptions, read and write short simple sentences using Arabic transliterations, and learn daily expressions used in daily speaking. Students will acquire the correct Arabic language pronunciation using romanized transliteration, to enable them to interact in various everyday situations. Simple conversations such as self introduction, introducing one self to others, describing objects/people and expressing everyday activities are taught. In addition, students will be exposed to the basic elements of Arabic culture via the topics covered in the syllabus.

**Course Outcomes:**

1. Ability to respond to repeated speech in everyday expressions & activities dealing with daily needs.
2. Ability to describe themselves and personal information (e.g., name, age, nationality, spoken language) using short phrases and simple dialogues.
3. Ability to comprehend words and phrases in simple informational texts.
4. Ability to reproduce personal information and details using simple phrases and short sentences.

**SMB01702 JAPANESE LANGUAGE PREPARATORY [BAHASA JEPUN PERMULAAN]****No of Credits: 2****Course Synopsis:**

This course is designed for beginners with no prior knowledge of Japanese language. This course focuses on developing the learner's basic listening, speaking and reading skills. Students will acquire the correct Japanese language pronunciation using Japanese Kana in Romaji, to enable them to interact in various everyday situations. Simple conversations such as self introduction, introducing one self to others, describing objects/people and expressing everyday activities are taught. In addition, students will be exposed to the basic elements of Japanese culture via the topics covered in the syllabus.

**Course Outcomes:**

1. Ability to identify basic simple words, phrases and short texts using Romaji transliteration.
2. Ability to respond to everyday expressions & activities dealing with everyday needs in very short, slow, and repeated speech.
3. Ability to describe personal information (e.g., name, age, nationality, spoken language) using short phrases and simple dialogues.

**SMB11702 PREPARATORY JAPANESE LANGUAGE [BAHASA JEPUN PERSEDIAAN]****No of Credits: 2****Course Synopsis:**

This course is designed for students who have no prior background in Japanese language. The course focus on receptive and productive skills. Student will be introduced to Japanese Writing System, read and write short sentences using Japanese characters and learn daily expressions.

**Course Outcomes:**

1. Ability to comprehend words and phrases in simple informational texts.
2. Ability to reproduce personal information and details using simple phrases and short sentences.
3. Ability to respond to repeated speech in everyday expressions & activities dealing with daily needs.
4. Ability to describe themselves and personal information (e.g., name, age, nationality, spoken language) using short phrases and simple dialogues.

**SMB21702 ELEMENTARY JAPANESE LANGUAGE 1 [BAHASA JEPUN ASAS 1]****No of Credits: 2****Course Synopsis:**

At this Elementary 1 level, students will be introduced to grammatical structures used in common everyday language and related to the workplace. Students will also be able to read, understand and write longer sentences and conversations in different social contexts.

**Course Outcomes:**

1. Ability to understand short, simple texts written in common everyday language and related to my job.
2. Ability to describe longer sentences, dialogues, basic descriptions of events and activities using Japanese characters.
3. Ability to identify essential information from short recorded passage dealing with everyday matters which are spoken slowly and clearly.
4. Ability to express simple aspects of their everyday life in a series of simple sentences, simple words and basic phrases.

**SMB31702 ELEMENTARY JAPANESE LANGUAGE 2 [BAHASA JEPUN ASAS 2]****No of Credits: 2****Course Synopsis:**

The objective of this course is the introduction to, and use of vocabulary related to personal experiences in different real-life formal and social contexts or situations. Students will be able to read longer texts and learn to construct complex sentences to produce longer dialogues and essays.

**Course Outcomes:**

1. Ability to apply specific information in different social contexts.
2. Ability to write sentences using correct grammar to produce longer dialogues and essay relating to personal experiences and social contexts.
3. Ability to interpret clear, standard speech on familiar matters in real life situations.
4. Ability to describe their plans and arrangements, activities and personal experiences.

**SMB01802 GERMAN LANGUAGE FOR BEGINNERS [BAHASA JERMAN PERMULAAN]****No of Credits: 2****Course Synopsis:**

This course is designed for beginners with no prior knowledge of German language. This course focuses on developing the learner's basic listening, speaking and reading skills. Students will acquire the correct German language pronunciation, to enable them to interact in various everyday situations. Simple conversations such as self introduction, introducing one self to others, describing objects/people and expressing everyday activities are taught. In addition, students will be exposed to the basic elements of German culture via the topics covered in the syllabus.

**Course Outcomes:**

1. Ability to identify basic simple words, phrases and short texts using romanized transliteration.
2. Ability to respond to everyday expressions & activities dealing with everyday needs in very short, slow, and repeated speech.
3. Ability to describe personal information (e.g., name, age, nationality, spoken language) using short phrases and simple dialogues.

**SMB11802 PREPARATORY GERMAN LANGUAGE [BAHASA JERMAN PERSEDIAAN]****No of Credits: 2****Course Synopsis:**

This course is designed for students who have no prior background in German language. The course focus on receptive and productive skills. Student will be introduced to German phonetic transcriptions, read and write short simple sentences and learn daily expressions.

**Course Outcomes:**

1. Ability to comprehend words and phrases in simple informational texts.
2. Ability to reproduce personal information and details using simple phrases and short sentences.
3. Ability to respond to repeated speech in everyday expressions & activities dealing with daily needs.
4. Ability to describe themselves and personal information (e.g., name, age, nationality, spoken language) using short phrases and simple dialogues. words and basic phrases.

**SMB01902 KOREAN LANGUAGE FOR BEGINNERS [BAHASA KOREA ASAS]****No of Credits: 2****Course Synopsis:**

This course is designed for beginners with no prior knowledge of Korean language. This course focuses on developing the learner's basic listening, speaking and reading skills. Students will acquire the correct Korean language pronunciation using Hangul, to enable them to interact in various everyday situations. Simple conversations such as self introduction, introducing one self to others, describing objects/people and expressing everyday activities are taught. In addition, students will be exposed to the basic elements of Korean culture via the topics covered in the syllabus.

**Course Outcomes:**

1. Ability to identify basic simple words, phrases and short texts using Hangul transliteration.
2. Ability to respond to everyday expressions & activities dealing with everyday needs in very short, slow, and repeated speech.
3. Ability to describe personal information (e.g., name, age, nationality, spoken language) using short phrases and simple dialogues.

**SMB11902 PREPARATORY KOREAN LANGUAGE [BAHASA KOREA PERSEDIAAN]****No of Credits: 2****Course Synopsis:**

This course is designed for students who have no prior background in Korean language. This course focuses on receptive and productive skills. Student will be introduced to Korean Character and pronunciation, read and write short simple sentences using Hangul, and learn daily expressions.

**Course Outcomes:**

1. Ability to comprehend words and phrases in simple informational texts.
2. Ability to reproduce personal information and details using simple phrases and short sentences using Hangul.
3. Ability to respond to repeated speech in everyday expressions & activities dealing with daily needs.
4. Ability to describe themselves and personal information (e.g., name, age, nationality, spoken language) using short phrases and simple dialogues.

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**LIST OF COURSES**

| <b>COURSE CODE</b> | <b>COURSE NAME</b>                                                                      |
|--------------------|-----------------------------------------------------------------------------------------|
| QMQ10002           | Matematik Asas [Fundamentals of Mathematics]                                            |
| QMQ10103           | Matematik Kejuruteraan I [Engineering Mathematics I]                                    |
| QMQ10203           | Matematik Kejuruteraan II [Engineering Mathematics II]                                  |
| QMQ11103           | Matematik Untuk Teknologi Kejuruteraan I [Mathematics for Engineering Technology I]     |
| QMQ11203           | Matematik Untuk Teknologi Kejuruteraan II [Mathematics for Engineering Technology II]   |
| QMQ20303           | Matematik Kejuruteraan III [Engineering Mathematics III]                                |
| QMQ21303           | Matematik Untuk Teknologi Kejuruteraan III [Mathematics for Engineering Technology III] |
| QMQ22103           | Matematik Diskrit Dan Aljabar Linear [Discrete Mathematics and Linear Algebra]          |
| QMQ27103           | Statistik Kejuruteraan [Engineering Statistics]                                         |
| QMQ27203           | Kebarangkalian Dan Statistik [Probability and Statistics]                               |
| QMQ27303           | Statistik Untuk Teknologi Kejuruteraan [Statistics for Engineering Technology]          |

**QM10002 MATEMATIK ASAS [FUNDAMENTALS OF MATHEMATICS]**

**Type of course : Audit course**

**No of Credits: 2**

**Course Synopsis:**

This course develops basic mathematical concepts for many scientific disciplines including engineering and engineering technology. Topics included are: basic algebra and basic calculus. This course is applied to students who needs a basic to advanced understanding of mathematics concepts and its operations.

**Course Outcomes:**

1. Ability to solve the basic concepts of algebra.
2. Ability to solve the basic concepts of calculus.

**QM10103 MATEMATIK KEJURUTERAAN I [ENGINEERING MATHEMATICS I]**

**No of Credits: 3**

**Course Synopsis:**

This course introduces the fundamental principles and concepts of algebra and calculus which are essential tools in engineering. The topics discussed in algebra are the basics of complex numbers, matrices and vectors. In the topic of calculus, several techniques will be introduced to solve the differentiation and integration for single variables. At the end of the study, the topic of partial derivatives will be discussed.

**Course Outcomes:**

1. Ability to apply concepts of complex numbers, matrices and vectors in engineering problems.
2. Ability to apply concepts of differentiation and integration in engineering problems.
3. Ability to analyse solutions of partial derivatives in engineering problems.

**QM10203 MATEMATIK KEJURUTERAAN II [ENGINEERING MATHEMATICS II]**

**No of Credits: 3**

**Course Synopsis:**

In this course, students will be exposed to differential equations. Number of analytical methods will be introduced for solving the first and second order ordinary differential equations and also partial differential equations. Theory of

Laplace transforms and its applications on solving ordinary differential equations will be taught. Fourier series of periodic functions will be covered.

**Course Outcomes:**

1. Ability to solve first and second order ordinary differential equations, partial differential equations and certain physical problems that relate to differential equations.
2. Ability to analyse the function and appropriate properties of Laplace transform in solving initial value problems that relate to first and second order ordinary differential equations.
3. Ability to analyse periodic function using the fundamental understanding of Fourier series in generating Fourier series and Fourier series expansions.

**QM11103 MATEMATIK UNTUK TEKNOLOGI KEJURUTERAAN I [MATHEMATICS FOR ENGINEERING TECHNOLOGY I]**

**No of Credits: 3**

**Course Synopsis:**

This course introduces the fundamental principles and concepts in algebra, calculus and statistics which are the essential tools in engineering technology. The topics discussed in algebra are the basics of complex numbers, matrices and vectors. In the calculus topic, several techniques will be introduced to solve the differentiation and integration. Regression and correlation techniques will be introduced in the statistics topic, for investigating the relationship between two variables.

**Course Outcomes:**

1. Ability to apply basic concepts of algebra in solving mathematical problems using complex numbers, matrices and vectors.
2. Ability to apply basic concepts of calculus in solving mathematical problems using methods of differentiation and integration.
3. Ability to analyze related problems by using statistical data analysis.

## QMQ11203 MATEMATIK UNTUK TEKNOLOGI KEJURUTERAAN II [MATHEMATICS FOR ENGINEERING TECHNOLOGY II]

**No of Credits: 3**

### Course Synopsis:

This course will introduce the concepts of ordinary differential equations. The topics that will be discussed in this course are the methods in solving the differential equations including first and second order differential equations and its applications. Next, the course will introduce the Laplace transform method to solve differential equations and at the end of the topic, Fourier Series expansion of a function will be discussed.

