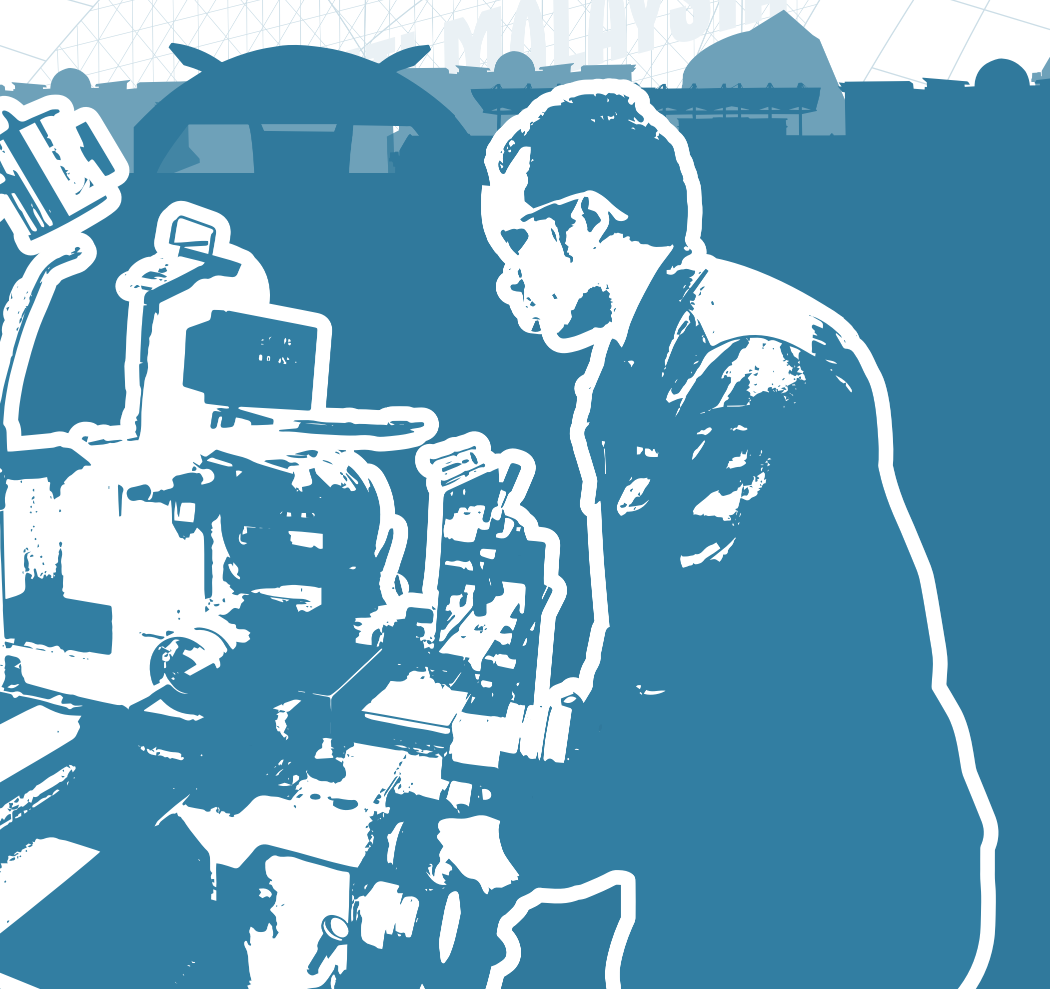
Universiti
Malaysia
Perlis

Ilmu • Keikhlasan • Kecemerlangan
Knowledge • Sincerity • Excellence

Program Kejuruteraan / Engineering Programmes
Sidang Akademik / Academic Session
2013/2014



Buku Panduan Akademik
Academic Guide Book
Program Sarjana Muda / Bachelor Degree Programmes

Buku Panduan Akademik
Program Sarjana Muda
Academic Guide Book for Bachelor Degree Programmes

Program Kejuruteraan / *Engineering Programmes*
Sidang Akademik 2013/2014 - *Academic Session 2013/2014*

Disediakan oleh / *Prepared by:*
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Deputy Vice-Chancellor's Office (Academic & International)

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Prof. Madya Dr. Mohd Fo'ad Sakdan,
En. Zuber Hj. Mohamad,
Pn. Mazmin Mat Akhir dan
Pn. Saodah Hassan.

dan / *and*

semua Dekan Pusat-pusat Pengajian dan
Pengarah Pusat / Unit di Univesiti Malaysia Perlis.
All Deans and Directors of Schools / Centers / Units
in Universiti Malaysia Perlis.

serta / and

kepada semua staf di Bahagian Pengurusan
Akademik, Pejabat Timbalan Naib Canselor
(Akademik & Antarabangsa),
Universiti Malaysia Perlis.
All the staff at Academic Management Division,
Deputy Vice-Chancellor (Academic & International)
Office, Universiti Malaysia Perlis.

Isi Kandungan / *Contents*

Muka Surat / *Page*

* Dari semasa ke semasa, universiti mungkin melakukan perubahan kepada beberapa aspek-aspek kurikulum dan sistem akademik tertentu bagi memenuhi keperluan semasa. Jika terdapat sebarang perubahan, semua pelajar akan dimaklumkan. Semua pelajar adalah tertakluk kepada perubahan tersebut.

* *From time to time, the university may make changes on certain aspects of curriculum and academic system in order to fulfill the current needs and requirements. If there are any changes, all students will be informed. All students are subject to the changes.*

Pengenalan / *Introduction*

Buku Panduan Akademik Program Ijazah Sarjana Muda ini disediakan untuk membantu pelajar baru 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 tahun pertama sehingga tahun 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.

The Academic Guidebook for Bachelor Degree Programmes is prepared to assist UniMAP new students in understanding the process and procedure that are related to their study in UniMAP. Students should utilize this book as their major guidance in planning and deciding on courses to be taken from their first until final year of their studies. This guidebook also gives some basic information on the academic systems, program structures, list of courses offered together with the synopsis, source of references, list of staff and other related information. It is hoped that students will benefit from the information given in this guidebook and use the information to plan their studies in UniMAP.

Senarai Pusat Pengajian / *List of Schools*

1. Pusat Pengajian Kejuruteraan Mikrolektronik / *School of Microelectronic Engineering*
2. Pusat Pengajian Kejuruteraan Komputer & Perhubungan / *School of Computer & Communication Engineering*
3. Pusat Pengajian Kejuruteraan Mekatronik / *School of Mechatronic Engineering*
4. Pusat Pengajian Kejuruteraan Sistem Elektrik / *School of Electrical Systems Engineering*
5. Pusat Pengajian Kejuruteraan Pembuatan / *School of Manufacturing Engineering*
6. Pusat Pengajian Kejuruteraan Bahan / *School of Materials Engineering*
7. Pusat Pengajian Kejuruteraan Bioproses / *School of Bioprocess Engineering*
8. Pusat Pengajian Kejuruteraan Alam Sekitar / *School of Environmental Engineering*
9. Pusat Pengajian Inovasi Perniagaan & Teknousahawan / *School of Business Innovation and Technopreneurship (PPIPT)*
10. Fakulti Teknologi Kejuruteraan / *Faculty of Engineering Technology*

Pusat/Unit Pemantapan Akademik / *Academic Enhancement Support Centres/Units*

1. Pusat Teknologi Komunikasi dan Pembangunan Insan / *Centre for Communication Technology and Human Development (PTKPI)*
2. Pusat Kejuruteraan / *Engineering Centre*
3. Institut Matematik Kejuruteraan / *Institute of Engineering Mathematics (IMK)*
4. Pusat Kerjasama Inndustri / *Centre for Industrial Collaboration (CIC)*
5. Pusat Ko-kurikulum / *Centre for Co-Curriculum*
6. Pusat Bahasa Antarabangsa / *Centre of International Language*

Senarai Program Pengajian Sarjana Muda / *List of Degree Programmes*

1. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Mikroelektronik) / *Bachelor of Engineering (Honours) (Microelectronic Engineering)*
2. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Elektronik) / *Bachelor of Engineering (Honours) (Electronic Engineering)*
3. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Fotonik) / *Bachelor of Engineering (Honours) (Photonic Engineering)*
4. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Komputer) / *Bachelor of Engineering (Honours) (Computer Engineering)*
5. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Perhubungan) / *Bachelor of Engineering (Honours) (Communication Engineering)*
6. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Rangkaian Komputer) / *Bachelor of Engineering (Honours) (Computer Network Engineering)*
7. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Mekatronik) / *Bachelor of Engineering (Honours) (Mechatronic Engineering)*
8. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Mekanikal) / *Bachelor of Engineering (Honours) (Mechanical Engineering)*
9. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Elektronik Bioperubatan) / *Bachelor of Engineering (Honours) (Biomedical Electronic Engineering)*
10. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Sistem Elektrik) / *Bachelor of Engineering (Honours) (Electrical System Engineering)*
11. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Elektronik Industri)/ *Bachelor of Engineering (Honours) (Industrial Electronic Engineering)*
12. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Elektrik Sistem Tenaga) / *Bachelor of Engineering (Honours) (Electrical Power System)*

13. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Pembuatan)/
    Bachelor of Engineering (Honours) (Manufacturing Engineering)
14. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Rekabentuk Produk)/
    Bachelor of Engineering (Honours) (Product Design Engineering)
15. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Bahan)/
    Bachelor of Engineering (Honours) (Materials Engineering)
16. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Metalurgi)/
    Bachelor of Engineering (Honours) (Metallurgical Engineering)
17. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Polimer)/
    Bachelor of Engineering (Honours) (Polymer Engineering)
18. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Bioproses)/
    Bachelor of Engineering (Honours) (Bioprocess Engineering)
19. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Biosistem)/
    Bachelor of Engineering (Honours) (Biosystems Engineering)
20. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Alam Sekitar)/
    Bachelor of Engineering (Honours) (Environmental Engineering)
21. Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Bangunan)/
    Bachelor of Engineering (Honours) (Building Engineering)
22. Sarjana Muda Perniagaan (Kepujian) (Keusahawanan Kejuruteraan)/
    Bachelor of Business (Honours) (Entrepreneurial Engineering)
23. Sarjana Muda Perniagaan (Kepujian) (Perniagaan Antarabangsa)/
    Bachelor of Business (Honours) (International Business)
24. Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Bioteknologi Industri)/
    Bachelor of Chemical Engineering Technology (Honours) (Biotechnology Industry)
25. Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Rangkaian Elektronik)/
    Bachelor of Electronic Engineering Technology (Honours) (Electronic Network Design)
26. Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Kuasa Industri)/
    Bachelor of Electrical Engineering Technology (Honours) (Industrial Power)
27. Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemesinan)/
    Bachelor of Mechanical Engineering Technology (Honours) (Machining)
28. Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Sistem Pertanian)/
    Bachelor of Mechanical Engineering Technology (Honours) (Agricultural Systems)
29. Sarjana Muda Teknologi Kejuruteraan Awam (Kepujian) (Pembinaan)/
    Bachelor of Civil Engineering Technology (Honours) (Construction)
30. Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pembangunan Produk)/
    Bachelor of Mechanical Engineering Technology (Honours) (Product Development)
31. Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemprosesan Bahan)/
    Bachelor of Mechanical Engineering Technology (Honours) (Materials Processing)

32. Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Teknologi Robotik dan Automasi)/
Bachelor of Electrical Engineering Technology (Honours) (Robotic and Automation Technology)
33. Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Sistem Elektronik)/
Bachelor of Electronic Engineering Technology (Honours) (Electronic Systems)
34. Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Elektronik Bersepadu)/
Bachelor of Electronic Engineering Technology (Honours) (Integrated Electronics)
35. Sarjana Muda Teknologi Kejuruteraa Elektronik (Kepujian) (Rekabentuk Telekomunikasi Elektronik) /
Bachelor of Electronic Engineering Technology (Honours) (Electronic Telecommunication Design)
36. Sarjana Muda Teknologi Kejuruteraa Kimia (Kepujian) (Proses Kimia Industri) /
Bachelor of Chemical Engineering Technology (Honours) (Industrial Chemical Process)

Misi / *Mission*

Melahirkan Modal Insan kamil yang menyumbang kepada agenda pembagunan dan daya saing industri negara.
To produce holistic human capitals that contributes to the nation's development and industrial competitiveness agenda.