### Course Outcomes:

1. Ability to evaluate first and second order ordinary differential equations and certain physical problems that related to differential equations.
2. Ability to analyse the function and appropriate properties of Laplace transform in solving initial value problems related to first and second order ordinary differential equations.
3. Ability to analyse periodic functions using the fundamental understanding of Fourier Series in generating Fourier series and Fourier series expansions.

## QMQ20303 MATEMATIK KEJURUTERAAN III [ENGINEERING MATHEMATICS III]

**No of Credits: 3**

### Course Synopsis:

This course generally introduces the concepts of vector calculus, the fundamental theorems of vector calculus, and numerical methods. The topics discuss the concept of differentiation and integration in vector calculus, the line, surface, and volume integrals as well as the Green, Gauss, and Stokes theorems. In the numerical methods chapter, several numerical methods will be discussed to solve nonlinear equations, interpolation, differentiation, integration, ordinary differential equations, and partial differential equations.

### Course Outcomes:

1. Ability to apply vector calculus concepts for solving single, double or triple integrals.
2. Ability to evaluate classical theorems in vector calculus based on the concept of differentiation and integration in vector calculus.
3. Ability to predict the approximate solution by using appropriate numerical methods for solving mathematical problems.

## QMQ21303 MATEMATIK UNTUK TEKNOLOGI KEJURUTERAAN III [MATHEMATICS FOR ENGINEERING TECHNOLOGY III]

**No of Credits: 3**

### Course Synopsis:

This course will focus on understanding the concept of partial derivatives, vector calculus, and numerical methods. Students will be exposed to an introduction to fundamental theorems in vector calculus. At the end of the study, the topic of numerical methods will be discussed, which will introduce students to a variety of techniques for solving mathematical problems.

### Course Outcomes:

1. Ability to solve mathematical problems by using the concepts of partial derivatives.
2. Ability to evaluate vector calculus problems and its applications using single, double and triple integrals.
3. Ability to predict the approximate solution by using appropriate numerical methods for solving mathematical problems.

## QMQ22103 MATEMATIK DISKRIT DAN ALJABAR LINEAR [DISCRETE MATHEMATICS AND LINEAR ALGEBRA]

**No of Credits: 3**

### Course Synopsis:

This course introduces the definition and concepts in discrete mathematics and linear algebra which is an essential tool in almost all subareas of computer science and communication systems. The topics discussed include sets and functions, logic, theory number and cryptography, matrices and linear transformation, vector spaces and inner product spaces.

### Course Outcomes:

1. Ability to apply the concepts of discrete mathematics in solving engineering problems.
2. Ability to apply the concept of linear algebra in solving engineering problems.
3. Ability to solve engineering problems using the knowledge in discrete mathematics and linear algebra.

### QMQ27103 STATISTIK KEJURUTERAAN [ENGINEERING STATISTICS]

**No of Credits: 3**

**Course Synopsis:**

This course introduces the fundamental principles and techniques of statistics, focusing on data analysis, interpretation, and probability. Students will learn the statistical methods necessary to understand and work with data effectively. The course emphasizes how statistical ideas, concepts, techniques, and probability can be applied in real-world scenarios.

**Course Outcomes:**

1. Able to apply fundamentals of statistical data analysis and concepts of probability distributions to enhance statistical reasoning skills.
2. Able to formulate solutions using statistical inference methods for decision-making.
3. Able to evaluate the significance of a linear regression model for making predictions.

### QMQ27203 KEBARANGKALIAN DAN STATISTIK [PROBABILITY AND STATISTICS]

**No of Credits: 3**

**Course Synopsis:**

This course provides an elementary introduction to probability and statistics with applications. Topics include probability theorem, random variables, probability distribution, statistical inference which includes estimation and hypothesis testing and finally the regression concept.

**Course Outcomes:**

1. Ability to apply the theory of probability for discrete and continuous random variables.
2. Ability to solve discrete and continuous probability distribution problems.
3. Ability to evaluate statistical inference methods and simple linear regression models in solving engineering problems.

### QMQ27303 STATISTIK UNTUK TEKNOLOGI KEJURUTERAAN [STATISTICS FOR ENGINEERING TECHNOLOGY]

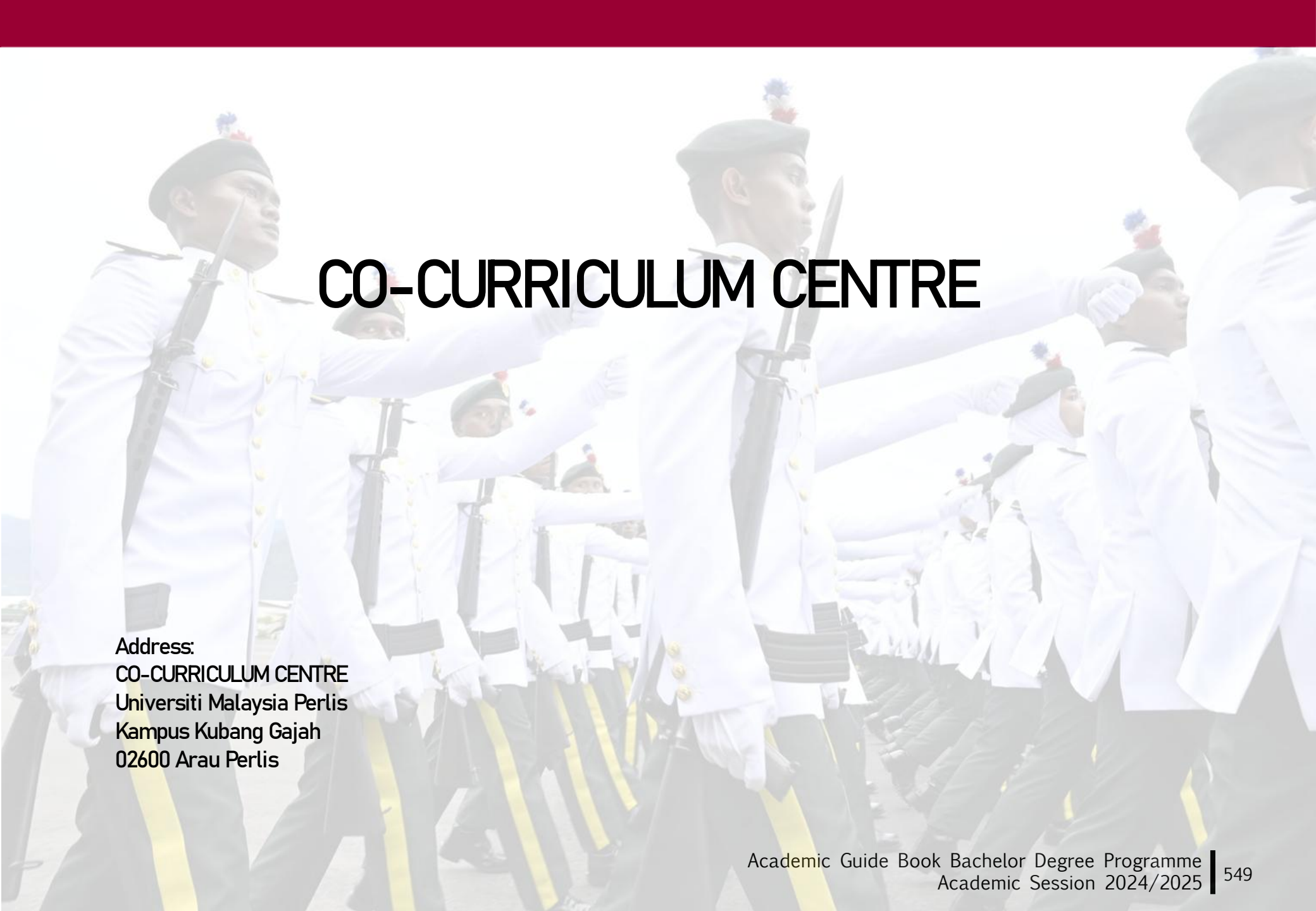
**No of Credits: 3**

**Course Synopsis:**

This course begins with descriptive statistics, basic probability concepts, discrete and continuous probability distributions. Inferential methods using estimation and hypothesis test for single population and comparing two populations parameter. Lastly, analysis of variance (ANOVA) to compare more than two populations and linear regression to model relationship between two quantitative variables.

**Course Outcomes:**

1. Able to apply fundamentals of statistical data analysis and concepts of probability distributions in enhancing statistical reasoning skills.
2. Able to evaluate solutions using statistical inference methods for decision-making.
3. Able to evaluate the significance of a linear regression model for making predictions.

A group of military band members in white uniforms with black hats and yellow stripes on their trousers are marching in formation. They are holding rifles and have their right arms raised in a salute. The background is a bright, overexposed outdoor setting.

# CO-CURRICULUM CENTRE

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## LIST OF COURSES

| COURSE CODE | COURSE NAME                                                                                                                                                      |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SMZ11001    | Sukarelawan Siswa/Siswi Koreksional Jabatan Penjara Malaysia I (KOR SISKOR) [Students Voluntary Correctional Malaysian Prison Department I (KOR SISKOR I)]       |
| SMZ11101    | Sukarelawan Siswa/Siswi Koreksional Jabatan Penjara Malaysia II (KOR SISKOR) [Students Voluntary Correctional Malaysian Prison Department II (KOR SISKOR II)]    |
| SMZ21001    | Sukarelawan Siswa/Siswi Koreksional Jabatan Penjara Malaysia III (KOR SISKOR) [Students Voluntary Correctional Malaysian Prison Department III (KOR SISKOR III)] |
| SMZ21101    | Sukarelawan Siswa/Siswi Koreksional Jabatan Penjara Malaysia IV (KOR SISKOR) [Students Voluntary Correctional Malaysian Prison Department IV (KOR SISKOR IV)]    |
| SMZ11201    | Kumpulan Latihan Kelanasiswa Malaysia I (Udara) [Malaysian University Rover Training Group I (Air)]                                                              |
| SMZ11301    | Kumpulan Latihan Kelanasiswa Malaysia II (Udara) [Malaysian University Rover Training Group II (Air)]                                                            |
| SMZ11401    | Sukarelawan Muda Bantuan Perubatan Malaysia (MERCY MUDA 1) [Student Voluntary Malaysian Medical Relief Society [YOUNG MERCY 1]                                   |
| SMZ11501    | Sukarelawan Muda Bantuan Perubatan Malaysia (MERCY MUDA 2) [Student Voluntary Malaysian Medical Relief Society [YOUNG MERCY 2]                                   |
| SMZ11601    | Pasukan Kadet Maritim Malaysia I (PASKAM) [Malaysian Maritime Cadet I (PASKAM)]                                                                                  |
| SMZ11701    | Pasukan Kadet Maritim Malaysia II (PASKAM) [Malaysian Maritime Cadet II (PASKAM)]                                                                                |
| SMZ21601    | Pasukan Kadet Maritim Malaysia III [Malaysian Maritime Cadet III (PASKAM)]                                                                                       |
| SMZ21701    | Pasukan Kadet Maritim Malaysia IV (PASKAM) [Malaysian Maritime Cadet IV (PASKAM)]                                                                                |
| SMZ12001    | Briged Bomba dan Penyelamat I [Fire and Rescue Brigade I]                                                                                                        |
| SMZ12101    | Briged Bomba dan Penyelamat II [Fire and Rescue Brigade II]                                                                                                      |
| SMZ12201    | Pandu Puteri Klover I [Clover I]                                                                                                                                 |
| SMZ12301    | Pandu Puteri Klover II [Clover II]                                                                                                                               |
| SMZ12401    | Kor St. John Ambulans Malaysia I [Malaysian St. John Ambulance I]                                                                                                |