Visi / *Vision*

Institusi akademik dan penyelidikan yang berdaya saing di persada antarabangsa.
An internationally competitive academic and research institution.

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

CANSELOR UniMAP / *CHANCELLOR OF UniMAP*

D.Y.T.M. Tuanku Syed Faizuddin Putra Ibni Tuanku Syed Sirajuddin Putra Jamalullail
D.K., S.P.M.P., P.A.T., Doctor of Education (Honoris Causa), La Trobe University Melbourne, Australia
Raja Muda Perlis / *Crown Prince of Perlis*

PRO CANSELOR / PRO CHANCELLOR OF UniMAP

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S.P.M.P., Honoris Causa in Health Sciences, (University Nacional Pedro Henriquez Unrena, DR)
Raja Puan Muda Perlis / *Crown Princess Of Perlis*

Kata Aluan Naib Canselor

Bismillahirrahmanirrahim
Assalamualaikum W. B. T, Salam Sejahtera dan Salam 1 Malaysia

Selamat Datang ke Universiti Malaysia Perlis! Terlebih dahulu, saya ingin merakamkan ucapan tahniah kepada semua pelajar baru sidang akademik 2013/2014 kerana telah berjaya untuk menyambung pengajian di UniMAP, 'Universiti Pilihan yang Berdaya Saing'. Para pelajar kini sudah melangkah ke satu alam baru, alam Universiti yang bakal menjanjikan pelbagai cabaran dan keseronokan dalam usaha mendaki puncak kejayaan. Semoga dengan doa dan usaha yang gigih segala impian dan harapan dapat direalisasikan.

Universiti ini amat komited ke arah meningkatkan pengetahuan, mengasah bakat dan meluaskan minda para pelajar melalui pendekatan pengajaran-pembelajaran yang berkesan ke arah menghasilkan insan kamil yang menyumbang kepada pembangunan Negara.

UniMAP juga sentiasa berusaha menyediakan prasarana terbaik meliputi peralatan moden dan terkini untuk meningkatkan keberkesanan pembelajaran. Saya amat berharap agar semua pelajar dapat mengoptimakan penggunaan kemudahan yang telah disediakan oleh pihak Universiti. Saya percaya ekosistem yang kondusif di UniMAP akan menyumbang kepada kehidupan kampus yang menarik lagi menyeronokkan.

Suasana indah dan kedamaian Negeri Perlis Indera Kayangan merupakan antara tarikan menarik untuk meningkatkan pengalaman pembelajaran para pelajar di sini. Selain itu, Universiti ini sentiasa memberi fokus ke arah menyediakan peluang menarik kepada para pelajar untuk berinteraksi dengan komuniti universiti dan masyarakat sekitar melalui penganjuran aktiviti ko-kurikulum. Apa yang lebih penting, saya amat berharap agar semua pelajar melibatkan diri secara aktif dalam pelbagai aktiviti anjuran universiti untuk menggilap potensi pelajar sekalian.

UniMAP sentiasa beriltizam untuk menyerlahkan keterlihatan antarabangsa melalui kecemerlangan akademik dan penyelidikan. Saya yakin dan percaya bahawa strategi berkesan untuk menarik dan menggilap kehebatan bakat pelajar akan berjaya menempatkan universiti ini dalam kalangan 500 universiti terbaik dunia menjelang tahun 2015.

Sekali lagi, saya mengucapkan tahniah dan semoga berjaya menempuhi perjalanan mencapai impian para pelajar di UniMAP!

Wassalam.

Vice Chancellor's Message

Bismillahirrahmanirrahim
Assalamualaikum W. B. T, Salam Sejahtera and Salam 1 Malaysia.

Welcome to Universiti Malaysia Perlis! First of all, I would like to congratulate all students in the new academic session 2013/2014 for being selected to study in UniMAP, a 'University of Competitive Choice'. As a student you are now stepping into a new domain, that is a University, which promises many challenges and pleasures in order to climb to the top. May your prayers and the tireless efforts you commit while in the university make you realized all your dreams and hopes.

The University is committed to enhancing the knowledge, sharpen the talents and broaden the minds of students through an effective teaching-learning approach towards producing a balanced human resource who can contribute towards national development.

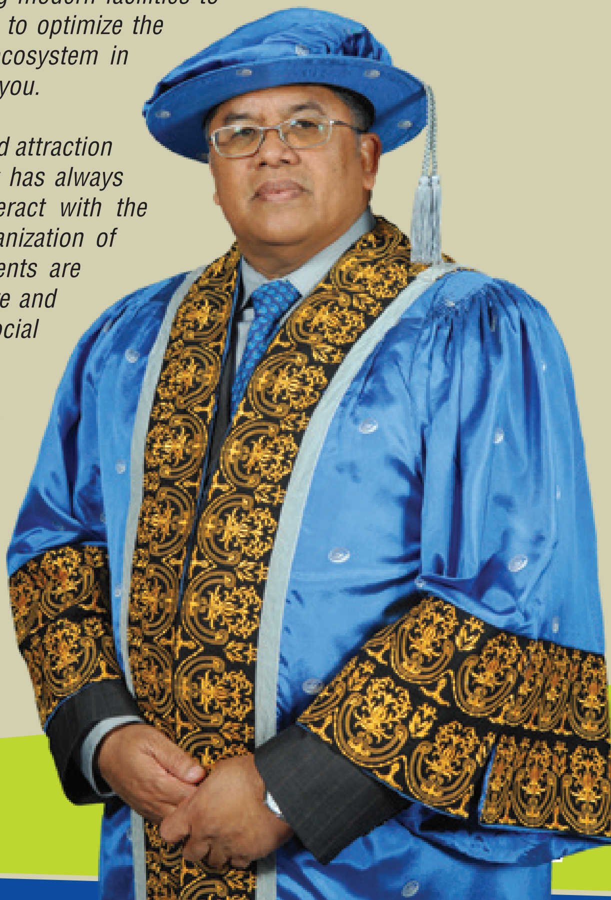
UniMAP also constantly strives to provide the best infrastructure including modern facilities to enhance learning effectiveness. I sincerely hope that all students are able to optimize the use of facilities provided by the University. I believe that a conducive ecosystem in UniMAP will contribute to an enjoyable and interesting campus life for all of you.

The beautiful and peaceful atmosphere in Perlis Indera Kayangan is an added attraction to enhance students' learning experience here. In addition, the University has always focused towards providing an exciting opportunity for students to interact with the university community as well as the social community through the organization of extra-curricular activities. What is more important, I hope that all students are actively involved in various activities organized by the university to explore and develop their potential and talents in the academic, sports, culture and social fields.

UniMAP is constantly striving to highlight its international visibility through academic excellence and research. I believe that an effective strategy to attract good students and enrich their potential talents will put the university among the 500 best universities in the world by 2015.

Again, congratulations and good luck in your journey as a student while at UniMAP to achieve your dreams!

Wassalam.



Brig. Jen. Datuk Prof. Dr.
Kamarudin Hussin
Naib Canselor / *Vice Chancellor*

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UniMAP Principal Officers

Brig. Jen. Datuk Prof. Dr. Kamarudin Hussin
Naib Canselor / *Vice Chancellor*

Dato' Prof. Dr.
Zul Azhar Zahid Jamal
Timbalan Naib Canselor
(Akademik & Antarabangsa) /
Deputy Vice Chancellor
(Academic & International)

Belum Dilantik /
To be Appointed
Timbalan Naib Canselor
(Penyelidikan & Inovasi) /
Deputy Vice Chancellor
(Research & Innovation)

Prof. Madya Dr.
Mohd Fo'ad Sakdan
Timbalan Naib Canselor
(Hal Ehwal Pelajar dan Alumni) /
Deputy Vice Chancellor
(Students Affairs)

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Pemangku Pendaftar /
Acting Registrar

Pn. Saodah Hassan
Bendahari / *Bursar*

Pn. Mazmin Mat Akhir
Pustakawan Kanan /
Chief Librarian

Kalendar Akademik Semester I Sidang 2013/2014

Program Ijazah Sarjana Muda

SEMESTER 1 9 September 2013 – 19 Januari 2014 (19 minggu)				
AKTIVITI	**JANGKA MASA**		**TEMPOH**	**CATATAN**
Pendaftaran Pelajar Baru / Minggu Suai Kenal	1 September 2013	5 September 2013	5 hari	-
Kuliah	9 September 2013	13 Oktober 2013	5 minggu	**Hari Malaysia** 16 September 2013
Cuti Pertengahan Semester	14 Oktober 2013	20 Oktober 2013	1 minggu	**Hari Raya Aidiladha** 15 - 16 Okt 2013
Kuliah	21 Oktober 2013	22 Disember 2013	9 minggu	**Hari Deepavali** 2 November 2013 **Awal Muharam/Maal Hijrah 1434** 5 November 2013
Minggu Ulangkaji	23 Disember 2013	29 Disember 2013	1 minggu	**Hari Krismas** 25 Dis 2013
Peperiksaan	30 Disember 2013	19 Januari 2014	3 minggu	**Maulidur Rasul** 14 Jan 2014
Cuti Antara Semester	20 Januari 2014	16 Februari 2014	4 minggu	**Tahun Baru Cina** 31 Jan- 1 Feb 2014

Kalendar Akademik Semester II Sidang 2013/2014

Program Ijazah Sarjana Muda

SEMESTER 2 * 17 Februari 2014 – 27 Jun 2014 (18 minggu)				
AKTIVITI	**JANGKA MASA**		**TEMPOH**	**CATATAN**
Kuliah	17 Feb 2014	6 April 2014	7 minggu	-
Cuti Pertengahan Semester	7 April 2014	13 April 2014	1 minggu	-
Kuliah	14 April 2014	1 Jun 2014	7 minggu	**Hari Pekerja** 1 Mei 2014 **Hari Keputeraan DYMM Tuanku Raja Perlis** 17 Mei 2014 **Hari Wesak** 25 Mei 2014 **Hari Keputeraan SPB Yang Di-Pertuan Agung** 7 Jun 2014
Minggu Ulangkaji	2 Jun 2014	8 Jun 2014	1 minggu	**Israk Mikraj** 6 Jun 2014
Peperiksaan	9 Jun 2014	27 Jun 2014	3 minggu	-
Cuti Panjang	28 Jun 2014	31 Ogos 2014	9 minggu	**Nuzul Al-Quran** 15 Julai 2014 **Hari Raya Aidilfitri** 28 & 29 Julai 2014

** Nota: Kalendar Akademik Semester II 2013/2014 diatas tidak terpakai kepada pelajar Tahun 3 Ijazah Sarjana Muda Kejuruteraan dan pelajar Tahun 2 Ijazah Sarjana Muda Perniagaan (Keusahawanan Kejuruteraan). Kalendar Akademik pelajar Tahun 3 Ijazah Sarjana Muda Kejuruteraan dan pelajar Tahun 2 Ijazah Sarjana Muda Perniagaan (Keusahawanan Kejuruteraan) seperti di muka surat seterusnya.*

Kalendar Akademik Semester II Sidang 2013/2014

Khas Bagi Pelajar Tahun 3 Program Ijazah Sarjana Muda Kejuruteraan
dan Pelajar Tahun 2 Sarjana Muda Perniagaan (Keusahawanan Kejuruteraan)