| COURSE CODE | COURSE NAME                                                                                          |
|-------------|------------------------------------------------------------------------------------------------------|
| SMZ12501    | Kor St. John Ambulans Malaysia II [Malaysian St. John Ambulance II]                                  |
| SMZ22401    | Kor St. John Ambulans Malaysia III [Malaysian St. John Ambulance III]                                |
| SMZ22501    | Kor St. John Ambulans Malaysia IV [Malaysian St. John Ambulance IV]                                  |
| SMZ12601    | Kumpulan Latihan Kelanasiswa Malaysia I (Darat) [Malaysian University Rover Training Group I]        |
| SMZ12701    | Kumpulan Latihan Kelanasiswa Malaysia II (Darat) [Malaysian University Rover Training Group II]      |
| SMZ12801    | Kumpulan Latihan Kelanasiswa Malaysia I (Laut) [Malaysian University Rover Training Group I (Sea)]   |
| SMZ12901    | Kumpulan Latihan Kelanasiswa Malaysia II (Laut) [Malaysian University Rover Training Group II (Sea)] |
| SMZ15101    | Asas Gamelan [Foundation of Gamelan]                                                                 |
| SMZ25101    | Gamelan II [Gamelan II]                                                                              |
| SMZ15201    | Kumpulan Jazz I [Jazz Band I]                                                                        |
| SMZ25201    | Kumpulan Jazz II [Jazz Band II]                                                                      |
| SMZ15301    | Pancaragam I [Brass Band I]                                                                          |
| SMZ25301    | Pancaragam II [Brass Band II]                                                                        |
| SMZ15401    | Angklung I [Angklung I]                                                                              |
| SMZ25401    | Angklung II [Angklung II]                                                                            |
| SMZ16001    | Palapes Darat I [ROTU Army I]                                                                        |
| SMZ16101    | Palapes Darat II [ROTU Army II]                                                                      |
| SMZ26001    | Palapes Darat III [ROTU Army III]                                                                    |
| SMZ26101    | Palapes Darat IV [ROTU Army IV]                                                                      |

| COURSE CODE | COURSE NAME                                                                                          |
|-------------|------------------------------------------------------------------------------------------------------|
| SMZ36001    | Palapes Darat V [ROTU Army V]                                                                        |
| SMZ36101    | Palapes Darat VI [ROTU Army VI]                                                                      |
| SMZ16201    | Kor Siswa Siswi Pertahanan Awam I (Kor SISPA I) [Malaysia Civil Defence Department I]                |
| SMZ16301    | Kor Siswa Siswi Pertahanan Awam II (Kor SISPA II) [Malaysia Civil Defence Department II]             |
| SMZ26201    | Kor Siswa Siswi Pertahanan Awam III (Kor SISPA III) [Malaysia Civil Defence Department III]          |
| SMZ26301    | Kor Siswa Siswi Pertahanan Awam IV (Kor SISPA IV) [Malaysia Civil Defence Department IV]             |
| SMZ36201    | Kor Siswa Siswi Pertahanan Awam V (Kor SISPA V) [Malaysia Civil Defence Department V]                |
| SMZ16401    | Kursus Persijilan Bulan Sabit Merah Malaysia I [The Malaysian Red Crescent Certification Course I]   |
| SMZ26401    | Kursus Persijilan Bulan Sabit Merah Malaysia II [The Malaysian Red Crescent Certification Course II] |
| SMZ16601    | Kor Sukarelawan Polis Siswa/Siswi 1 [SVPC-1 @ Students Voluntary Polis Corp 1]                       |
| SMZ16701    | Kor Sukarelawan Polis Siswa/Siswi 2 [SVPC-2 @ Students Voluntary Polis Corp 2]                       |
| SMZ26601    | SUKSIS-3 @ Kor Sukarelawan Polis Siswa/Siswi [SVPC-3 @ Students Voluntary Polis Corp 3]              |
| SMZ26701    | Kor Sukarelawan Polis Siswa/Siswi 4 [SVPC-4 @ Students Voluntary Polis Corp 4]                       |
| SMZ36601    | SUKSIS-5 @ Kor Sukarelawan Polis Siswa/Siswi [SVPC-5 @ Students Voluntary Polis Corp 5]              |
| SMZ36701    | Kor Sukarelawan Polis Siswa/Siswi 6 [SVPC-6 @ Students Voluntary Polis Corp 6]                       |
| SMZ11801    | Briged RELA Siswa Siswi I [Malaysian People's Volunteer Corps I]                                     |
| SMZ11901    | Briged RELA Siswa Siswi II [Malaysian People's Volunteer Corps II]                                   |
| SMZ17101    | Seni Silat Cekak I [Seni Silat Cekak I]                                                              |

| COURSE CODE | COURSE NAME                                                            |
|-------------|------------------------------------------------------------------------|
| SMZ27101    | Seni Silat Cekak II [Seni Silat Cekak II]                              |
| SMZ17401    | Taekwon-Do ITF I [Taekwon-Do ITF I]                                    |
| SMZ27401    | Taekwon-Do ITF II [Taekwon-Do ITF II]                                  |
| SMZ17301    | Karate-Do I [Karate-Do I]                                              |
| SMZ27301    | Karate-Do II [Karate-Do II]                                            |
| SMZ17601    | Taekwon-Do WTF I [Taekwon-Do WTF I]                                    |
| SMZ27601    | Taekwon-Do WTF II [Taekwon-Do WTF II]                                  |
| SMZ17701    | Silat Olahraga I [Sport Silat I]                                       |
| SMZ17801    | Silat Olahraga II [Sport Silat II]                                     |
| SMZ17501    | Futsal [Futsal]                                                        |
| SMZ19301    | Tajwid [Tajwid]                                                        |
| SMZ19601    | Student In-Free Enterprise (SIFE) [Student In-Free Enterprise (SIFE)]  |
| SMZ19801    | Manusia dan Kelestarian Alam [People and Environmental Sustainability] |
| SMZ10101    | Golf [Golf]                                                            |
| SMZ18901    | Sofbol [Softball]                                                      |
| SMZ10301    | Woodball [Woodball]                                                    |
| SMZ10401    | Bola Sepak [Football]                                                  |
| SMZ10501    | Bola Jaring [Netball]                                                  |

| COURSE CODE | COURSE NAME                                                 |
|-------------|-------------------------------------------------------------|
| SMZ10601    | Tenis [Tennis]                                              |
| SMZ10801    | Angkat berat [Weightlifting]                                |
| SMZ10901    | Bola Tampar [Volleyball]                                    |
| SMZ13201    | Penerbitan Video [Video Publishing]                         |
| SMZ15501    | Seni Pergerakan Kreatif [Arts of Creative Movement]         |
| SMZ15601    | Drama, Pementasan & Seni Lakon [Drama, Playwright & Acting] |
| SMZ18101    | Boling Padang [Lawn Ball]                                   |
| SMZ18201    | Petanque [Petanque]                                         |
| SMZ17901    | Olahraga [Athletic]                                         |
| SMZ18401    | Badminton [Badminton]                                       |
| SMZ18701    | Ragbi [Rugby]                                               |
| SMZ18801    | Memamah [Archery]                                           |
| SMZ18901    | Sofbol [Softball]                                           |
| SMZ18601    | Sepak Takraw [Sepak Takraw]                                 |
| SMZ19001    | Sukan Berbasikal [Cycling]                                  |
| SMZ19101    | Khidmat Masyarakat [Community Services]                     |
| SMZ19201    | Daya Usaha & Inovasi [Initiative & Innovation]              |
| SMZ19501    | Radio Kampus [Campus Radio]                                 |
| SMZ19901    | Tulisan Jawi [Jawi Orthography]                             |

**SMZ11001 SUKARELAWAN SISWA/SISWI KOREKSIONAL JABATAN PENJARA MALAYSIA I****No. of Credits: 1****Course Synopsis:**

Kursus ini adalah kursus awalan dalam siri kursus-kursus Pengurusan Kepingjaraan. Melalui kursus ini, para pelajar akan diperkenalkan dengan organisasi kepenjaraan, sejarah serta kepentingannya dalam pembangunan negara. Pelajar akan didedahkan dengan aktiviti, latihan dan tugas tentang peranan Jabatan Penjara Malaysia. Di samping memberi pendedahan berkaitan Asas Kesukarelawan, Akta Penjara 1995 Pindaan Tahun 2008, Peraturan-Peraturan Penjara Tahun 2000, United Nations Standard Minimum Rules (UNSMR) & latihan kawad kaki..

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dalam aktiviti SISKOR.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan sifat setia dan kecintaan pada keamanan dalam komuniti.

**SMZ11101 SUKARELAWAN SISWA/SISWI KOREKSIONAL JABATAN PENJARA MALAYSIA II****No. of Credits: 1****Course Synopsis:**

Siswa Siswi Koreksional II (SISKOR II) adalah lanjutan daripada SISKOR I yang mana ia memberi penekanan terhadap pengurusan keselamatan, pengurusan penahanan, pengurusan layanan dan pengurusan pemulihan (PPI) di Jabatan Penjara Malaysia. Kursus ini juga memberi penekanan kepada pembinaan kemahiran interpersonal dan sahsiah pelajar. Pelajar akan didedahkan dengan latihan kemahiran kawad, SENTAP dan pengendalian senjata api.

**Course Outcomes :**

1. Keupayaan untuk menunjuk cara kemahiran asas bela diri dalam kumpulan kecil.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan aktiviti kepenjaraan yang bersesuaian dengan komuniti.

**SMZ21001 SUKARELAWAN SISWA/SISWI KOREKSIONAL JABATAN PENJARA MALAYSIA III****No. of Credits: 1****Course Synopsis:**

Siswa Siswi Koreksional III (SISKOR III) adalah lanjutan daripada SISKOR II yang mana ia memberi penekanan kefahaman terhadap Dasar Kepingjaraan, Memasyarakatkan Penjara, Pemulihan dan Rumah Perantaraan (RP). Siswa Siswi juga diberi latihan luar serta kemahiran kawad kaki.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan etika dan kepimpinan dalam acara berprotokol.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Berkeupayaan untuk mengorganisasikan aktiviti rawatan pemulihan yang bersesuaian dalam komuniti.

**SMZ21101 SUKARELAWAN SISWA/SISWI KOREKSIONAL JABATAN PENJARA MALAYSIA IV****No. of Credits: 1****Course Synopsis:**

Siswa Siswi Koreksional IV (SISKOR IV) merupakan kursus lanjutan SISKOR III yang memberi penekanan terhadap Pengurusan Keselamatan dan Program Parol dan Perkhidmatan Komuniti di Institusi Penjara yang menjadi core business dalam perkhidmatan koreksional. Pelajar juga akan didedahkan dengan ilmu pengetahuan asas program pemulihan Pemasyarakatan, latihan teori & praktikal senjata api, Program Pemulihan & Unit Keselamatan Dalam. Pelajar dikehendaki menjalankan aktiviti jalinan Universiti dan komuniti.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan sikap profesional dan bertanggungjawab dalam menjalankan tugas.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Berkeupayaan untuk menganjurkan program dan aktiviti pemulihan yang bersesuaian dalam komuniti.