SEMESTER 2 10 Februari 2014 – 15 Jun 2014 (18 minggu)				
AKTIVITI	**JANGKA MASA**		**TEMPOH**	**CATATAN**
Kuliah	10 Feb 2014	6 April 2014	8 minggu	-
Cuti Pertengahan Semester	7 April 2014	13 April 2014	1 minggu	-
Kuliah	14 April 2014	25 Mei 2014	6 minggu	**Hari Pekerja** 1 Mei 2014 **Hari Keputeraan DYMM Tuanku Raja Perlis** 17 Mei 2014 **Hari Wesak** 25 Mei 2014 **Hari Keputeraan SPB Yang Di-Pertuan Agung** 7 Jun 2014
Minggu Ulangkaji	26 Mei 2014	1 Jun 2014	1 minggu	**Israk Mikraj** 6 Jun 2014
Peperiksaan	2 Jun 2014	15 Jun 2014	2 minggu	-
Latihan Industri	16 Jun 2014	7 September 2014	12 minggu	**Nuzul Al-Quran** 25 Julai 2014 **Hari Raya Aidilfitri** 29 & 30 Julai 2014

Syarat Kemasukan Bagi
Program Pengajian Ijazah Sidang Akademik 2013/2014
Calon Lepasan Matrikulasi

<table>
<tr><th>BIL</th><th>(i) Program Pengajian
(ii) Kod
(iii) Tempoh Pengajian</th><th>Kelayakan Minimum Matrikulasi/Asasi</th></tr>
<tr><td></td><td></td><td>Syarat Am Universiti

Lulus Sijil Pelajaran Malaysia (SPM)/Setaraf dengan mendapat kepujian dalam mata pelajaran Bahasa Melayu / Bahasa Malaysia atau kepujian Bahasa Melayu / Bahasa Malaysia Kertas Julai;

dan

Lulus Matrikulasi KPM/Asasi Sains UM/ Asasi UiTM dengan mendapat sekurang-kurangnya PNGK 2.00;

dan

Mendapat sekurang-kurangnya Tahap 1 (Band 1) dalam Malaysian University English Test (MUET).</td></tr>
<tr><td>1.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mikroelektronik
RK05 (8 Semester)</td><td rowspan="6">Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

Mendapat sekurang-kurangnya Gred C (2.00) pada peringkat Matrikulasi / Asasi dalam mana-mana mata pelajaran berikut:-

(i) Physics / Engineering Physics / Chemistry / Engineering Chemistry;

dan

(ii) Mathematics

Calon yang menggunakan kelayakan mata pelajaran Chemistry / Engineering Chemistry pada peringkat Matrikulasi / Asasi perlu mendapat sekurang-kurangnya kepujian (Gred C) pada peringkat SPM dalam mata pelajaran Physics.

dan

Calon tidak buta warna dan tidak cacat anggota sehingga menyukarkan kerja amali.</td></tr>
<tr><td>2.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mekanikal
RK08 (8 Semester)</td></tr>
<tr><td>3.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Pembuatan
RK13 (8 Semester)</td></tr>
<tr><td>4.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Komputer
RK20 (8 Semester)</td></tr>
<tr><td>5.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Sistem Elektrik
RK23 (8 Semester)</td></tr>
<tr><td>6.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mekatronik
RK24 (8 Semester)</td></tr>
</table>

BIL	**(i) Program Pengajian** **(ii) Kod** **(iii) Tempoh Pengajian**	**Kelayakan Minimum Matrikulasi/Asasi**
7.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektronik Industri **RK45** (8 Semester)	**Memenuhi Syarat Am Universiti** **serta** **Syarat Khas Program** **Syarat Khas Program:** Mendapat sekurang-kurangnya **Gred C (2.00)** pada peringkat Matrikulasi / Asasi dalam mana-mana mata pelajaran berikut:- **(i) Physics / Engineering Physics / Chemistry / Engineering Chemistry;** **dan** **(ii) Mathematics** Calon yang menggunakan kelayakan mata pelajaran Chemistry / Engineering Chemistry pada peringkat Matrikulasi / Asasi perlu mendapat sekurang-kurangnya **kepujian (Gred C)** pada peringkat SPM dalam mata pelajaran **Physics.** **dan** Calon tidak buta warna dan tidak cacat anggota sehingga menyukarkan kerja amali.
8.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Perhubungan **RK53** (8 Semester)	
9.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Metalurgi **RK56** (8 Semester)	
10.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Bangunan **RK82** (8 Semester)	
11.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Rekabentuk Produk **RK84** (8 Semester)	
12.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektronik **RK86** (8 Semester)	
13.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Fotonik **RK89** (8 Semester)	
14.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Rangkaian Komputer **RK93** (8 Semester)	
15.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektrik Sistem Tenaga **RK96** (8 Semester)	

<table>
<tr><th>BIL</th><th>(i) Program Pengajian
(ii) Kod
(iii) Tempoh Pengajian</th><th>Kelayakan Minimum Matrikulasi/Asasi</th></tr>
<tr><td>16.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Alam Sekitar
RK07 (8 Semester)</td><td rowspan="5">Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

Mendapat sekurang-kurangnya Gred C (2.00) pada peringkat Matrikulasi / Asasi dalam mana-mana mata pelajaran berikut:-

(i) Physics / Engineering Physics / Chemistry / Engineering Chemistry/ Biology;

dan

(ii) Mathematics

Calon yang menggunakan kelayakan mata pelajaran Chemistry / Engineering Chemistry / Biology pada peringkat Matrikulasi / Asasi perlu mendapat sekurang-kurangnya kepujian (Gred C) pada peringkat SPM dalam mata pelajaran Physics.

dan

Calon tidak buta warna dan tidak cacat anggota sehingga menyukarkan kerja amali.</td></tr>
<tr><td>17.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Bahan
RK12 (8 Semester)</td></tr>
<tr><td>18.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Bioproses
RK28 (8 Semester)</td></tr>
<tr><td>19.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Polimer
RK32 (8 Semester)</td></tr>
<tr><td>20.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektronik Bioperubatan
RK85 (8 Semester)</td></tr>
<tr><td>21.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Biosistem
RK90 (8 Semester)</td><td>Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

Mendapat sekurang-kurangnya Gred C (2.00) pada peringkat Matrikulasi / Asasi dalam mana-mana mata pelajaran berikut:-

(i) Physics / Engineering Physics / Chemistry / Engineering Chemistry/ Biology;

dan

(ii) Mathematics

Calon yang menggunakan kelayakan mata pelajaran Chemistry / Engineering Chemistry / Biology pada peringkat Matrikulasi / Asasi perlu mendapat sekurang-kurangnya kepujian (Gred C) pada peringkat SPM dalam mata pelajaran Physics.

dan

Calon tidak buta warna dan tidak cacat anggota sehingga menyukarkan kerja amali.</td></tr>
</table>

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi/Asasi
22.	Ijazah Sarjana Muda Perniagaan (Kepujian) Keusahawanan Kejuruteraan **RP52** (6 Semester)	**Memenuhi Syarat Am Universiti serta Syarat Khas Program** **Syarat Khas Program:** **Lulus Sijil Matrikulasi KPM/Asasi Sains UM/Asasi UiTM/setaraf** (dalam aliran sains, aliran teknikal atau aliran perakaunan) **dengan mendapat:** **Sekurang-kurangnya** Gred C (2.00) **dalam** mana-mana satu (1) **daripada mata pelajaran berikut:** Aliran Sains / Aliran Teknikal: **Mathematics / Physics / Engineering Physics / Chemistry / Engineering Chemistry / Biology / Computer Science / Pengajian Kejuruteraan Awam / Pengajian Kejuruteraan Elektrik & Elektronik / Pengajian Kejuruteraan Mekanikal/Computing** **Atau** Aliran Perakaunan: **Mathematics / Ekonomi / Pengurusan Perniagaan / Akaun** Dan Mendapat sekurang-kurangnya **kepujian (Gred C)** di peringkat **Sijil Pelajaran Malaysia (SPM)/setaraf** di dalam mata pelajaran berikut: i) Bahasa Inggeris dan **ii) Salah satu (1)** daripada mata pelajaran berikut: Mathematics / Additional Mathematics / Physics / Chemistry / Biology / Lukisan Kejuruteraan / Teknologi Kejuruteraan / Pengajian Kejuruteraan Awam / Pengajian Kejuruteraan Mekanikal / Pengajian Kejuruteraan Elektrik & Elektronik / Prinsip Perakaunan / Ekonomi Asas / Perdagangan / Pengajian Keusahawanan / Perakaunan Perniagaan **Dan** Calon tidak cacat anggota.

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi/Asasi
23.	Ijazah Sarjana Muda Perniagaan (Kepujian) Perniagaan Antarabangsa **RE09** (6 Semester)	**Memenuhi Syarat Am Universiti serta Syarat Khas Program** **Syarat Khas Program:** **Lulus Sijil Matrikulasi KPM/Asasi Sains UM/Asasi UiTM/setaraf** (dalam aliran sains, aliran teknikal atau aliran perakaunan) **dengan mendapat:** **Sekurang-kurangnya** Gred C (2.00) **dalam** mana-mana satu (1) **daripada mata pelajaran berikut:** Aliran Sains/Aliran Teknikal: **Mathematics / Physics / Engineering Physics / Chemistry / Engineering Chemistry / Biology / Computer Science / Pengajian Kejuruteraan Awam / Pengajian Kejuruteraan Elektrik & Elektronik / Pengajian Kejuruteraan Mekanikal/Computing** **atau** Aliran Perakaunan: **Mathematics / Ekonomi / Pengurusan Perniagaan / Akaun** Dan Mendapat sekurang-kurangnya **kepujian (Gred C)** di peringkat **Sijil Pelajaran Malaysia (SPM)/setaraf** di dalam mata pelajaran: i) Bahasa Inggeris dan ii) Salah satu (1) **daripada mata pelajaran berikut:** Mathematics / Additional Mathematics / Prinsip Perakaunan / Ekonomi Asas / Perdagangan / Pengajian Keusahawanan / Perakaunan Perniagaan **Dan** Calon tidak cacat anggota.