**SMZ11201 KUMPULAN LATIHAN KELANASISWA MALAYSIA I (UDARA)****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum badan beruniform Kumpulan Latihan Kelanasiswa Udara I ini merupakan satu unit baru yang ditubuhkan dalam kumpulan Kelana Siswa di Malaysia. UniMAP merupakan perintis kepada penubuhan Pengakap Kelana Udara di universiti-universiti di Malaysia. Pelajar akan didedahkan kepada Skim Latihan Pengakap Kelana Udara yang baru serta kursus Kepimpinan Manikayu. Pengakap Kelana Udara ini terdiri daripada remaja yang berumur dari 17 tahun sehingga 25 tahun. Kursus ini menawarkan pelbagai aktiviti dan latihan dalam membangunkan kemahiran modal insan individu secara langsung mahupun tidak langsung. Tumpuan juga diberikan pada pembangunan kesedaran diri yang menekankan aspek tanggungjawab terhadap diri sendiri, patuh kepada ketua, organisasi, masyarakat dan negara serta memberi perkhidmatan kesukarelaan kepada masyarakat, selaras dengan cogan kata Pengakap Kelana iaitu "Berkhidmat".

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dalam aktiviti pengakap.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kaedah dan kemahiran yang bersesuaian dalam aktiviti pengakap dengan komuniti.

**SMZ11301 KUMPULAN LATIHAN KELANASISWA MALAYSIA II (UDARA)****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum badan beruniform Kumpulan Latihan Kelanasiswa Udara II ini dengan nama lain Unit Pengakap Kelana merupakan satu unit baru yang ditubuhkan dalam kumpulan Kelana Siswa di Malaysia. UniMAP merupakan perintis kepada penubuhan Pengakap Kelana Udara. Ia merupakan satu-satunya Universiti di Malaysia yang mempunyai Pengakap Kelana Udara dan juga akan didedahkan kepada Skim Latihan Pengakap Kelana Udara yang baru serta kursus Kepimpinan Manikayu. Pengakap Kelana Udara ini terdiri daripada remaja yang berumur dari 17 tahun sehingga ke 25 tahun yang menawarkan pelbagai aktiviti dan latihan dalam membangunkan kemahiran modal insan individu secara langsung mahupun tidak langsung. Penumpuan juga diberikan kepada pembangunan kesedaran diri yang menekankan aspek tanggungjawab terhadap diri sendiri, patuh kepada ketua, organisasi, masyarakat dan Negara serta memberi perkhidmatan kesukarelaan kepada masyarakat, selaras dengan

cogan kata Pengakap Kelana iaitu "Berkhidmat".

**Course Outcomes :**

1. Keupayaan untuk menunjuk cara kemahiran asas aktiviti pengakap dalam kumpulan kecil.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk menganjurkan program dan aktiviti pengakap bersama komuniti.

**SMZ11401 SUKARELAWAN MUDA BANTUAN PERUBATAN MALAYSIA (MERCY MUDA 1)****No. of Credits: 1****Course Synopsis:**

Kursus MERCY merupakan salah satu kursus kokurikulum yang memberi pendedahan awal tentang kesukarelaan. Kursus MERCY I ini menggabungkan pengetahuan asas aspek bantuan kemanusiaan dengan latihan praktikal. Pelajar akan menjalani Latihan Sukarelawan dan Misi Asas sebelum terlibat dalam merancang dan melaksanakan projek kemanusiaan.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dalam aktiviti kesukarelawan.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran teknikal dan kaedah yang bersesuaian dalam melaksanakan aktiviti kesukarelawan.

**SMZ11501 SUKARELAWAN MUDA BANTUAN PERUBATAN MALAYSIA (MERCY MUDA 2)****No. of Credits: 1****Course Synopsis:**

The MERCY II course is a continuation from MERCY I where early exposure to volunteerism is instilled. The basic knowledge of the humanitarian relief aspect blended with practical exercise is integrated in this MERCY I course. The students will undergo a Basic Volunteer & Mission Training before getting involved in the planning & implementing a humanitarian project.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan tanggungjawab sosial dalam melaksanakan aktiviti dan program kesukarelawan dalam kumpulan kecil.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk menganjurkan program dan aktiviti kesukarelawan bersama komuniti.

**SMZ11601 PASUKAN KADET MARITIM MALAYSIA I (PASKAM)****No. of Credits: 1****Course Synopsis:**

Pasukan Kadet Maritim Malaysia I (PASKAM I) adalah kursus permulaan kepada para pelajar tentang pengurusan Agensi Penguatkuasaan Maritim Malaysia (APMM). Melalui kursus ini, para pelajar akan diperkenalkan kepada organisasi APMM, sejarah penubuhan serta kepentingan APMM kepada Negara. Pada peringkat awal, para pelajar akan didedahkan dengan aktiviti, latihan, tugas dan silibus pelajaran tentang peranan APMM serta latihan kawad kaki.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dalam aktiviti maritim.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi dengan berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran dan langkah-langkah asas aktiviti maritim yang bersesuaian dalam komuniti.

**SMZ11701 PASUKAN KADET MARITIM MALAYSIA II (PASKAM)****No. of Credits: 1****Course Synopsis:**

Pasukan Kadet Maritim Malaysia II (PASKAM II) merupakan sambungan kepada Pasukan Kadet Maritim Malaysia I. Melalui kursus ini, para pelajar akan diperkenalkan kepada Penguatkuasaan undang-undang di bawah Akta APMM, pendedahan ilmu mencari & menyelamatkan dan ilmu kelautan. Selain itu, para pelajar akan didedahkan dengan aktiviti, latihan, tugas latihan kawad kaki.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam aktiviti maritim secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi dengan berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan teknik dan langkah-langkah aktiviti menyelamatkan dalam dunia maritim.

**SMZ21701 PASUKAN KADET MARITIM MALAYSIA III (PASKAM)****No. of Credits: 1****Course Synopsis:**

Pasukan Kadet Maritim Malaysia III (PASKAM III) merupakan kursus peringkat ketiga Pasukan Kadet Maritim Malaysia. Melalui kursus ini, Pada peringkat ini, selain itu didedahkan dengan aktiviti latihan, tugas dan latihan kawad kaki, para pelajar akan diperkenalkan kepada pengetahuan undang-undang yang lebih tinggi di bawah Akta APMM, asas tempur tanpa senjata, pengendalian senjata kecil, latihan menembak dan ilmu kelautan.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan undang-undang, peraturan dan kerjasama dalam pasukan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Berkeupayaan untuk mengorganisasikan sesuatu aktiviti dalam pengendalian kapal.

**SMZ11701 PASUKAN KADET MARITIM MALAYSIA IV (PASKAM)****No. of Credits: 1****Course Synopsis:**

Pasukan Kadet Maritim Malaysia IV (PASKAM IV) merupakan peringkat akhir kursus Pasukan Kadet Maritim Malaysia (APMM). Pada peringkat ini, para pelajar akan didedahkan lebih lanjut berkaitan operasi mencari & menyelamatkan, latihan penembakan, dan kaedah komunikasi & navigasi. Para pelajar juga akan didedahkan dengan ilmu siasatan & forensik, kaedah-kaedah pengeledahan dan peranan pegawai pemerintah kapal.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan sikap profesional, berdisiplin dan bertanggungjawab dalam kumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Berkeupayaan untuk menganjurkan aktiviti dan program keselamatan maritim dengan komuniti

**SMZ12001 BRIGED BOMBA DAN PENYELAMAT I****No. of Credits: 1**

**Course Synopsis:** Kebakaran merupakan ancaman yang terdapat dalam masa aman, oleh itu kursus ini diharap dapat memupuk serta memberi kesedaran yang tinggi kepada mahasiswa serta warga UniMAP tentang bahaya kebakaran. Memberi pengetahuan, latihan, kemahiran kepada mahasiswa UniMAP sebagai langkah berjaga-jaga serta pencegahan. Meningkatkan semangat untuk berkhidmat kepada masyarakat dalam kalangan mahasiswa UniMAP terutama apabila berlaku sesuatu ancaman kebakaran.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dalam aktiviti kebommbaan.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi dengan berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran dan langkah-langkah asas aktiviti kebommbaan yang bersesuaian dalam komuniti.

**SMZ12101 BRIGED BOMBA DAN PENYELAMAT II****No. of Credits: 1****Course Synopsis:**

Kebakaran merupakan ancaman yang terdapat dalam masa aman, oleh itu kursus ini diharap dapat memupuk serta memberi kesedaran yang tinggi kepada mahasiswa serta warga UniMAP tentang bahaya kebakaran. Memberi pengetahuan, latihan, kemahiran kepada mahasiswa UniMAP sebagai langkah berjaga-jaga serta pencegahan. Meningkatkan semangat untuk berkhidmat kepada masyarakat dalam kalangan mahasiswa UniMAP terutama apabila berlaku sesuatu ancaman kebakaran.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan cara kaedah dan langkah-langkah aktiviti memadam kebakaran dan menyelamatkan mangsa dalam kumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program dan aktiviti kebommbaan dalam komuniti.

**SMZ12201 PANDU PUTERI KLOVER I****No. of Credits: 1****Course Synopsis:**

Kursus Badan Beruniform Pandu Puteri Clover 1 ini dilaksanakan dengan tujuan untuk melahirkan graduan yang mempunyai kemahiran insaniah melalui Program Pandu Puteri Siswi terutamanya dari aspek pengetahuan dan kemahiran asas Pandu Puteri berteraskan kerja berpasukan yang boleh diaplikasikan dalam kerjaya yang diceburi.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dalam aktiviti Pandu Puteri.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran asas kepanduan dalam aktiviti khidmat komuniti.

**SMZ12301 PANDU PUTERI KLOVER II****No. of Credits: 1****Course Synopsis:**

Kursus Badan Beruniform Pandu Puteri ni dilaksanakan bertujuan melahirkan graduan yang mempunyai kemahiran insaniah melalui Program Pandu Puteri klover terutamanya dari aspek pengetahuan dan kemahiran asas Pandu Puteri berteraskan kerja berpasukan yang boleh diaplikasikan dalam kerjaya yang diceburi.

**Course Outcomes :**

1. Keupayaan untuk menunjuk cara kemahiran asas aktiviti pandu puteri dalam kumpulan kecil.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk menganjurkan program pandu puteri bersama komuniti.

**SMZ12401 KOR ST. JOHN AMBULANS MALAYSIA I****No. of Credits: 1****Course Synopsis:**

Kursus ini bertujuan memperkenalkan prinsip-prinsip asas serta matlamat pertolongan cemas. Pelajar akan didedahkan bagaimana memberi bantuan dalam sesuatu kecemasan. Mereka akan belajar kaedah pembalutan dan pembebatan, serta cara mengendali pendarahan luaran dan keadaan renjatan. Pelajar juga akan mengenali kepatahan tulang, terseliuh, dislokasi dan cara memberi rawatan kecemasan ke atas kes-kes tersebut.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dalam aktiviti pertolongan cemas.
2. Keupayaan untuk mempraktik kemahiran berkomunikasi dengan berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk menunjukkan langkah-langkah pertolongan cemas dalam aktiviti menyelamatkan dengan komuniti.

**SMZ12501 KOR ST. JOHN AMBULANS MALAYSIA II****No. of Credits: 1****Course Synopsis:**

Kursus ini merupakan kesinambungan SMZ12401 Kor St. John Ambulans Malaysia I. Pelajar akan didedahkan bagaimana memberi bantuan dalam sesuatu kecemasan. Mereka akan belajar kaedah merawat keracunan, melecur akibat kebakaran, serangan sawan & jantung serta pengurusan ambulan. Pelajar juga akan didedahkan dengan pengurusan dan operasi bencana.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam aktiviti menyelamatkan dan pertolongan cemas secara berkumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk menunjukkan kemahiran asas pertolongan cemas dalam aktiviti menyelamatkan dengan komuniti.