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi/Asasi
24.	Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Bioteknologi Industri) **RY21** (8 Semester)	**Memenuhi Syarat Am Universiti** **serta** **Syarat Khas Program** **Syarat Khas Program:** Mendapat sekurang-kurangnya **Gred C (2.00)** pada peringkat Matrikulasi / Asasi dalam mana-mana mata pelajaran berikut:- **(i) Physics / Engineering Physics / Chemistry / Engineering Chemistry/Biology /Pengajian Kejuruteraan Elektrik dan Elektronik / Pengajian Kejuruteraan Mekanikal / Pengajian Kejuruteraan Awam;** **dan** **(ii) Mathematics** Calon yang menggunakan kelayakan mata **pelajaran Chemistry / Engineering Chemistry / Biology** ***/ Pengajian Kejuruteraan Elektrik dan Elektronik / Pengajian Kejuruteraan Mekanikal / Pengajian Kejuruteraan Awam*** pada peringkat Matrikulasi / Asasi perlu mendapat sekurang-kurangnya **kepujian (Gred C)** pada peringkat SPM dalam mata pelajaran **Physics.** **dan** Calon tidak buta warna dan tidak cacat anggota sehingga menyukarkan kerja amali.
25.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Kuasa Industri) **RY31** (8 Semester)	
26.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Rangkaian Elektronik) **RY43** (8 Semester)	
27.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemesinan) **RY55** (8 Semester)	
28.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Sistem Pertanian) **RY56** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi/Asasi
29.	Ijazah Sarjana Muda Teknologi Kejuruteraan Awam (Kepujian) (Pembinaan) **RY11** (8 Semester)	**Memenuhi Syarat Am Universiti** **serta** **Syarat Khas Program** **Syarat Khas Program:** Mendapat sekurang-kurangnya **Gred C (2.00)** pada peringkat Matrikulasi / Asasi dalam mana-mana mata pelajaran berikut:- **(i) Physics / Engineering Physics / Chemistry / Engineering Chemistry/ Biology/ Pengajian Kejuruteraan Elektrik dan Elektronik / Pengajian Kejuruteraan Mekanikal / Pengajian Kejuruteraan Awam;** **dan** **(ii) Mathematics** Calon yang menggunakan kelayakan mata pelajaran **Chemistry / Engineering Chemistry / Biology / Pengajian Kejuruteraan Elektrik dan Elektronik /Pengajian Kejuruteraan Mekanikal / Pengajian Kejuruteraan Awam** pada peringkat Matrikulasi / Asasi perlu mendapat sekurang-kurangnya **kepujian (Gred C)** pada peringkat SPM dalam mata pelajaran **Physics.** **dan** Calon tidak buta warna dan tidak cacat anggota sehingga menyukarkan kerja amali.
30.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pembangunan Produk) **RY57** (8 Semester)	
31.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemprosesan Bahan) **RY58** (8 Semester)	
32.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Teknologi Robotik dan Automasi) **RY32** (8 Semester)	
33.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Sistem Elektronik) **RY40** (8 Semester)	
34.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Elektronik Bersepadu) **RY44** (8 Semester)	
35.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Telekomunikasi Elektronik) **RY41** (8 Semester)	
36.	Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Proses Kimia Industri) **RY20** (8 Semester)	

Syarat Kemasukan Bagi
Program Pengajian Ijazah Sidang Akademik 2013/2014
Calon Lepasan STPM

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum STPM
		Syarat Am Universiti Lulus Sijil Pelajaran Malaysia (SPM)/Setaraf dengan mendapat kepujian dalam mata pelajaran Bahasa Melayu/Bahasa Malaysia atau kepujian Bahasa Melayu/Bahasa Malaysia Kertas Julai. **dan** Lulus Peperiksaan Sijil Tinggi Persekolahan Malaysia (STPM) dengan mendapat sekurang-kurangnya PNGK 2.00 dan mendapat sekurang-kurangnya: • Gred C (NGMP 2.00) mata pelajaran Pengajian Am; **dan** • Gred C (NGMP 2.00) dalam dua (2) mata pelajaran lain. **dan** Mendapat sekurang-kurangnya Tahap 1 (Band 1) dalam Malaysian University English Test (MUET).

<table>
<tr><th>BIL</th><th>(i) Program Pengajian
(ii) Kod
(iii) Tempoh Pengajian</th><th>Kelayakan Minimum STPM</th></tr>
<tr><td>1.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mikroelektronik
RK05 (8 Semester)</td><td rowspan="8">Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

Mendapat sekurang-kurangnya Gred C (NGMP 2.00) pada peringkat STPM dalam mata pelajaran berikut:

(i) Physics / Chemistry;

dan

(ii) Mathematics T / Further Mathematics T

Calon yang menggunakan kelayakan mata pelajaran Chemistry pada peringkat STPM perlu mendapat sekurang-kurangnya kepujian (Gred C) pada peringkat SPM dalam mata pelajaran Physics.

dan

Calon tidak buta warna dan tidak cacat anggota sehingga menyukarkan kerja amali.</td></tr>
<tr><td>2.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mekanikal
RK08 (8 Semester)</td></tr>
<tr><td>3.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Pembuatan
RK13 (8 Semester)</td></tr>
<tr><td>4.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Komputer
RK20 (8 Semester)</td></tr>
<tr><td>5.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Sistem Elektrik
RK23 (8 Semester)</td></tr>
<tr><td>6.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mekatronik
RK24 (8 Semester)</td></tr>
<tr><td>7.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektronik Industri
RK45 (8 Semester)</td></tr>
<tr><td>8.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Perhubungan
RK53 (8 Semester)</td></tr>
</table>

<table>
<tr><th>BIL</th><th>(i) Program Pengajian
(ii) Kod
(iii) Tempoh Pengajian</th><th>Kelayakan Minimum STPM</th></tr>
<tr><td>9.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Metalurgi
RK56 (8 Semester)</td><td rowspan="7">Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

Mendapat sekurang-kurangnya Gred C (NGMP 2.00) pada peringkat STPM dalam mata pelajaran berikut:

(i) Physics / Chemistry;

dan

(ii) Mathematics T / Further Mathematics T

Calon yang menggunakan kelayakan mata pelajaran Chemistry pada peringkat STPM perlu mendapat sekurang-kurangnya kepujian (Gred C) pada peringkat SPM dalam mata pelajaran Physics.

dan

Calon tidak buta warna dan tidak cacat anggota sehingga menyukarkan kerja amali.</td></tr>
<tr><td>10.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Bangunan
RK82 (8 Semester)</td></tr>
<tr><td>11.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Rekabentuk Produk
RK84 (8 Semester)</td></tr>
<tr><td>12.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektronik
RK86 (8 Semester)</td></tr>
<tr><td>13.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Fotonik
RK89 (8 Semester)</td></tr>
<tr><td>14.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Rangkaian Komputer
RK93 (8 Semester)</td></tr>
<tr><td>15.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektrik Sistem Tenaga
RK96 (8 Semester)</td></tr>
</table>

<table>
<tr><th>BIL</th><th>(i) Program Pengajian
(ii) Kod
(iii) Tempoh Pengajian</th><th>Kelayakan Minimum STPM</th></tr>
<tr><td>16.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Alam Sekitar
RK07 (8 Semester)</td><td rowspan="6">Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

Mendapat sekurang-kurangnya Gred C (NGMP 2.00) pada peringkat STPM dalam mata pelajaran berikut:

(i) Physics/ Chemistry / Biology;

dan

(ii) Mathematics T / Further Mathematics T

Calon yang menggunakan kelayakan mata pelajaran Chemistry / Biology pada peringkat STPM perlu mendapat sekurang-kurangnya kepujian (Gred C) pada peringkat SPM dalam mata pelajaran Physics.

dan

Calon tidak buta warna dan tidak cacat anggota sehingga menyukarkan kerja amali.</td></tr>
<tr><td>17.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Bahan
RK12 (8 Semester)</td></tr>
<tr><td>18.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Bioproses
RK28 (8 Semester)</td></tr>
<tr><td>19.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Polimer
RK32 (8 Semester)</td></tr>
<tr><td>20.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektronik Bioperubatan
RK85 (8 Semester)</td></tr>
<tr><td>21.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Biosistem
RK90 (8 Semester)</td></tr>
</table>

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum STPM
22.	Ijazah Sarjana Muda Perniagaan (Kepujian) Keusahawanan Kejuruteraan **RP52** (6 Semester)	**Memenuhi Syarat Am Universiti** **serta** **KEPERLUAN KHAS PROGRAM** **Syarat Khas Program:** **Lulus Sijil Tinggi Pelajaran Malaysia (STPM)/setaraf dengan mendapat:** **Sekurang-kurangnya Gred C (2.00) dalam mana-mana satu (1) daripada mata pelajaran berikut:** **Aliran Sains:** **Mathematics T/ Further Mathematics T/ Physics/Chemistry/Biology/Computing atau** **Aliran Sastera:** **Mathematics S / Ekonomi / Pengurusan Perniagaan / Perakaunan / Computer Science** **Dan** Mendapat sekurang-kurangnya **kepujian (Gred C)** di peringkat **Sijil Pelajaran Malaysia (SPM)/setaraf** di dalam mata pelajaran berikut: i) Bahasa Inggeris dan ii) **Salah satu (1)** daripada mata pelajaran berikut: Mathematics / Additional Mathematics / Physics / Chemistry / Biology / Lukisan Kejuruteraan / Teknologi Kejuruteraan / Pengajian Kejuruteraan Awam / Pengajian Kejuruteraan Mekanikal / Pengajian Kejuruteraan Elektrik & Elektronik / Prinsip Perakaunan / Ekonomi Asas / Perdagangan / Pengajian Keusahawanan / Perakaunan Perniagaan **Dan** Calon tidak cacat anggota.

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum STPM
23.	Ijazah Sarjana Muda Perniagaan (Kepujian) Perniagaan Antarabangsa **RE09** (6 Semester)	**Memenuhi Syarat Am Universiti** **serta** **Syarat Khas Program** **Syarat Khas Program:** **Lulus Sijil Tinggi Pelajaran Malaysia (STPM)/setaraf dengan mendapat:** **Sekurang-kurangnya Gred C (2.00) dalam mana-mana satu (1) daripada mata pelajaran berikut:** **Aliran Sains:** **Mathematics T/ Further Mathematics T/ Physics/Chemistry/Biology /Computing** **atau** **Aliran Sastera:** **Mathematics S / Ekonomi / Pengurusan Perniagaan / Perakaunan / Computer Science** **Dan** Mendapat sekurang-kurangnya **kepujian (Gred C)** di peringkat **Sijil Pelajaran Malaysia (SPM)/setaraf** di dalam mata pelajaran berikut: i) Bahasa Inggeris dan ii) **Salah satu (1)** daripada mata pelajaran berikut: Mathematics / Additional Mathematics / Prinsip Perakaunan/ Ekonomi Asas/ Perdagangan/Pengajian Keusahawanan/Perakaunan Perniagaan **Dan** Calon tidak cacat anggota.

<table>
<tr><th>BIL</th><th>(i) Program Pengajian
(ii) Kod
(iii) Tempoh Pengajian</th><th>Kelayakan Minimum STPM</th></tr>
<tr><td>24.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Bioteknologi Industri)
RY21 (8 Semester)</td><td rowspan="5">Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

Mendapat sekurang-kurangnya Gred C (NGMP 2.00) pada peringkat STPM dalam mata pelajaran berikut:

(i) Physics/ Chemistry / Biology;

dan

(ii) Mathematics T / Further Mathematics T

Calon yang menggunakan kelayakan mata pelajaran Chemistry / Biology pada peringkat STPM perlu mendapat sekurang-kurangnya kepujian (Gred C) pada peringkat SPM dalam mata pelajaran Physics.

dan

Calon tidak buta warna dan tidak cacat anggota sehingga menyukarkan kerja amali.</td></tr>
<tr><td>25.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Kuasa Industri)
RY31 (8 Semester)</td></tr>
<tr><td>26.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Rangkaian Elektronik)
RY43 (8 Semester)</td></tr>
<tr><td>27.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemesinan)
RY55 (8 Semester)</td></tr>
<tr><td>28.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Sistem Pertanian)
RY56 (8 Semester)</td></tr>
</table>

<table>
<tr><th>BIL</th><th>(i) Program Pengajian
(ii) Kod
(iii) Tempoh Pengajian</th><th>Kelayakan Minimum STPM</th></tr>
<tr><td>29.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Awam (Kepujian) (Pembinaan)
RY11 (8 Semester)</td><td rowspan="8">Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

Mendapat sekurang-kurangnya Gred C (NGMP 2.00) pada peringkat STPM dalam mata pelajaran berikut:

(i) Physics/ Chemistry / Biology;

dan

(ii) Mathematics T / Further Mathematics T

Calon yang menggunakan kelayakan mata pelajaran Chemistry/ Biology pada peringkat STPM perlu mendapat sekurang-kurangnya kepujian (Gred C) pada peringkat SPM dalam mata pelajaran Physics.