**SMZ22401 KOR ST. JOHN AMBULANS MALAYSIA III****No. of Credits: 1****Course Synopsis:**

Kursus ini merupakan kesinambungan kepada kursus St. John Ambulans II. Pelajar yang telah lulus Sijil Asas Pertolongan Cemas dalam kursus SMZ12501 layak menjadi ahli berdaftar dalam Kor St. John Ambulans Malaysia UniMAP seterusnya melayakkan mereka menduduki Sijil Pertolongan Cemas Lanjutan. Dalam kursus ini, pelajar akan didedahkan dengan topik-topik pertolongan cemas dengan lebih mendalam dan menyediakan pelajar sebagai seorang jurulatih bertauliah dalam pertolongan cemas.

**Course Outcomes :**

1. Keupayaan untuk mengenal pasti tanda-tanda dan gejala korban dan menggunakan rawatan pertolongan cemas yang diperlukan dalam sebarang keadaan kecemasan.
2. Keupayaan untuk berkomunikasi, memimpin dan bekerja secara berkumpulan dengan berkesan.
3. Keupayaan untuk mengaplikasikan pengetahuan dan kemahiran asas BSMM dalam aktiviti kemasyarakatan.

**SMZ22501 KOR ST. JOHN AMBULANS MALAYSIA IV****No. of Credits: 1****Course Synopsis:**

Kursus ini merupakan kesinambungan kepada kursus SMZ22401 Kor St. John Ambulans Malaysia III. Pelajar yang telah lulus Sijil pertolongan cemas lanjutan dalam kursus ini layak menduduki kursus kejurulatihan dan setelah tamat kursus ini layak untuk dilantik sebagai pegawai St. John Ambulans Malaysia yang berkebolehan sama ada di peringkat kor atau Kawasan, negeri dan kebangsaan. Di dalam kursus ini, pelajar akan didedahkan dengan disiplin-disiplin dan peraturan-peraturan bagi melayakkan pelajar menjadi seorang pegawai yang diiktiraf oleh Ibu pejabat St. John Kebangsaan Malaysia.

**Course Outcomes :**

1. Keupayaan untuk mengorganisasi unit / badan badan beruniform yang berkaitan dengan pertolongan cemas dan, perkhidmatan kepada masyarakat dan umat manusia.
2. Keupayaan untuk berkomunikasi, memimpin dan bekerja secara berkumpulan dengan berkesan.
3. Keupayaan untuk mempamerkan langkah-langkah aktiviti menyelamatkan dan pertolongan cemas dalam komuniti.

**SMZ12601 KUMPULAN LATIHAN KELANASISWA MALAYSIA I (DARAT)****No. of Credits: 1****Course Synopsis:**

KLKM merupakan badan beruniform bersifat antarabangsa yang membincangkan mengenai ilmu kemahiran hidup dan ikhtiar hidup. Para pelajar juga akan didedahkan dengan tatacara kehidupan yang beretika, saling membantu, hormat-menghormati, kasih sesama manusia dan alam sekitar melalui penghayatan Persetiaan dan Undang-Undang Pengakap.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dalam aktiviti pengakap.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran yang bersesuaian dalam aktiviti pengakap.

**SMZ12701 KUMPULAN LATIHAN KELANASISWA MALAYSIA II (DARAT)****No. of Credits: 1****Course Synopsis:**

KLKM merupakan badan beruniform bersifat antarabangsa yang membincangkan mengenai ilmu kemahiran hidup dan ikhtiar hidup. Para pelajar juga akan didedahkan dengan tatacara kehidupan yang beretika, saling membantu, hormat-menghormati, kasih sesama manusia dan alam sekitar melalui penghayatan Persetiaan dan Undang-Undang Pengakap.

**Course Outcomes :**

1. Keupayaan untuk menunjuk cara kemahiran asas aktiviti pengakap darat dalam kumpulan kecil.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk menganjurkan aktiviti dan program pengakap darat bersama komuniti.

**SMZ12801 KUMPULAN LATIHAN KELANASISWA MALAYSIA I (LAUT)****No. of Credits: 1****Course Synopsis:**

KLKM LAUT I merupakan kumpulan pengakap dewasa di bawah Persekutuan Pengakap Malaysia. Kumpulan ini ditubuhkan di bawah institusi-institusi pengajian tinggi tempatan. Disifatkan sebagai satu kumpulan di bawah unit KLKM (Negeri). Krew KLKM ditubuhkan dengan polisi unit KLKM. Ia juga sama seperti KLKM Darat dan Udara, tetapi KLKM Laut lebih menekankan unsur-unsur ilmu kelautan. Ilmu kemahiran, kepimpinan, ikhtiar hidup dan khidmat masyarakat ditekankan.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dalam aktiviti pengakap.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran yang bersesuaian dalam aktiviti pengakap.

**SMZ12901 KUMPULAN LATIHAN KELANASISWA MALAYSIA II (LAUT)****No. of Credits: 1****Course Synopsis:**

KLKM merupakan badan beruniform bersifat antarabangsa yang membincangkan mengenai ilmu kemahiran hidup dan ikhtiar hidup. Para pelajar juga akan didedahkan dengan tatacara kehidupan yang beretika, saling membantu, hormat-menghormati, kasih sesama manusia dan alam sekitar melalui penghayatan Persetiaan dan Undang-Undang Pengakap.

**Course Outcomes :**

1. Keupayaan untuk menunjuk cara kemahiran asas aktiviti pengakap darat dalam kumpulan kecil.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk menganjurkan aktiviti dan program pengakap darat bersama komuniti.

**SMZ15101 ASAS GAMELAN****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar kepada ilmu seni asas tradisional gamelan dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan tradisional asas gamelan. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain gamelan.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam permainan muzik gamelan secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan alunan muzik melalui persembahan gamelan.

**SMZ25101 GAMELAN II****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu seni asas tradisional gamelan dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan tradisional asas gamelan. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali (praktikal) dari segi kemahiran bermain gamelan.

**Course Outcomes :**

1. Keupayaan untuk mempamerkan sikap profesional dan kerja berpasukan dalam permainan muzik gamelan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program atau aktiviti berkaitan muzik gamelan dengan komuniti.

**SMZ15201 KUMPULAN JAZZ I****No of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu muzik jazz dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan seni muzik jazz. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali (praktikal) dari segi kemahiran bermain muzik jazz.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam permainan muzik jazz secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan alunan muzik melalui persembahan kumpulan jazz.

**SMZ25201 KUMPULAN JAZZ II****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu muzik jazz dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan seni muzik jazz. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali (praktikal) dari segi kemahiran bermain muzik jazz.

**Course Outcomes :**

1. Keupayaan untuk mempamerkan sikap profesional dan kerja berpasukan dalam permainan muzik jazz.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program atau aktiviti berkaitan muzik kumpulan jazz dengan komuniti.

**SMZ15301 PANCARAGAM I****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu pancaragam dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, pengurusan diri dan lain-lain yang berkaitan dengan pancaragam. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan dari segi kemahiran bermain alatan pancaragam.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam permainan muzik pancaragam secara berkumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan alunan muzik melalui persembahan pancaragam.

**SMZ25301 PANCARAGAM II****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu Pancaragam II dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, pengurusan diri dan lain-lain yang berkaitan dengan Pancaragam II. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan dari segi kemahiran bermain alatan Pancaragam II.

**Course Outcomes :**

1. Keupayaan untuk mempamerkan sikap profesional dan kerja berpasukan dalam permainan pancaragam.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program atau aktiviti pancaragam dengan komuniti.

**SMZ15401 ANGKLUNG I****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada seni muzik tradisional angklung dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan seni muzik tradisional angklung. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali (praktikal) dari segi kemahiran bermain muzik angklung.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam permainan muzik angklung secara berkumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan alunan muzik melalui persembahan angklung.



**SMZ25401 ANGKLUNG II****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada seni muzik tradisional angklung dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan seni muzik tradisional angklung. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali (praktikal) dari segi kemahiran bermain muzik angklung.

**Course Outcomes :**

1. Keupayaan untuk menunjuk sikap profesional dan kerja berpasukan dalam permainan muzik angklung.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk menganjurkan program atau aktiviti berkaitan permainan muzik angklung dengan komuniti.

**SMZ16001 PALAPES DARAT I****No. of Credits: 1****Course Synopsis:**

Kursus ini bertujuan untuk mendedahkan pelajar kepada Latihan Asas Ketenteraan (Teori dan Praktikal) yang merangkumi aspek taktikal, latihan, persenjataan, kepimpinan, kerja berpasukan, membaca peta, tugas-tugas rejimen dan etika sosial serta pengetahuan am ketenteraan. Melalui latihan-latihan yang diberikan, potensi dan keupayaan pegawai kadet dapat dipertingkatkan dari segi pengetahuan, kepimpinan, disiplin, keyakinan diri dan semangat juang dan patriotisme yang tinggi.

**Course Outcomes :**

1. Keupayaan untuk mematuhi undang-undang dan peraturan dalam pasukan Palapes.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran yang bersesuaian dalam aktiviti Palapes.

**SMZ16101 PALAPES DARAT II****No. of Credits: 1****Course Synopsis:**

Kursus ini bertujuan untuk mendedahkan pelajar kepada Latihan Asas Ketenteraan (Teori dan Praktikal) yang merangkumi aspek taktikal, latihan, persenjataan, kepimpinan, kerja berpasukan, membaca peta, tugas-tugas rejimen dan etika sosial serta pengetahuan am ketenteraan. Melalui latihan-latihan yang diberikan, potensi dan keupayaan pegawai kadet dapat dipertingkatkan dari segi pengetahuan, kepimpinan, disiplin, keyakinan diri dan semangat juang dan patriotisme yang tinggi.

**Course Outcomes :**

1. Keupayaan untuk mematuhi undang-undang, berdisiplin dan bersemangat patriotik yang tinggi dalam aktiviti berkumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan sikap profesional dan tanggungjawab dalam pasukan.

**SMZ26001 PALAPES DARAT III****No. of Credits: 1****Course Synopsis:**

Kursus ini bertujuan untuk mendedahkan pelajar kepada Latihan Asas Ketenteraan (Teori dan Praktikal) yang merangkumi aspek taktikal, latihan, persenjataan, kepimpinan, kerja berpasukan, membaca peta, tugas-tugas rejimen dan etika sosial serta pengetahuan am ketenteraan. Melalui latihan-latihan yang diberikan, potensi dan keupayaan pegawai kadet dapat dipertingkatkan dari segi pengetahuan, kepimpinan, disiplin, keyakinan diri dan semangat juang dan patriotisme yang tinggi.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan undang-undang dan peraturan Palapes dengan jelas dalam pasukan.
2. Berkeupayaan untuk menunjuk cara pengendalian senjata api secara berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran yang bersesuaian dalam aktiviti ketenteraan.

**SMZ26101 PALAPES DARAT IV****No. of Credits: 1****Course Synopsis:**

Kursus ini bertujuan untuk mendedahkan pelajar kepada Latihan Asas Ketenteraan (Teori dan Praktikal) yang merangkumi aspek taktikal, latihan, persenjataan, kepimpinan, kerja berpasukan, membaca peta, tugas-tugas rejimen dan etika sosial serta pengetahuan am ketenteraan. Melalui latihan-latihan yang diberikan, potensi dan keupayaan pegawai kadet dapat dipertingkatkan dari segi pengetahuan, kepimpinan, disiplin, keyakinan diri dan semangat juang dan patriotisme yang tinggi.

**Course Outcomes :**

1. Keupayaan untuk menunjuk cara kemahiran taktikal dan sikap profesional dalam membuat keputusan secara berkumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan sikap profesional dan disiplin dalam formasi kawad yang bersesuaian dalam ketenteraan.

**SMZ36001 PALAPES DARAT V****No. of Credits: 1****Course Synopsis:**

Kursus ini bertujuan untuk mendedahkan pelajar kepada Latihan Asas Ketenteraan (Teori dan Praktikal) yang merangkumi aspek taktikal, latihan, persenjataan, kepimpinan, kerja berpasukan, membaca peta, tugas-tugas rejimen dan etika sosial serta pengetahuan am ketenteraan. Melalui latihan-latihan yang diberikan, potensi dan keupayaan pegawai kadet dapat dipertingkatkan dari segi pengetahuan, kepimpinan, disiplin, keyakinan diri dan semangat juang dan patriotisme yang tinggi.

**Course Outcomes :**

1. Berkeupayaan untuk menunjuk cara pengendalian senjata api berdasarkan SOP ATM.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan kaedah dan kemahiran yang bersesuaian dalam aktiviti ketenteraan.

**SMZ36101 PALAPES DARAT VI****No. of Credits: 1****Course Synopsis:**

Kursus ini bertujuan untuk mendedahkan pelajar kepada Latihan Asas Ketenteraan (Teori dan Praktikal) yang merangkumi aspek taktikal, latihan, persenjataan, kepimpinan, kerja berpasukan, membaca peta, tugas-tugas rejimen dan etika sosial serta pengetahuan am ketenteraan. Melalui latihan-latihan yang diberikan, potensi dan keupayaan pegawai kadet dapat dipertingkatkan dari segi pengetahuan, kepimpinan, disiplin, keyakinan diri dan semangat juang dan patriotisme yang tinggi.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan teori dan kemahiran ketenteraan dengan jelas berdasarkan undang-undang ketenteraan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengadaptasi kemahiran ketenteraan dalam komuniti.

**SMZ16201 KOR SISWA SISWI PERTAHANAN AWAM I****No. of Credits: 1****Course Synopsis:**

Kursus ini menawarkan pengetahuan dan kemahiran asas kawad kaki, asas pertolongan cemas, sistem pendarahan tubuh manusia, rawatan lecur kebakaran, rawatan kecederaan tulang, sendi dan otot, rawatan gigitan serangga dan binatang berbisa, resusitasi kardiopulmonari, dan teknik ektrikasi. Para pelajar akan diajar secara teori dan praktikal berkenaan operasi menyelamatkan dan pertolongan cemas semasa kemalangan bagi meningkatkan pemahaman dan kesediaan mental dan fizikal semasa menghadapi sebarang isu kecemasan.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan pertahanan awam dalam aktiviti kumpulan kecil.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Berkeupayaan untuk mempamerkan kaedah dan kemahiran teknikal dalam melaksanakan aktiviti menyelamatkan dalam komuniti.

**SMZ16301 KOR SISWA SISWI PERTAHANAN AWAM II****No. of Credits: 1****Course Synopsis (COs):**

Kursus ini menawarkan pengetahuan & kemahiran asas kawad kaki, teknik ekstraksi & mengeluarkan mangsa, kawad usungan, ikatan & simpulan tali, manual keselamatan operasi gergaji berantai, sains kebakaran & alatan pemadam api, teknik membaca peta & kompas, mengurus pusat bantuan kecemasan & keselamatan semasa bencana alam. Para pelajar akan diajar secara teori & praktikal berkenaan operasi menyelamatkan & pertolongan cemas semasa kemalangan bagi meningkatkan pemahaman & kesediaan mental & fizikal semasa menghadapi sebarang isu kecemasan.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan sikap profesional dan bertanggungjawab dalam aktiviti menyelamatkan secara berkumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran asas menyelamatkan mangsa bencana dalam komuniti.

**SMZ26201 KOR SISWA SISWI PERTAHANAN AWAM III****No. of Credits: 1****Course Synopsis:**

Kursus ini menawarkan pengetahuan & kemahiran asas kawad kaki, Pelan Integriti Nasional (PIN), penggunaan power cutter & peralatan hidraulik, peralatan & teknik ascending dan descending, teknik menyelamatkan dari tempat tinggi, pengenalan peralatan asas kebombaian, peralatan Basic Trauma & Life Support (BTLs) & pengenalan kepada peralatan ambulan. Para pelajar akan diajar secara teori & praktikal berkenaan operasi menyelamatkan & pertolongan cemas semasa kemalangan bagi meningkatkan pemahaman & kesediaan mental & fizikal semasa menghadapi sebarang isu kecemasan.

**Course Outcomes :**

1. Keupayaan untuk menunjuk cara langkah-langkah dan aktiviti menyelamatkan dalam kumpulan kecil.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Berkeupayaan untuk mengorganisasikan aktiviti bantuan dan operasi menyelamatkan yang bersesuaian dalam komuniti.

**SMZ26301 KOR SISWA SISWI PERTAHANAN AWAM IV****No. of Credits: 1****Course Synopsis:**

Kursus ini pengetahuan dan kemahiran asas kawad kaki, Khidmat Kecemasan 999, pengurusan bencana dan krisis, kaedah pengurusan latihan, kaedah pengurusan pasukan, kursus kepimpinan dalam organisasi (PTB) dan kursus etiket dan protokol. Para pelajar akan diajar secara teori dan praktikal berkenaan operasi dan pentadbiran pasukan penyelamat Jabatan Pertahanan Awam bagi meningkatkan pemahaman para pelajar dengan struktur organisasi dan cara kerja Jabatan Pertahanan Awam Malaysia.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan sikap profesional, kepimpinan, disiplin dan beretika dalam aktiviti Pertahanan Awam secara berkumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk menganjurkan program dan aktiviti asas menyelamatkan dengan komuniti.

**SMZ36201 KOR SISWA SISWI PERTAHANAN AWAM V****No. of Credits: 1****Course Synopsis:**

Kursus ini pengetahuan dan kemahiran asas kawad kaki, pengendalian mesyuarat, sahsiah, etika pegawai dan kepimpinan, etiket dan protokol, latihan ketahanan diri, kursus kejurulatihan kemahiran dan kursus bakal pegawai. Para pelajar akan diajar secara teori dan praktikal berkenaan pengurusan dan pentadbiran pasukan Jabatan Pertahanan Awam Malaysia bagi meningkatkan kredibiliti dan kesiapsiagaan para pelajar dengan sebarang kemungkinan pada masa hadapan.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan etika, etiket dan kepimpinan dalam acara berprotokol.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan pengurusan majlis berprotokol.

**SMZ16401 KURSUS PERSIJILAN BULAN SABIT MERAH MALAYSIA I****No. of Credits: 1****Course Synopsis:**

Kursus ini bertujuan mendedahkan dan memberikan kefahaman pelajar kepada prinsip pertolongan cemas asas dan aspek-aspek memberi bantuan sukarela, latihan kawad asas dan khidmat masyarakat. Penekanan diberikan kepada setiap individu untuk mengetahui asas pertolongan cemas dan Pemulihan Cardiopulmonary atau CPR (Cardiopulmonary) bagi melahirkan seorang pembantu pertolongan cemas untuk kesejahteraan masyarakat.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran asas pertolongan cemas dalam aktiviti berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Berkeupayaan untuk mempamerkan kemahiran dan langkah-langkah aktiviti menyelamatkan dan pertolongan cemas yang bersesuaian dalam komuniti.

**SMZ26401 KURSUS PERSIJILAN BULAN SABIT MERAH MALAYSIA II****No. of Credits: 1****Course Synopsis:**

Kursus ini bertujuan mendedahkan dan memberikan kefahaman pelajar kepada prinsip pertolongan cemas asas dan aspek-aspek memberi bantuan sukarela, latihan kawad asas dan khidmat masyarakat. Penekanan diberikan kepada setiap individu untuk mengetahui asas pertolongan cemas dan Pemulihan Cardiopulmonary atau CPR (Cardiopulmonary) bagi melahirkan seorang pembantu pertolongan cemas untuk kesejahteraan masyarakat.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan sikap tanggungjawab dan berdisiplin dalam aktiviti menyelamatkan dan pertolongan cemas secara berkumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengaplikasikan pengetahuan dan kemahiran asas BSMM dalam komuniti.

**SMZ16601 KOR SUKARELAWAN POLIS SISWA/SISWI 1****No. of Credits: 1****Course Synopsis:**

Kursus ini bertujuan membentuk sahsiah dan pembangunan mahasiswa yang berilmu, berdisiplin dan patriotik serta mempunyai tahap pengetahuan kepolisian yang baik. Program latihan dan aktiviti Kor SUKSIS adalah mengikut program latihan dan aktiviti yang telah disediakan dan diluluskan oleh PDRM. Sejumlah 672 jam diperlukan untuk memenuhi keperluan latihan dan aktiviti Kor SUKSIS bagi tujuan pentauliahan. Oleh itu, 112 jam latihan diperlukan untuk tiap-tiap semester untuk memenuhi keperluan latihan dalam aspek Pentadbiran/Pengurusan, Latihan Luar dan Akademik. Tujuan penubuhan Kor SUKSIS adalah untuk melahirkan seorang Pegawai Kor SUKSIS Polis yang berpengetahuan undang-undang berkaitan, mempunyai sikap serta amalan disiplin (kepolisian) yang sesuai. Mampu memainkan peranan dan tanggungjawab dengan cekap dan berkesan sebagai seorang Pegawai Kor SUKSIS Polis. Mewujudkan kesedaran sivik dan hubungan baik polis dengan masyarakat dan memupuk ketahanan fizikal, mental serta personaliti yang kental untuk menghadapi cabaran.

**Course Outcomes :**

1. Keupayaan untuk mematuhi undang-undang dan peraturan dalam pasukan PDRM.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kaedah yang bersesuaian dalam aktiviti PDRM.

**SMZ16701 KOR SUKARELAWAN POLIS SISWA/SISWI 2****No. of Credits: 1****Course Synopsis:**

Kursus ini merupakan lanjutan dari program yang dilaksanakan pada semester satu yang bertujuan membentuk sahsiah dan pembangunan mahasiswa yang berilmu, berdisiplin dan patriotik serta mempunyai tahap pengetahuan kepolisian yang baik. Program latihan dan aktiviti Kor SUKSIS adalah mengikut program latihan dan aktiviti yang telah disediakan dan diluluskan oleh PDRM.

**Course Outcomes :**

1. Berkeupayaan untuk menunjuk cara pengendalian senjata api secara berkumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kaedah dan kemahiran yang bersesuaian dalam aktiviti PDRM.

**SMZ26601 KOR SUKARELAWAN POLIS SISWA/SISWI 3****No. of Credits: 1****Course Synopsis:**

Kursus ini merupakan lanjutan dari program yang dilaksanakan pada semester dua yang bertujuan membentuk sahsiah & pembangunan mahasiswa yang berilmu, berdisiplin & patriotik serta mempunyai tahap pengetahuan kepolisian yang baik. Program latihan & aktiviti Kor SUKSIS adalah mengikut program latihan & aktiviti yang telah disediakan dan diluluskan oleh PDRM. Sejumlah 112 jam latihan diperlukan untuk memenuhi keperluan latihan dalam aspek Pentadbiran/Pengurusan, Latihan Luar & Akademik.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan undang-undang dan peraturan persenjataan dengan jelas.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kaedah dan kemahiran yang bersesuaian dalam aktiviti PDRM.