dan

Calon tidak buta warna dan tidak cacat anggota sehingga menyukarkan kerja amali.</td></tr>
<tr><td>30.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pembangunan Produk)
RY57 (8 Semester)</td></tr>
<tr><td>31.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemprosesan Bahan)
RY58 (8 Semester)</td></tr>
<tr><td>32.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Teknologi Robotik dan Automasi)
RY32 (8 Semester)</td></tr>
<tr><td>33.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Sistem Elektronik)
RY40 (8 Semester)</td></tr>
<tr><td>34.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Elektronik Bersepadu)
RY44 (8 Semester)</td></tr>
<tr><td>35.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Telekomunikasi Elektronik)
RY41 (8 Semester)</td></tr>
<tr><td>36.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Proses Kimia Industri)
RY20 (8 Semester)</td></tr>
</table>

Syarat Kemasukan Bagi
Program Pengajian Ijazah Sidang Akademik 2013/2014
Calon Lepasan Diploma/Setaraf

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Diploma/Setaraf
		Lulus peperiksaan Sijil Pelajaran Malaysia (SPM) atau peperiksaan yang diiktiraf setaraf dengannya oleh Kerajaan Malaysia serta mendapat **kepujian dalam mata pelajaran Bahasa Melayu** atau **kepujian Bahasa Melayu Kertas Julai**; **dan** Memiliki kelulusan **Diploma** atau kelulusan lain yang diiktiraf setaraf dengannya oleh Kerajaan Malaysia dan diluluskan oleh Senat Universiti; **atau** Lulus peperiksaan **Sijil Tinggi Persekolahan Malaysia (STPM) tahun 2011 atau sebelumnya** dengan mendapat **sekurang-kurangnya PNGK 2.00** dan mendapat; • Gred C (NGMP 2.00) dalam mata pelajaran Pengajian Am; dan • Gred C (NGMP 2.00) dalam dua (2) mata pelajaran lain; **atau** Lulus peperiksaan **Matrikulasi / Asasi tahun 2011 atau sebelumnya** dengan mendapat s**ekurang-kurangnya PNGK 2.00**; **dan** Mendapat sekurang-kurangnya **Tahap 1 (Band 1)** dalam **Malaysian University English Test (MUET)**.

<table>
<tr><th>BIL</th><th>(i) Program Pengajian
(ii) Kod
(iii) Tempoh Pengajian</th><th>Kelayakan Minimum Diploma/Setaraf</th></tr>
<tr><td>1.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mikroelektronik
RK05 (8 Semester)</td><td rowspan="11">Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

<u>Kelayakan Diploma</u>

Memiliki Diploma dari Institusi Pengajian Tinggi Awam (IPTA) atau institusi-institusi lain yang diiktiraf dalam bidang yang sesuai dengan kursus yang dipohon.

Mendapat sekurang-kurangnya PNGK 2.50 di peringkat Diploma.

Nota:
Pengecualian daripada beberapa mata pelajaran yang berkaitan boleh diberi tertakluk kepada keputusan peperiksaan yang diperolehi di peringkat diploma.

(Calon perlu sertakan salinan transkrip akademik dari semester satu hingga semester akhir semasa menghantar permohonan ke UniMAP).

Kelulusan pada peringkat Sijil TIDAK akan dipertimbangkan.

atau

<u>Kelayakan STPM/Matrikulasi/Asasi (Tahun 2011 atau sebelumnya)</u>

Mengikut syarat kemasukan kelayakan STPM/Matrikulasi/ Asasi tahun semasa.</td></tr>
<tr><td>2.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mekanikal
RK08 (8 Semester)</td></tr>
<tr><td>3.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Pembuatan
RK13 (8 Semester)</td></tr>
<tr><td>4.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Komputer
RK20 (8 Semester)</td></tr>
<tr><td>5.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Sistem Elektrik
RK23 (8 Semester)</td></tr>
<tr><td>6.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mekatronik
RK24 (8 Semester)</td></tr>
<tr><td>7.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektronik Industri
RK45 (8 Semester)</td></tr>
<tr><td>8.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Perhubungan
RK53 (8 Semester)</td></tr>
<tr><td>9.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Metalurgi
RK56 (8 Semester)</td></tr>
<tr><td>10.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Bangunan
RK82 (8 Semester)</td></tr>
<tr><td>11.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Rekabentuk Produk
RK84 (8 Semester)</td></tr>
</table>

<table>
<tr><th>BIL</th><th>(i) Program Pengajian
(ii) Kod
(iii) Tempoh Pengajian</th><th>Kelayakan Minimum Diploma/Setaraf</th></tr>
<tr><td>12.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektronik
RK86 (8 Semester)</td><td rowspan="11">Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

<u>Kelayakan Diploma</u>

Memiliki Diploma dari Institusi Pengajian Tinggi Awam (IPTA) atau institusi-institusi lain yang diiktiraf dalam bidang yang sesuai dengan kursus yang dipohon.

Mendapat sekurang-kurangnya PNGK 2.50 di peringkat Diploma.

Nota:
Pengecualian daripada beberapa mata pelajaran yang berkaitan boleh diberi tertakluk kepada keputusan peperiksaan yang diperolehi di peringkat diploma.

(Calon perlu sertakan salinan transkrip akademik dari semester satu hingga semester akhir semasa menghantar permohonan ke UniMAP).

Kelulusan pada peringkat Sijil TIDAK akan dipertimbangkan.

atau

<u>Kelayakan STPM/Matrikulasi/Asasi (Tahun 2011 atau sebelumnya)</u>

Mengikut syarat kemasukan kelayakan STPM/Matrikulasi/ Asasi tahun semasa.</td></tr>
<tr><td>13.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Fotonik
RK89 (8 Semester)</td></tr>
<tr><td>14.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Rangkaian Komputer
RK93 (8 Semester)</td></tr>
<tr><td>15.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektrik Sistem Tenaga
RK96 (8 Semester)</td></tr>
<tr><td>16.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Alam Sekitar
RK07 (8 Semester)</td></tr>
<tr><td>17.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Bahan
RK12 (8 Semester)</td></tr>
<tr><td>18.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Bioproses
RK28 (8 Semester)</td></tr>
<tr><td>19.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Polimer
RK32 (8 Semester)</td></tr>
<tr><td>20.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektronik Bioperubatan
RK85 (8 Semester)</td></tr>
<tr><td>21.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Biosistem
RK90 (8 Semester)</td></tr>
<tr><td>22.</td><td>Ijazah Sarjana Muda Perniagaan (Kepujian) Keusahawanan Kejuruteraan
RP52 (6 Semester)</td></tr>
</table>

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Diploma/Setaraf
23.	Ijazah Sarjana Muda Perniagaan (Kepujian) Perniagaan Antarabangsa **RE09** (6 Semester)	**Memenuhi Syarat Am Universiti serta Syarat Khas Program** **Syarat Khas Program:** **<u>Kelayakan Diploma</u>** Memiliki **Diploma** dari Institusi Pengajian Tinggi Awam (IPTA) atau institusi-institusi lain yang diiktiraf dalam **bidang yang sesuai** dengan kursus yang dipohon. Mendapat sekurang-kurangnya **PNGK 2.50** di peringkat **Diploma**. **Nota:** Pengecualian daripada beberapa mata pelajaran yang berkaitan boleh diberi tertakluk kepada keputusan peperiksaan yang diperolehi di peringkat diploma. (Calon perlu sertakan salinan transkrip akademik dari semester satu hingga semester akhir semasa menghantar permohonan ke UniMAP). Kelulusan pada peringkat Sijil **TIDAK** akan dipertimbangkan. **atau** **<u>Kelayakan STPM/Matrikulasi/Asasi (Tahun 2011 atau sebelumnya)</u>** *Mengikut syarat kemasukan* kelayakan STPM/Matrikulasi/ Asasi tahun semasa.
24.	Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Bioteknologi Industri) **RY21** (8 Semester)	
25.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Kuasa Industri) **RY31** (8 Semester)	
26.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Rangkaian Elektronik) **RY43** (8 Semester)	
27.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemesinan) **RY55** (8 Semester)	
28.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Sistem Pertanian) **RY56** (8 Semester)	
29.	Ijazah Sarjana Muda Teknologi Kejuruteraan Awam (Kepujian) (Pembinaan) **RY11** (8 Semester)	
30.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pembangunan Produk) **RY57** (8 Semester)	
31.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemprosesan Bahan) **RY58** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Diploma/Setaraf
32.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Teknologi Robotik dan Automasi) **RY32** (8 Semester)	**Memenuhi Syarat Am Universiti** **serta** **Syarat Khas Program** **Syarat Khas Program:** **<u>Kelayakan Diploma</u>** Memiliki **Diploma** dari Institusi Pengajian Tinggi Awam (IPTA) atau institusi-institusi lain yang diiktiraf dalam **bidang yang sesuai** dengan kursus yang dipohon. Mendapat sekurang-kurangnya **PNGK 2.50** di peringkat **Diploma**. **Nota:** Pengecualian daripada beberapa mata pelajaran yang berkaitan boleh diberi tertakluk kepada keputusan peperiksaan yang diperolehi di peringkat diploma. (Calon perlu sertakan salinan transkrip akademik dari semester satu hingga semester akhir semasa menghantar permohonan ke UniMAP). Kelulusan pada peringkat Sijil **TIDAK** akan dipertimbangkan. **atau** **<u>Kelayakan STPM/Matrikulasi/Asasi (Tahun 2011 atau sebelumnya)</u>** *Mengikut syarat kemasukan* kelayakan STPM/Matrikulasi/ Asasi tahun semasa.
33.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Sistem Elektronik) **RY40** (8 Semester)	
34.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Elektronik Bersepadu) **RY44** (8 Semester)	
35.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Telekomunikasi Elektronik) **RY41** (8 Semester)	
36.	Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Proses Kimia Industri) **RY20** (8 Semester)	

Sistem Akademik

Kurikulum program pengajian Sarjana Muda Kejuruteraan dan Sarjana Muda Teknologi Kejuruteraan dirangka untuk dilengkapkan dalam tempoh 4 tahun manakala bagi program pengajian Sarjana Muda Perniagaan pula dalam tempoh 3 tahun, dengan setiap Tahun Akademik atau Sidang Akademik dibahagikan kepada Semester I dan Semester II. Setiap semester mengandungi 14 minggu pembelajaran. Peperiksaan akan diadakan pada hujung semester. Kursus-kursus yang ditawarkan dibahagikan mengikut peringkat pengajian iaitu peringkat 100, 200, 300 dan 400 yang bersamaan dengan Tahun 1, 2, 3 dan 4.

Bagi tujuan pengijazahan, pelajar Sarjana Muda Kejuruteraan perlu mengambil kursus-kursus Teras berjumlah 120 unit, pelajar Sarjana Muda Teknologi Kejuruteraan pula perlu mengambil kursus-kursus Teras berjumlah 123 unit manakala bagi pelajar Sarjana Muda Perniagaan pula, perlu mengambil 72 atau 74 unit Kursus Teras (mengikut pengkhususan yang diambil) dan 30 unit Kursus Elektif.

Pelajar juga perlu mengambil kursus Keperluan Universiti sebanyak 17 unit bagi program Sarjana Muda Kejuruteraan, 19 unit bagi program Sarjana Muda Teknologi Kejuruteraan dan 20 unit bagi program Sarjana Muda Perniagaan.

Pelajar juga perlu lulus semua kursus dan mendapat jumlah kredit yang diperlukan mengikut program pengajian masing-masing serta PNGK sekurang-kurangnya 2.00 untuk bergraduat.

Struktur Program

Struktur program Sarjana Muda Kejuruteraan, Sarjana Muda Kejuruteraan Teknologi Kejuruteraan dan Sarjana Muda Perniagaan dikelompokkan seperti yang ditunjukkan dalam Jadual 1 1(a), 1(b), 1(c) dan 1(d). Pelajar dikehendaki untuk mengambil sejumlah 137 unit bagi program Sarjana Muda Kejuruteraan, 142 unit bagi program Sarjana Muda Teknologi Kejuruteraan dan 122 unit atau 124 unit bagi program Sarjana Muda Perniagaan bagi tujuan pengijazahan.

Jadual 1(a): Struktur Program Sarjana Muda Kejuruteraan

SARJANA MUDA KEJURUTERAAN	
KURSUS	**UNIT**
KURSUS TERAS KEJURUTERAAN	**120**
KURSUS KEPERLUAN UNIVERSITI	**17**
a. Keusahawanan Kejuruteraan	2
b. Kemahiran Berfikir	2
c. Bahasa Melayu Universiti	2
d. Bahasa Inggeris Universiti	2
e. Tamadun Islam & Tamadun Asia	2
f. Hubungan Etnik	2
g. Ko-kurikulum	3
h. Kursus Opsyen	2
JUMLAH	**137**

Jadual 1(b): Struktur Program Sarjana Muda Teknologi Kejuruteraan

SARJANA MUDA TEKNOLOGI KEJURUTERAAN	
KURSUS	**UNIT**
KURSUS TERAS TEKNOLOGI KEJURUTERAAN	**123**
KURSUS KEPERLUAN UNIVERSITI	**19**
a. Keusahawanan Kejuruteraan	2
b. Kemahiran Berfikir	2
c. Bahasa Melayu Universiti	2
d. Bahasa Inggeris Universiti	2
e. Tamadun Islam & Tamadun Asia	2
f. Hubungan Etnik	2
g. Kemahiran & Teknologi dalam Komunikasi	2
h. Ko-kurikulum	3
i. Kursus Opsyen	2
JUMLAH	**142**

Jadual 1(c): Struktur Program Sarjana Muda Perniagaan (Keusahawanan Kejuruteraan)

SARJANA MUDA PERNIAGAAN (KEUSAHAWANAN KEJURUTERAAN)	
KURSUS	**UNIT**
KURSUS TERAS PERNIAGAAN	**72**
KURSUS ELEKTIF	**30**
KURSUS KEPERLUAN UNIVERSITI	**20**
a. Keusahawanan Kejuruteraan	2
b. Kemahiran Berfikir	2
c. Bahasa Melayu Universiti	2
d. Bahasa Inggeris Universiti	2
e. Tamadun Islam & Tamadun Asia	2
f. Hubungan Etnik	2
g. Kemahiran & Teknologi dalam Komunikasi	2
h. Komunikasi dalam Perniagaan	3
i. Ko-kurikulum	3
JUMLAH	**122**

Jadual 1(d): Struktur Program Sarjana Muda Perniagaan (Perniagaan Antarabangsa)

SARJANA MUDA PERNIAGAAN (PERNIAGAAN ANTARABANGSA)	
KURSUS	**UNIT**
KURSUS TERAS PERNIAGAAN	**74**
KURSUS ELEKTIF	**30**
KURSUS KEPERLUAN UNIVERSITI	**20**
a. Keusahawanan Kejuruteraan	2
b. Kemahiran Berfikir	2
c. Bahasa Melayu Universiti	2
d. Bahasa Inggeris Universiti	2
e. Tamadun Islam & Tamadun Asia	2
f. Hubungan Etnik	2
g. Kemahiran & Teknologi dalam Komunikasi	2
h. Komunikasi dalam Perniagaan	3
i. Ko-kurikulum	3
JUMLAH	**124**

Jenis-Jenis Kursus

1. **Kursus Keperluan Universiti**
Kursus Keperluan Universiti ialah kursus-kursus dar luar pengkhususan pelajar. Kursus-kursus ini ditawarkan oleh Pusat Teknologi Komunikasi dan Pembangunan Insan (PTKPI), Pusat Bahasa Antarabangsa dan Pusat Kokurikulum. Semua kursus ini wajib diambil dan lulus dengan gred C sebagai syarat utama untuk pengijazahan. Kursus-kursus tersebut ialah:

   a. **Keusahawanan Kejuruteraan (2 unit)**
   Semua pelajar wajib mengambil 2 unit kursus Keusahawanan Kejuruteraan. Pelajar digalakkan mengambil kursus-kursus lain di dalam kategori ‘keusahawanan’, di mana unit yang dikumpul boleh dikira sebagai Kursus Opsyen.

   b. **Hubungan Etnik (2 unit)**
   Semua pelajar wajib mengambil kursus Hubungan Etnik.

   c. **Tamadun Islam & Tamadun Asia (2 unit)**
   Semua pelajar wajib mengambil kursus Tamadun Islam & Tamadun Asia.

   d. **Bahasa Melayu Universiti (2 unit)**
   Semua pelajar wajib mengambil kursus Bahasa Melayu Universiti dan dikira sebagai sebahagian keperluan pengijazahan.

   e. **Bahasa Inggeris Universiti (2 unit)**
   Semua pelajar wajib mengambil kursus Bahasa Inggeris Universiti dan merupakan salah satu syarat kemasukan. Pelajar yang memperolehi band 1, 2 dan 3 dalam MUET dikehendaki mengambil Bahasa Inggeris Asas dan lulus gred C sebelum dibenarkan mengambil Bahasa Inggeris Universiti. Dua unit tambahan kursus Bahasa Inggeris Asas ini boleh dikira sebagai Kursus Opsyen. Bagi pelajar yang memperolehi band 4 dan 5 dalam MUET boleh mengambil dua unit tambahan kursus Bahasa Inggeris Asas ini dan dikira sebagai Kursus Opsyen.

f. **Kemahiran Berfikir (2 unit)**
Semua pelajar wajib mengambil kursus Kemahiran Berfikir.

g. **Kemahiran dan Teknologi Dalam Komunikasi (2 unit)**
Semua pelajar Sarjana Muda Teknologi Kejuruteraan dan Sarjana Muda Perniagaan wajib mengambil kursus Kemahiran dan Teknologi Dalam Komunikasi.

h. **Komunikasi Dalam Perniagaan (3 unit)**
Kursus Komunikasi Dalam Perniagaan diwajibkan kepada semua pelajar program Sarjana Muda Perniagaan.

i. **Program Ko-Kurikulum**
Semua pelajar diwajibkan mengumpul 3 unit ko-kurikulum sepanjang pengajiannya di UniMAP. Dua (2) unit Badan Beruniform perlu diambil oleh pelajar secara berpakej iaitu iaitu 1 unit pada Semester I dan 1 unit lagi pada Semester II (dalam Tahun Pertama pengajian). Bagi kursus bukan Badan Beruniform sebanyak 1 unit, boleh diambil pada mana-mana semester.

2. **Kursus Teras (Sarjana Muda Kejuruteraan)**
Kursus Teras terdiri daripada kursus-kursus kejuruteraan yang wajib diambil oleh semua pelajar menurut bidang pengkhususan Kejuruteraan masing-masing. Kursus-kursus ini menjadi sebahagian keperluan untuk pengijazahan. Pelajar yang gagal mana-mana Kursus Teras Kejuruteraan mesti mengulanginya sebelum layak dipertimbangkan untuk pengijazahan.

3. **Kursus Teras (Sarjana Muda Teknologi Kejuruteraan)**
Kursus Teras terdiri daripada kursus-kursus kejuruteraan yang wajib diambil oleh semua pelajar menurut bidang pengkhususan Teknologi Kejuruteraan masing-masing. Kursus-kursus ini menjadi sebahagian keperluan untuk pengijazahan. Pelajar yang gagal mana-mana Kursus Teras Teknologi Kejuruteraan mesti mengulanginya sebelum layak dipertimbangkan untuk pengijazahan.

4. **Kursus Teras (Sarjana Muda Perniagaan)**
Kursus Teras bagi Program Sarjana Muda Perniagaan UniMAP dibahagikan kepada dua kumpulan iaitu (i) Kursus Teras Perniagaan dan (ii) Kursus Teras Program.

Kursus Teras Perniagaan terdiri daripada kursus-kursus kontemporari dalam bidang perniagaan yang wajib diambil oleh semua pelajar program Sarjana Muda Perniagaan di UniMAP manakala Kursus Teras Program ditawarkan mengikut pengkhususan yang dipilih oleh pelajar.

Kursus-kursus Teras ini menjadi sebahagian keperluan untuk pengijazahan. Pelajar yang gagal mana-mana Kursus Teras mesti mengulanginya sebelum layak dipertimbangkan untuk pengijazahan.

5. **Kursus Elektif (Sarjana Muda Perniagaan)**
Pelajar boleh memilih kursus Elektif berdasarkan minat mereka dalam bidang-bidang tertentu.

6. **Kursus Opsyen**
Kursus Opsyen merupakan mana-mana kursus yang ditawarkan oleh Pusat Teknologi Komunikasi dan Pembangunan Insan (PTKPI) untuk Program Sarjana Muda Kejuruteraan dan Sarjana Muda Teknologi Kejuruteraan. Sebanyak 2 unit Kursus Opsyen perlu diambil oleh pelajar program Sarjana Muda Kejuruteraan dan Sarjana Muda Teknologi Kejuruteraan sepanjang pengajiannya di UniMAP.

Sistem Unit

Setiap kursus diberikan nilai yang dikenali sebagai UNIT kecuali mana-mana kursus-kursus yang diluluskan oleh Senat Universiti. Unit yang diberikan berdasarkan skop kursus dan kedalaman kursus berkenaan. Kecuali dalam kes-kes tertentu, nilai unit bagi kursus yang mempunyai unit adalah seperti Jadual 2:

Jadual 2 : Penilaian Unit bagi setiap minggu untuk Semester 14 Minggu

Bentuk Pertemuan	Nilai Unit	Jumlah Pertemuan Setiap Minggu
Kuliah	1	1 jam
Makmal/Tutorial	1	2 jam
Projek Tahun Akhir	1	3 jam
Pembelajaran berbantu melibatkan mod penyampaian lain seperti Problem-based Learning (PBL), pembelajaran-e (e-learning modules), lawatan kerja dll.	1	3 jam
Latihan Industri	1*	Bergantung kepada program pengajian

**Nota: Nilai satu (1) unit bagi Latihan Industri adalah setara dengan dua (2) minggu latihan*

Pendekatan Pengajaran dan Pembelajaran di UniMAP

Kebanyakan Kursus Teras yang ditawarkan merangkumi komponen teori dan komponen praktikal dengan nilaian jam pertemuan seperti berikut:

1. **Komponen Teori**
   Satu (1) unit komponen Teori adalah bersamaan dengan 1 jam kuliah/tutorial/bacaan seminggu atau 14 jam dalam satu semester.

2. **Komponen Praktikal**
   Satu (1) unit komponen Praktikal adalah bersamaan 2 jam pertemuan dalam seminggu atau 28 jam pertemuan dalam 1 semester.

Bagi kebanyakan Kursus Teras, pelajar perlu menjalani projek mini dan menduduki peperiksaan atau viva pada penghujung semester.

Komponen praktikal terdiri daripada bentuk-bentuk pengajaran dan pembelajaran berikut:

1. **Pembelajaran di dalam makmal -** 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.

2. **Pembelajaran menggunakan Teaching Factory –** sepasukan pelajar yang terdiri dari 5-6 orang menjalankan sesebuah larian proses (process run) dengan menggunakan peralatan skala sebenar yang digunakan di industri.

3. **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.

4. **Pendedahan kepada industri –** pelajar menjalankan lawatan ke industri selama tempoh masa tertentu sepanjang pengajiannya di UniMAP. Ini termasuklah program IndEx (Pendedahan kepada Industri), InTra (Latihan Industri), Keusahawanan Industri, dan lain-lain lagi.