**SMZ26701 KOR SUKARELAWAN POLIS SISWA/SISWI 4****No. of Credits: 1****Course Synopsis:**

Kursus ini merupakan lanjutan dari program yang dilaksanakan pada semester tiga yang bertujuan membentuk sahsiah dan pembangunan mahasiswa yang berilmu, berdisiplin dan patriotik serta mempunyai tahap pengetahuan kepolisian yang baik. Program latihan dan aktiviti Kor SUKSIS adalah mengikut program latihan dan aktiviti yang telah disediakan dan diluluskan oleh PDRM. Sejumlah 112 jam latihan diperlukan untuk memenuhi keperluan latihan dalam aspek Pentadbiran/Pengurusan, Latihan Luar dan Akademik.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan sikap profesional secara berkumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan sikap profesional, integriti dan kemahiran asas PDRM dalam komuniti.

**SMZ36601 KOR SUKARELAWAN POLIS SISWA/SISWI 5****No. of Credits: 1****Course Synopsis:**

Kursus ini merupakan lanjutan dari program yang dilaksanakan pada semester empat yang bertujuan membentuk sahsiah dan pembangunan mahasiswa yang berilmu, berdisiplin dan patriotik serta mempunyai tahap pengetahuan kepolisian yang baik. Program latihan dan aktiviti Kor SUKSIS adalah mengikut program latihan dan aktiviti yang telah disediakan dan diluluskan oleh PDRM. Sejumlah 112 jam latihan diperlukan untuk memenuhi keperluan latihan dalam aspek Pentadbiran/Pengurusan, Latihan Luar dan Akademik.

**Course Outcomes :**

1. Keupayaan untuk mensintesis akta dan undang-undang PDRM dengan jelas.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan kaedah dan kemahiran yang bersesuaian dalam aktiviti PDRM dalam komuniti.

**SMZ36701 KOR SUKARELAWAN POLIS SISWA/SISWI 6****No. of Credits: 1****Course Synopsis:**

Kursus ini merupakan lanjutan dari program yang dilaksanakan pada semester lima yang bertujuan membentuk sahsiah dan pembangunan mahasiswa yang berilmu, berdisiplin dan patriotik serta mempunyai tahap pengetahuan kepolisian yang baik. Program latihan dan aktiviti Kor SUKSIS adalah mengikut program latihan dan aktiviti yang telah disediakan dan diluluskan oleh PDRM. Sejumlah 112 jam latihan diperlukan untuk memenuhi keperluan latihan dalam aspek Pentadbiran/Pengurusan, Latihan Luar dan Akademik.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan teori dan ilmu kepolisian dengan jelas berdasarkan undang-undang PDRM.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengadaptasi kemahiran dan ilmu kepolisian dalam komuniti.

**SMZ11801 BRIGED RELA SISWA SISWI I****No. of Credits: 1****Course Synopsis:**

Kursus ini memberikan pendedahan kepada pelajar mengenai asas kawad tangan kosong. Selain itu, konsep kesukarelawanan dan penyatuan bangsa, kepimpinan dan pengucapanawam, pengurusan media sosial, pengurusan dan pengendalian mesyuarat serta pengurusan program akan didedahkan kepada pelajar.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan undang-undang, peraturan dan kerjasama dalam pasukan.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti
3. berkumpul.
4. Keupayaan untuk mempamerkan kaedah yang bersesuaian dalam aktiviti berpasukan.

**SMZ11901 BRIGED RELA SISWA SISWI II****No. of Credits: 1****Course Synopsis:**

Kursus ini memberikan pendedahan kepada pelajar berkenaan dengan asas pertolongan cemas, kemahiran menyelamatkan, kemahiran medan, kemahiran asas pertahanan diri, khidmat bakti RELA, pengendalian senjata api, dan kawad senjata.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan ilmu asas kemahiran medan, pertahanan diri, dan
2. semangat kerja dalam aktiviti khidmat masyarakat dan menyelamatkan.
3. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti
4. berkumpul.
5. Keupayaan untuk mengorganisasikan aktiviti dan program kesukarelawan dengan komuniti.

**SMZ17101 SENI SILAT CEKAK I****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu Seni Silat Cekak dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, pengurusan diri dan lain-lain yang berkaitan Seni Silat Cekak. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan dari segi kemahiran bermain Seni Silat Cekak.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam aktiviti silat dalam kumpulan kecil.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kaedah dan langkah yang bersesuaian dalam persembahan silat.

**SMZ27101 SENI SILAT CEKAK II****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu Seni Silat Cekak II dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, pengurusan diri dan lain-lain yang berkaitan Seni Silat Cekak II. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan dari segi kemahiran bermain Seni Silat Cekak II.

**Course Outcomes :**

1. Keupayaan untuk mempamerkan kemahiran dan teknik silat secara berdisiplin dan bertanggungjawab dalam kumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program dan aktiviti silat dengan komuniti.

## SMZ17401

## TAEKWON-DO ITF I

**No. of Credits: 1****Course Synopsis:**

Kursus Taekwon-Do I (International Taekwon-Do Federation - ITF) bertujuan untuk mengasah bakat seni mempertahankan diri para pelajar melalui ilmu asas serta teori dan teknikal yang terdapat dalam Taekwon-Do itu sendiri. Para pelajar akan didedahkan kepada sejarah, latar belakang, terminologi, aspek teknikal, pengurusan diri serta aspek-aspek lain yang berkaitan Taekwon-Do I. Latihan asas kemahiran kaki dan tangan juga akan didedahkan kepada pelajar dan pelajar akan diuji dari masa ke semasa.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan peraturan dalam aktiviti taekwon-do.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kaedah dan teknik yang bersesuaian dalam persembahan taekwon-do.

## SMZ27401

## TAEKWON-DO ITF II

**No. of Credits: 1****Course Synopsis:**

Kursus Taekwon-Do II (International Taekwon-Do Federation - ITF) bertujuan untuk membangunkan bakat dan memantapkan kemahiran insaniah para pelajar melalui teori dan teknikal yang terdapat dalam seni mempertahankan diri Taekwon-Do itu sendiri. Dalam aspek teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan Taekwon-Do II. Dalam aspek teknikal pula, kursus ini akan memberi lebih tumpuan kepada latihan amali atau praktikal melalui kemahiran kaki dan tangan yang dilakukan dari masa ke semasa.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran taekwon-do secara berdisiplin dan bertanggungjawab.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program dan aktiviti taekwon-do bersama komuniti.

## SMZ17301

## KARATE-DO I

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu Karate-Do dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan Karate-Do. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan dari segi kemahiran bermain Karate -Do.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan peraturan dalam sesuatu aktiviti karate-do.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kaedah dan teknik yang bersesuaian dalam sesuatu persembahan karate-do.

## SMZ27301

## KARATE-DO II

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu Karate-Do dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan Karate -Do. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan dari segi kemahiran bermain Karate -Do.

**Course Outcomes :**

1. Keupayaan untuk menunjukan kemahiran karate-do secara berdisiplin dan bertanggungjawab.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program dan aktiviti karate-do dengan komuniti.



## SMZ17601

## TAEKWON-DO WTF I

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum Taekwon-Do WTF I bertujuan memberi pendedahan kepada para pelajar mengenai seni mempertahankan diri Taekwon-Do WTF dari segi kemahiran teori dan kemahiran secara teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, disiplin diri dan lain-lain berkaitan Taekwon-Do WTF. Manakala dari segi praktikal, kursus ini lebih menumpukan kepada latihan terhadap pergerakan serta koordinasi anggota badan melalui kemahiran-kemahiran tangan dan kaki dalam serangan dan pertahanan.

**Course Outcomes:**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, peraturan dan disiplin dalam aktiviti taekwon-do.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kaedah dan teknik yang bersesuaian dalam persembahan taekwon-do.

## SMZ27601

## TAEKWON-DO WTF II

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum Taekwon-Do WTF II adalah lanjutan kepada Taekwon-Do WTF I. Melalui kursus ini, penekanan diberikan kepada aspek teknikal dan taktikal yang berkaitan bagi setiap peringkat tali pinggang. Antara aspek yang akan disampaikan termasuk Teori of Power, foot works, free sparring dan sebagainya.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran taekwon-do secara berdisiplin dan bertanggungjawab.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program dan aktiviti taekwon-do bersama komuniti.

## SMZ17701

## SILAT OLAHRAGA I

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum Silat Olahraga ini memperkenalkan dan mendedahkan para pelajar berkenaan dengan seni silat daripada segi teori dan juga praktikal. Para pelajar akan mempelajari latar belakang, konsep dan kelengkapan serta peraturan-peraturan dalam silat olahraga dan seni silat. Aspek disiplin diri turut diberi penekanan. Selain itu, para pelajar akan mempelajari asas-asas gerakan seni silat, gabungan gerakan dan teknik asas dalam pencak silat.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan peraturan silat dalam kumpulan kecil.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kaedah dan langkah yang tepat dalam aktiviti silat.

## SMZ27701

## SILAT OLAHRAGA II

**No of Credits: 1****Course Synopsis:**

Kursus kokurikulum Silat Olahraga ini adalah lanjutan daripada Silat Olahraga I. Dalam kursus ini, para pelajar akan mendalami Silat Olahraga dari segi teori, teknikal dan juga praktikal. Para pelajar akan diajar tentang seni ikatan tengkolok, seni ikatan sampan serta gerakan asas permainan silat olahraga dan seni silat. Pelajar juga akan diberi penekanan dalam aspek disiplin diri. Selain itu para pelajar akan mempelajari bengkel asas kejurulatihan silat olahraga dan seni silat.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran seni silat olahraga secara berdisiplin, bertanggungjawab dan beretika.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program dan aktiviti silat olahraga sebagai aktiviti sukan dalam komuniti.

**SMZ17501 FUTSAL****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan futsal dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan sukan futsal. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain sukan futsal.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan peraturan dalam permainan futsal.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran dan teknik yang bersesuaian dalam perlawanan futsal.

**SMZ19301 TAJWID****No. of Credits: 1****Course Synopsis:**

Kursus ini merangkumi pengenalan kepada asas-asas ilmu tajwid, pengetahuan asas hokum-hakam bacaan Al-Quran yang tepat, dan seterusnya talaqqi dan latihan bacaan Al-Quran secara mujawwad. Pelajar mengetahui asas-asas hokum tajwid, mengadakan perbincangan dalam sesi muzakarah, menjalani latihan bacaan Al-Quran, mengaplikasikan ilmu tajwid dan seterusnya menjalani talaqqi musyafahah dan ujian untuk penilaian.

**Course Outcomes :**

1. Keupayaan untuk membezakan hukum-hukum tajwid dalam bacaan al-quran.
2. Keupayaan untuk membudayakan aktiviti bacaan al-Quran dalam kumpulan kecil.
3. Keupayaan untuk mengorganisasikan aktiviti bacaan al-quran dalam komuniti

**SMZ19601 STUDENT IN-FREE ENTERPRISE****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum SIFE ini adalah bagi membudayakan aktiviti keusahawanan dan memupuk semangat kemasyarakatan dalam kalangan pelajar. Di samping itu, kursus ini juga mempunyai tiga elemen terpenting yang diambil untuk memberi sumbangan kepada masyarakat, iaitu keusahawanan, pembelajaran dan persekitaran. Ia dilaksanakan agar para pelajar dapat membantu masyarakat untuk meningkatkan taraf hidup bagi mereka yang memerlukan.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam aktiviti keusahawan.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan perniagaan yang bersesuaian dalam komuniti.