Latihan Industri (InTra)

Latihan Industri merupakan kursus 4 unit bagi pelajar Sarjana Muda Kejuruteraan, 12 unit bagi pelajar Sarjana Muda Teknologi Kejuruteraan dan 6 unit bagi pelajar Sarjana Muda Perniagaan.

Pelajar Sarjana Muda Kejuruteraan Tahun 3 dikehendaki untuk menjalani 12 minggu Latihan Industri untuk mendapatkan 4 kredit manakala pelajar Sarjana Muda Teknologi Kejuruteraan Tahun 4 pula dikehendaki untuk menjalani 12 minggu Latihan Industri untuk mendapatkan 12 kredit.

Pelajar program Sarjana Muda Perniagaan (Perniagaan Antarabangsa) pula akan mengikuti Latihan Industri pada semester ke-2 dan ke-4, mengikut Pilihan Pertama iaitu (2+2) atau Pilihan Kedua (3+1). Bagi Pilihan Pertama, iaitu Pilihan 2+2, pelajar akan mengikuti 2 fasa (2 bulan + 2 bulan) Latihan Industri di syarikat-syarikat multinasional di Malaysia dan bagi Pilihan Kedua, iaitu Pilihan 3 +1, pelajar akan menjalani latihan industri di syarikat multinasional di Malaysia dan lawatan sambil belajar di luar negara (International Business Field Trips).

Bagi pelajar program Sarjana Muda Perniagaan (Keusahawanan Kejuruteraan), mereka akan mengambil bahagian dalam Program Perniagaan Inkubator selama 12 minggu. Mereka akan mendapat 6 jam kredit selepas semester ke-4.

Purata pertemuan selama 8 jam sehari selama 5 hari dalam seminggu, di mana 8 jam sehari X 5 hari = 40 jam seminggu, dianggap sebagai jam penilaian (waktu bekerja yang ditetapkan oleh organisasi/ syarikat)

Tujuan utama Latihan Industri ialah:-

- Menyemai sikap profesional di kalangan pelajar.
- Menyedarkan pelajar tentang kepentingan dan kaitan yang kuat antara latihan industri, makmal/amali dan teori kejuruteraan.
- Memberi pendedahan awal kepada pelajar tentang persekitaran dan keadaan di industri serta amalannya. Para pelajar berpeluang melengkapkan diri sebagai bekalan untuk menghadapi pengalaman akan datang, baik di dalam pengajian akademik mahupun latihan-latihan seterusnya.

Pusat Kerjasama Industri akan menyelaraskan bersama pusat-pusat lain kursus-kursus yang melibatkan industri seperti di bawah:

1. Pendedahan Industri (IndEx)
   a. Skim singkat 1 hari
   b. Pakar-pakar, pengurus dan jurutera-jurutera dari industri dijemput untuk mengadakan taklimat, demonstrasi dan dialog mengikut jadual yang disediakan
   c. Melibatkan lawatan ke industri
   d. Pendedahan ini adalah bagi pelajar-pelajar yang telah menyempurnakan pengajian Tahun 1

2. Pendedahan Keusahawanan Industri (IndEnt)
   a. Program singkat 1 hari
   b. Penyertaan sektor Industri Kecil, firma R&D dan badan-badan kerajaan seperti Kementerian Pembangunan Usahawan dan Koperasi.
   c. Berbentuk taklimat, dialog, dan demonstrasi
   d. Melibatkan pelajar-pelajar Tahun 2

Program Inkubator Perniagaan

Pendekatan Pengajaran dan Pembelajaran untuk program Sarjana Muda (Keusahawanan Kejuruteraan) bukan sahaja meliputi kuliah dan tutorial tetapi juga Latihan Praktikal melalui Program Inkubator Perniagaan. Selepas semester ke-4, pelajar akan mengambil bahagian dalam Program Perniagaan Inkubator selama dua belas (12) minggu. Mereka akan mendapat 6 jam kredit.

Pelajar dibimbing oleh syarikat-syarikat dalam inkubator perniagaan. Ini akan memberi mereka peluang untuk menjadi sebahagian daripada pasukan yang terlibat dalam pembangunan produk yang mungkin membawa kepada pengkomersialan. Mereka dapat mengetahui bagaimana idea dan inovasi boleh membawa kepada penghasilan produk untuk pengguna. Di samping itu, mereka juga akan melihat sendiri aliran proses perniagaan.

Pada akhir Program Inkubator Perniagaan, pelajar dikehendaki menyediakan satu laporan mengenai pengalaman mereka sepanjang Program Inkubator Perniagaan yang telah mereka jalani dalam syarikat-syarikat terpilih.

Inkubator perniagaan Malaysia telah membentuk satu kumpulan yang rapat di bawah National Incubator Network Association (NINA) dan bergabung dengan Association of Asean Business Incubation (AABI). Antara ahli-ahli pertubuhan ini termasuklah Technology Park Malaysia, Perbadanan Pembangunan Teknologi Malaysia, SIRIM dan Kulim Technology Park Corporation. UniMAP bekerjasama rapat dengan pertubuhan-pertubuhan ini untuk menjamin kejayaan program tersebut.

Program International Business Field Trips

Pada semester ke-2 dan ke-4, pelajar Sarjana Muda (Perniagaan Antarabangsa) pula akan mengikuti Latihan Industri mengikut Pilihan Pertama (2+2) atau Pilihan Kedua (3+1). Bagi Pilihan Pertama, iaitu Pilihan 2+2, pelajar akan mengikuti 2 fasa (2 bulan + 2 bulan) Latihan Industri di syarikat-syarikat multinasional di Malaysia dan penyelarasannya dilaksanakan dengan kerjasama Pusat Kerjasama Industri UniMAP.

Bagi Pilihan Kedua pula iaitu Pilihan 3+1, pelajar akan menjalani latihan industri di syarikat multinasional di Malaysia dan lawatan sambil belajar di luar negara (International Business Field Trips). Untuk pilihan kedua ini (3+1), 2 bulan dalam Fasa 1 merupakan latihan di industri di syarikat multinasional di Malaysia. Dalam Fasa 2, sebulan yang pertama melibatkan Latihan Industri di syarikat multinasional di dalam negara dan baki sebulan lagi akan digunakan untuk membuat lawatan sambil belajar di luar negara (International Business Field Trips).

Pelajar diberi kebebasan untuk memilih mana-mana dua pilihan yang diberikan untuk Latihan Industri mereka mengikut minat dan kemampuan kewangan mereka.

Kod Kursus

Setiap kursus yang ditawarkan mempunyai kod yang tersendiri. Untuk pengajian program Kejuruteraan, Perniagaan dan Teknologi Kejuruteraan, Kod bagi sesebuah kursus diringkaskan dalam Jadual 3(a), 3(b) dan 3(c) di bawah:

Jadual 3(a): Abjad Pertama-Peringkat Pengajian/ jenis program yang ditawarkan di peringkat Sarjana Muda.

Abjad Pertama di dalam Kod	Jenis Program
E	Sarjana Muda Kejuruteraan
B	Sarjana Muda Perniagaan
P	Sarjana Muda Teknologi Kejuruteraan
U	Kursus Umum (Subjek ini boleh digunapakai oleh semua program pengajian)

Jadual 3(b): Abjad Kedua-Pusat Pengajian yang Menawarkan Kursus.

Abjad Kedua di dalam Kod	Pusat Pengajian
E	Pusat Pengajian Kejuruteraan Sistem Elektrik
M	Pusat Pengajian Kejuruteraan Mikroelektronik
K	Pusat Pengajian Kejuruteraan Komputer & Perhubungan
N	Pusat Pengajian Kejuruteraan Mekatronik
B	Pusat Pengajian Kejuruteraan Bahan
P	Pusat Pengajian Kejuruteraan Pembuatan
R	Pusat Pengajian Kejuruteraan Bioproses
A	Pusat Pengajian Kejuruteraan Alam Sekitar
D	Pusat Pengajian Teknologi Kejuruteraan Mekanikal
G	Pusat Pengajian Teknologi Kejuruteraan Elektronik
L	Pusat Pengajian Teknologi Kejuruteraan Elektrik
S	Pusat Pengajian Teknologi Kejuruteraan Awam
T	Pusat Pengajian Teknologi Kejuruteraan Kimia
C	Pusat Kejuruteraan
Q	Institut Matematik Kejuruteraan
I	Pusat Kerjasama Industri

F	Pusat Pengajian Inovasi Perniagaan & Teknousahawan
U	Pusat Teknologi Komunikasi & Pembangunan Insan (PTKPI)
Z	Pusat Ko-kurikulum

Jadual 3(c): Abjad Ketiga-Kursus Teras atau Kursus Keperluan Universiti;

Abjad Ketiga di dalam Kod	Jenis Kursus
T	Kursus Teras/Elektif
W	Kursus Keperluan Universiti

Tiga angka terakhir bagi sesebuah kod kursus mewakili perkara-perkara berikut iaitu angka pertama adalah tahap kursus (1 = subjek tahun 1, 2 = subjek tahun 2, dsb); angka kedua dan ketiga adalah nombor kursus.

Kod bagi sesebuah kursus diringkaskan dalam Jadual 4 di bawah:

Jadual 4: Kod Kursus

A	B	C	1	2	3	4	ANGKA	DESKRIPSI
↓	↓	↓	↓	↓	↓	↓		
↓	↓	↓	↓	↓	↓	→	4	Unit/Kredit
↓	↓	↓	↓	↓	∟	→	3	Kelompok Kursus. (Penentuan kelompok kursus ditentukan oleh Pusat Pengajian masing-masing)
↓	↓	↓	↓	∟	→	→	2	
|	|	|	∟	→	→	→	1	Aras/ Tahap Kursus program SarjanaMuda: • 1=subjek tahun 1, • 2= subjek tahun 2, • 3= subjek tahun 3, • 4= subjek tahun 4,
↓	↓	∟	→	→	→	→	**JENIS KURSUS**	Sila rujuk **Jadual 3(c)**
↓	∟	→	→	→	→	→	**PUSAT PENGAJIAN**	Sila rujuk **Jadual 3(b)**
∟	→	→	→	→	→	→	**PERINGKAT PENGAJIAN**	Sila rujuk **Jadual 3(a)**

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. 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, menggugur 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-09 [Borang Permohonan Kursus Lewat] dan mesti mempunyai kelulusan daripada Dekan.

Manakala pelajar yang baru mendaftar bagi satu – satu sidang akademik baru akan mendaftar secara online pada tarikh yang dinyatakan pada minggu suaikenal mengikut Pusat Pengajian masing-masing. Pelajar akan diberi taklimat tentang kursus dalam minggu suaikenal tersebut di Pusat Pengajian masing - masing.

Adalah menjadi tanggungjawab pelajar untuk menyemak dan memastikan bahawa semua butir-butir yang dinyatakan dalam Slip Pendaftaran Kursus adalah betul. Sebarang permohonan pendaftaran kursus / tambah kursus / gugur kursus / tarik diri kursus di luar tempoh yang ditetapkan tanpa sebab-sebab yang boleh diterima oleh Universiti boleh dikenakan denda. Hanya pelajar yang mempunyai alasan yang tertentu sahaja akan dipertimbangkan oleh Dekan Pusat

Pengajian. Pelajar tidak dibenarkan membuat pendaftaran kursus / tambah kursus / gugur kursus/ tarik diri kursus semasa minggu peperiksaan.

Pelajar yang tidak mendaftar kursus maksimum dua (2) semester berturut – turut tanpa sebarang alasan boleh ditamatkan pengajian dengan menggunakan Borang HEA 20 (Borang Penamatan Pengajian Pelajar.

Bagi pelajar yang telah ditamatkan pengajian dan merayu untuk menyambung semula pengajian perlu menulis surat rayuan permohonan kemasukan kepada Naib Canselor melalui Dekan Pusat Pengajian (perakuan Dekan diperlukan). Penalti RM100 akan dikenakan kepada pelajar bagi setiap rayuan kemasukan semula yang diluluskan.