**SMZ19801 MANUSIA DAN KELESTARIAN ALAM****No. of Credits: 1****Course Synopsis:**

Kursus ini bertujuan memupuk semangat kelestarian dalam kalangan pelajar. Ia juga membantu proses membentuk jaringan komunikasi dan membina intelek bagi menggiatkan diri menyumbang kepada kepentingan kelestarian alam. Pelajar dibimbing secara teori berkenaan isu-isu semasa kelestarian alam dan perkara-perkara seharian yang boleh dilakukan untuk mengurangkan kesan alam sekitar yang tidak diingini. Kemudian, mereka dibimbing kaedah merancang, melaksana, mengurus dan memantau projek. Seterusnya mereka mempraktikkan, secara berpasukan, apa yang telah dipelajari melalui perancangan, pelaksanaan, dan pemantauan sekurang-kurangnya satu projek yang mengandungi unsur kelestarian alam. Projek kelestarian yang dijalankan di dalam kampus untuk mencapai hasrat Kampus Lestari UniMAP diberi keutamaan, namun pelaksanaan projek di luar kampus dan melibatkan masyarakat setempat juga digalakkan.

**Course Outcomes :**

1. Keupayaan untuk membudayakan konsep dan kaedah pelestarian alam dalam aktiviti berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan
3. Keupayaan untuk mengorganisasikan aktiviti kitar semula dalam komuniti.

## SMZ10101

## GOLF

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan golf dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan golf. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain golf.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam sukan golf secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran dan teknik asas sukan golf dalam komuniti.

## SMZ18901

## SOFBOL

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan sofbol dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan sukan sofbol. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain sofbol. Selain itu, kursus ini dapat menarik minat pelajar untuk mewakili Universiti dalam sukan Sofbol untuk kejohanan MASUM, SUKIPTS dan kejohanan-kejohanan lain.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam sukan sofbol secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran dan teknik asas sukan sofbol dalam komuniti.

## SMZ10301

## WOODBALL

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan woodball dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan woodball. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain woodball.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam sukan woodball secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program berkaitan sukan woodball dengan komuniti.

## SMZ10401

## BOLA SEPAK

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan bola sepak dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan bola sepak. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain bola sepak.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam sukan bola sepak secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program berkaitan sukan bola sepak dengan komuniti.

## SMZ10501

## BOLA JARING

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan bola jaring dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan bola jaring. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain bola jaring.

**Course Outcomes:**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika sukan bola jaring dalam kumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasi program berkaitan sukan bola jaring bersama komuniti.

## SMZ10601

## TENIS

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan tenis dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan tenis. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain tenis.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam sukan tenis secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran dan teknik asas sukan tenis dalam komuniti.

## SMZ10801

## ANGKAT BERAT

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan angkat berat dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan angkat berat. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali (praktikal) dari segi kemahiran sukan angkat berat.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan kemahiran kepimpinan, disiplin dan etika dalam sukan angkat berat secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran dan teknik asas sukan angkat berat dalam komuniti.

## SMZ10901

## BOLA TAMPAR

**No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan bola tampar dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan sukan bola tampar. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain sukan bola tampar.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam sukan bola tampar secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program berkaitan sukan bola tampar dengan komuniti

**SMZ13201 PENERBITAN VIDEO****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu penerbitan video dari segi kemahiran teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan penerbitan video. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali (practical) dari segi kemahiran bermain penerbitan video.

**Course Outcomes:**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika pembikinan video secara berkumpulan.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk menghasilkan video berkualiti dan dikomersialkan dalam komuniti.

**SMZ15501 SENI PERGERAKAN KREATIF****No. of Credits: 1****Course Synopsis:**

Kursus kokurikulum Seni Pergerakan Kreatif memberi pendidikan asas seni tari kepada para pelajar serta meningkatkan ilmu pengetahuan tentang nilai-nilai kesenian bangsa sebagai teras pembentukan masyarakat berbudaya.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam persembahan seni tari secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan persembahan seni tari dalam komuniti.

**SMZ15601 DRAMA, PEMENTASAN & SENI LAKON****No. of Credits: 1****Course Synopsis:**

Kursus Kursus kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu drama, pementasan dan seni lakon dari segi teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang terminologi, pengurusan diri dan lain-lain yang berkaitan dengan drama, pementasan dan seni lakon. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran drama, pementasan dan seni lakon.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam persembahan drama/teater dalam kumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan persembahan drama/teater dalam komuniti.

**SMZ18101 BOLING PADANG****No. of Credits: 1****Course Synopsis:**

Kursus Ko-kurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan boling padang dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan boling padang. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali (praktikal) dari segi kemahiran bermain boling padang.

**Course Outcomes :**

1. Keupayaan untuk mengamalkan kemahiran kepimpinan, disiplin dan etika dalam sukan boling padang secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran dan teknik asas sukan boling padang dalam komuniti.

**SMZ18201****PATANQUE****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan petanque dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan sukan petanque. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain sukan petanque.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam sukan petanque secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran dan teknik asas petanque dalam komuniti.

**SMZ17901****OLAHRAGA****No. of Credits: 1****Course Synopsis:**

Kursus Ko-Kurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu Sukan Olahraga yang merupakan asas kepada semua jenis sukan. Dalam Sukan Olahraga terdapat pelbagai jenis acara seperti berlari, melompat, merejam dan melontar. Kursus ini merangkumi perancangan, pelaksanaan dan penilaian hasil kerja, kepimpinan dan kemahiran. Di samping itu juga pelajar-pelajar dapat mempelajari pengurusan dalam menganjurkan sesuatu Sukan Olahraga.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dan disiplin dalam sukan olahraga secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program berkaitan sukan olahraga bersama komuniti.

**SMZ18401****BADMINTON****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan badminton dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan sukan badminton. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain sukan badminton.

**Course Outcomes :**

1. Keupayaan untuk mempamerkan kemahiran kepimpinan dan disiplin dalam sukan badminton secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program berkaitan sukan badminton dengan komuniti.

**SMZ18601****SEPAK TAKRAW****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan sepak takraw dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan sukan sepak takraw. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain sukan sepak takraw.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dan disiplin dalam sukan sepak takraw secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program berkaitan sukan sepak takraw bersama komuniti.

**SMZ18701****RAGBI****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan ragbi dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan sukan ragbi. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain sukan ragbi.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan pertauraan dalam permainan ragbi.
2. Keupayaan untuk mempraktikkan kemahiran berkomunikasi yang berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kaedah dan teknik yang bersesuaian dalam perlawanan ragbi.

**SMZ18801****MEMANAH****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan memanah dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan sukan memanah. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain sukan memanah.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dan disiplin aspek keselamatan dalam sukan memanah secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran dan teknik asas sukan memanah dalam komuniti.

**SMZ18901****SOFTBOL****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan mendedahkan pelajar-pelajar kepada ilmu sukan softball dari segi kemahiran, teori dan teknikal. Dari segi teori, kursus ini lebih menjurus kepada sejarah, latar belakang, terminologi, pengurusan diri dan lain-lain yang berkaitan dengan sukan softball. Manakala dari segi teknikal, kursus ini lebih menumpukan kepada latihan amali dari segi kemahiran bermain softball. Selain itu, kursus ini dapat menarik minat pelajar untuk mewakili Universiti dalam sukan Softbol untuk kejohanan MASUM, SUKIPTS dan kejohanan-kejohanan lain.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan etika dalam sukan softball secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran dan teknik asas sukan softball dalam komuniti.

**SMZ19001****SUKAN BERBASIKAL****No. of Credits: 1****Course Synopsis:**

Kursus Kokurikulum ini bertujuan untuk memberikan kemahiran dan ilmu berbasikal kepada para pelajar dari segi teori dan praktikal. Kursus ini merangkumi sejarah sukan berbasikal di Malaysia dan antarabangsa, pengenalan tentang jenis-jenis basikal dan kegunaannya, kemahiran dan teknik berbasikal yang betul, penjagaan basikal dan teknik-teknik asas berbasikal sebagai sukan atau pertandingan. Kursus ini juga memberi pendedahan tentang sukan berbasikal dan aspek-aspek keselamatan yang perlu diutamakan ketika berbasikal.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan teknik kayuhan asas berbasikal dan penyelenggaraan basikal.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan aktiviti dan program berbasikal dengan komuniti.



## SMZ19101

## KHIDMAT MASYARAKAT

No. of Credits: 1

**Course Synopsis:**

Kursus kokurikulum Khidmat Masyarakat adalah bagi memupuk semangat kemasyarakatan dan kesukarelawanan di kalangan para pelajar. Di samping itu, kursus ini juga membantu proses membentuk jaringan komunikasi dan membina intelek bagi menggiatkan diri dalam program khidmat masyarakat.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan, disiplin dan semangat kerjasama dalam aktiviti secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan program dan aktiviti bersama komuniti.

## SMZ19201

## DAYA USAHA &amp; INOVASI

No. of Credits: 1

**Course Synopsis:**

Kursus ini bertujuan melatih pelajar untuk menguasai kemahiran asas seni reka dan kejuruteraan. Di samping itu juga, ianya memberi pendedahan kepada pelajar untuk mengetahui cara-cara menggunakan bahan-bahan kitar semula, mekanisma-mekanisma yang boleh digunakan dan seterusnya teknik-teknik merekabentuk. Kursus ini dapat memberi peluang kepada pelajar untuk meluahkan idea-idea yang bernas serta mengaplikasikannya dalam bentuk produk, kerjasama yang tinggi, bertanggungjawab dan berkemampuan membentuk sahsiah pelajar yang cemerlang.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dan disiplin dalam aktiviti secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mereka bentuk produk inovasi yang boleh dikomersialkan dalam komuniti.

## SMZ19501

## RADIO KAMPUS

No. of Credits: 1

**Course Synopsis:**

Radio merupakan salah satu medium penyebar maklumat yang efektif dan paling meluas liputannya berbanding televisyen. Kursus Kokurikulum Radio Kampus akan mendedahkan kepada para pelajar berkenaan etika penyiaran, cara mengurus penyuntingan, membuat rakaman, siaran langsung dan dan atur cara program radio. Kursus ini membantu para pelajar untuk berkomunikasi dengan lebih baik dan beretika semasa menyampaikan maklumat kepada masyarakat.

**Course Outcomes :**

1. Keupayaan untuk menunjukkan kemahiran kepimpinan dan disiplin pengurusan radio secara berkumpulan.
2. Keupayaan untuk mempraktikkan kemahiran komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mengorganisasikan pengurusan radio dalam komuniti.

## SMZ19901

## TULISAN JAWI

No. of Credits: 1

**Course Synopsis:**

Kursus ini bertujuan untuk memberikan kemahiran membaca dan menulis Jawi mengikut sistem baharu. Pelajar juga akan mengetahui tentang sejarah perkembangan dan penyebaran tulisan jawi. Penekanan juga diberikan terhadap kemahiran membaca dan menulis jawi dan elemen-elemen penulisan Jawi seperti huruf Jawi dan padanannya dengan huruf rumi, bentuk tulisan Jawi, jenis ejaan Jawi, kaedah mengeja Jawi dan tulisan khat. Penawaran kursus juga merupakan usaha untuk mengekalkan elemen warisan dan kegemilangan sistem tulisan jawi.

**Course Outcomes :**

1. Keupayaan untuk menggunakan sistem ejaan yang baharu mengamalkan nilai, disiplin dan etika dalam pembelajaran.
2. Keupayaan untuk mempraktikkan komunikasi berkesan dalam aktiviti berkumpulan.
3. Keupayaan untuk mempamerkan kemahiran penguasaan kaedah dan teknik membaca dan menulis tulisan jawi dalam pelbagai konteks.

ACADEMIC **GUIDEBOOK**

**BACHELOR DEGREE PROGRAMME**  
**ACADEMIC SESSION**

**2024/2025**