Pendaftaran Kursus

1. **Pendaftaran Kursus Pelajar Berstatus Aktif**
   Pelajar berstatus Aktif boleh mendaftar kursus secara online tidak melebihi dua puluh dua (22) unit dan tidak kurang daripada sepuluh (10) unit kecuali pelajar yang mengikuti Latihan Industri dan pelajar semester akhir yang akan menamatkan pengajian. Pelajar yang ingin mendaftar melebihi 22 unit perlu mendapatkan kebenaran daripada Rakan Pendamping Siswa (RPS) dengan kelulusan daripada Dekan. Pelajar juga perlu mengisi Borang HEA-09a (Borang Pendaftaran Kursus). Keterangan mengenai pendaftaran kursus pelajar berstatus aktif di ringkaskan seperti Jadual 5 di bawah:

Jadual 5: Ringkasan Pendaftaran Kursus Pelajar Berstatus Aktif

Status Pelajar	Minimum	Maksimum
Pelajar Aktif	10	22
Pelajar Aktif yang mengambil kursus Latihan Indutri (LI) atau Projek Tahun Akhir	10	28

**** Pelajar yang tidak mengambil kursus LI atau FYP (Projek Tahun Akhir) boleh mengambil kursus melebihi 22 unit tetapi perlu mendapatkan kelulusan Dekan Pusat Pengajian terlebih dahulu.*

2. **Pendaftaran Kursus Pelajar Percubaan [P]**
   Pelajar dengan status Percubaan tidak dibenarkan untuk mendaftar sendiri secara dalam talian (online). Pelajar ini perlu bertemu dengan RPS mereka untuk mendapatkan pengesahan daripada Dekan dan perlu juga mengisi borang HEA-09b [Borang Pendaftaran Kursus-Percubaan (P)] sebelum menyerahkannya kepada Penolong Pendaftar Pusat Pengajian untuk didaftarkan. Hanya Penolong Pendaftar Pusat Pengajian/ Jabatan Pendaftar sahaja yang boleh mendaftarkan kursus. Jumlah unit yang dibenarkan untuk Pelajar Percubaan adalah seperti berikut:

Jadual 6: Ringkasan Pendaftaran Kursus Pelajar Percubaan

Status Pelajar	Minimum	Maksimum
Percubaan (P1)	10	12
Percubaan (P2)	8	10

Penambahan / Pengguguran / Tarik Diri Kursus

1. **Tambah Kursus**
   a. Tempoh masa yang dibenarkan untuk penambahan kursus ialah sehingga minggu ke-3 (minggu pembelajaran).
   b. Pelajar perlu mengisi borang HEA-11 [Borang Tambah Kursus] sebelum menyerahkannya kepada Penolong Pendaftar Pusat Pengajian untuk dikemaskini dalam sistem.

2. **Gugur Kursus**
   a. Tempoh masa yang dibenarkan untuk menggugurkan kursus ialah sehingga minggu ke-7 (minggu pembelajaran).
   b. Pelajar perlu menggunakan orang HEA-10 [Borang Gugur Kursus]. Borang perlu ditandatangani oleh Pensyarah kursus, Dekan Pusat Pengajian dan menyerahkannya kepada Penolong Pendaftar Pusat Pengajian untuk dikemaskini dalam sistem.

3. Tarik Diri Kursus (TD)

a. Pelajar dengan persetujuan Pensyarah Kursus dan Dekan Pusat Pengajian boleh memohon untuk menarik diri dari kursus yang telah didaftarkan pada semester yang berkenaan tidak lewat dari hari akhir bekerja pada minggu ke-13 (minggu pembelajaran).

b. Kebenaran untuk pelajar menarik diri dari mengikuti sesuatu kursus adalah tertakluk kepada jumlah unit minimum kecuali dengan kebenaran Dekan.

c. Status Tarik Diri (TD) akan dicatatkan dalam rekod pendaftaran kursus dan transkrip akademik pelajar. Walau bagaimanapun, gred tidak akan dimasukkan dalam pengiraan PNG dan PNGK.

Kursus Pra-Syarat Syarat

Pra-syarat merupakan kursus yang wajib diambil dan lulus oleh pelajar sebelum mendaftar kursus yang berikutnya. Kursus berikutnya itu dikenakan pra-syarat ke atasnya seperti yang telah ditentukan dalam struktur akademik program Ijazah Sarjana Muda. Untuk mendaftar kursus berikutnya yang mempunyai pra-syarat, pelajar perlu lulus pra-syarat tersebut. Pelajar yang gagal pra-syarat dan ingin mengambil pra-syarat seiring (pada semester yang sama) dengan kursus berikutnya hendaklah memohon dan mendapatkan kelulusan Dekan Pusat Pengajian.

Pertukaran Program Pengajian

Pertukaran program pengajian bermaksud pelajar menukar program pengajiannya kepada sesuatu program pengajian yang lain atas sebab-sebab tertentu yang dipersetujui oleh kedua-dua Dekan sekarang dan Dekan Pusat Pengajian yang dipohon.

Pertukaran program pengajian tidak digalakkan kerana ia melibatkan penukaran agihan sumber yang sudah dirancang dengan rapi pada awal sesuatu sidang akademik. Walau bagaimanapun, permohonan rayuan pertukaran program pengajian boleh dipertimbangkan dengan alasan-alasan yang kukuh sahaja dan tertakluk kepada syarat-syarat seperti berikut:

1. Permohonan hanya boleh dibuat oleh pelajar setelah tamat sekurang-kurangnya satu semester pengajian dengan mengisi Borang Permohonan Pertukaran Program Pengajian (HEA-12) dengan lengkap. Borang permohonan boleh didapati di Jabatan Pendaftar atau di Pusat Pengajian. Walau bagaimanapun, bagi kes-kes tertentu permohonan pelajar untuk pertukaran program pengajian pada permulaan pengajian boleh dipertimbangkan dengan kelulusan Naib Canselor/ Timbalan Naib Canselor (Akademik & Antarabangsa).

2. Permohonan perlu dikemukakan dalam masa dua minggu pertama semester bermula. Borang permohonan mestilah disertakan dengan salinan keputusan peperiksaan semester yang lepas atau keputusan di peringkat Matrikulasi/STPM/Diploma.

3. Pelajar hanya boleh memohon bertukar program pengajian tidak melewati 2 Semester Pertama pengajian di UniMAP. Permohonan setelah masuk semester ketiga pengajian tidak akan dipertimbangkan.

4. Setiap permohonan perlu menyertakan sebab-sebab yang kukuh secara bertulis untuk bertukar program pengajian. Permohonan perlu mendapat perakuan dan kelulusan Rakan Pendamping Siswa (RPS) (program asal dan program dipohon), Dekan Pusat Pengajian (program asal dan program dipohon), Dekan Pengurusan Akademik dan Naib Canselor/Timbalan Naib Canselor (Akademik & Antarabangsa).

5. Bagi pelajar yang mendapat biasiswa/PTPTN atau sebagainya, pelajar mestilah mendapat kelulusan dari penaja masing-masing. Pelajar perlu berurusan secara terus dengan pihak penaja atau memohon penerangan daripada Jabatan Hal Ehwal Pelajar dan Alumni.

6. Sekiranya permohonan diluluskan, pelajar perlu mengambil tindakan untuk mendaftar kursus-kursus baru yang ditawarkan oleh program pengajian baru tersebut.

7. Pelajar yang bertukar program pengajian dalam bidang yang sama boleh memohon pemindahan kredit bagi kursus teras dan kursus wajib universiti atau kursus yang sama dalam kurikulum program pengajian baru. Walau bagaimanapun, semua kursus lain yang tidak berkaitan dengan kurikulum program pengajian baru akan kekal dalam transkrip akademik tetapi pengiraan PNG/PNGK dan kredit tidak akan diambil kira.

8. Pelajar yang bertukar program pengajian dalam bidang yang berlainan hanya boleh memohon pemindahan kredit bagi kursus wajib universiti sahaja atau kursus yang sama dalam kurikulum program pengajian baru. Walau bagaimanapun, semua kursus lain yang tidak berkaitan dengan kurikulum program pengajian baru akan kekal dalam transkrip akademik tetapi pengiraan PNG/PNGK dan kredit tidak akan diambil kira.

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 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 Penangguhan Pengajian (HEA/HEP-13) yang boleh didapati di Jabatan Pendaftar atau di Pusat Pengajian. Permohonan perlu mendapat perakuan dan kelulusan yang berikut:

1. Perakuan Rakan Pendamping Siswa (RPS),
2. Perakuan Dekan Pusat Pengajian,
3. Perakuan Dekan Jabatan Hal Ehwal Pelajar & Alumni,
4. Perakuan Kaunselor (jika perlu)
5. Perakuan Dekan Pengurusan Akademik, dan
6. Kelulusan Naib Canselor atau Timbalan Naib Canselor (Akademik & Antarabangsa)

Borang pemohonan penangguhan pengajian pelajar perlu dikemukakan sebelum minggu ketujuh (7) pengajian. Pemohonan selepas minggu ketujuh hanya dibenarkan atas sebab kesihatan atau kes-kes tertentu yang mendapat kelulusan Naib Canselor/Timbalan Naib Canselor (Akademik & Antarabangsa).
Pelajar tidak dibenarkan menangguhkan pengajian melebihi dua (2) semester berturut-turut kecuali dengan kelulusan Naib Canselor/Timbalan 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.

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 di peringkat Majlis Peperiksaan Universiti (MPU), keputusan peperiksaan tersebut juga akan terbatal.

Pelajar yang menangguhkan pengajian atas sebab selain daripada sebab kesihatan, semester berkenaan akan diambil kira dalam pengiraan semester yang digunakan untuk pengijazahan (DENGAN PENALTI) kecuali dengan kebenaran Naib Canselor/Timbalan Naib Canselor (Akademik & Antarabangsa). Bagi kes Dengan Penalti, kursus yang didaftarkan pada semester tersebut tidak akan digugurkan dan akan diambil kira dalam semester. Sebarang keputusan peperiksaan yang telah disahkan pada peringkat MPU juga tidak terbatal dan akan tertera dalam transkrip akademik pelajar.

Pelajar akan diberikan amaran secara bertulis oleh Pusat Pengajian sekiranya didapati tidak mendaftar pada sesuatu semester tanpa memberi sebarang permohonan penangguhan pengajian. Pelajar yang tidak memberi sebarang maklum balas dalam sesuatu tempoh yang diberikan boleh dikeluarkan dari senarai nama pelajar berdaftar Universiti/ditamatkan dan disahkan berhenti dari Universiti.

Pentarafan Pelajar

Taraf akademik pelajar juga diukur dengan sistem Purata Nilai Gred (PNG) sepanjang pengajian di universiti. Seseorang pelajar yang berjaya mendapat sekurang-kurangnya 2.00 bagi Purata Nilai Gred (PNG) pada satu-satu semester diberi taraf 'Aktif' (A) dan boleh meneruskan pengajian dalam semester yang berikutnya. Pelajar juga dikehendaki mendapatkan Purata Nilai Gred Kumulatif (PNGK) sekurang-kurangnya 2.00 untuk berijazah.

Bagi pelajar yang dibenarkan mengambil Kursus Kuratif (iaitu kursus yang ditawarkan semasa cuti panjang), keputusan peperiksaan Kursus-Kursus Kuratif akan dicantumkan dengan keputusan peperiksaan Semester II untuk menentukan markah Purata Nilai Gred (PNG) dan taraf akademik pelajar. Jika purata gabungan adalah lebih baik, maka pelajar akan diberi taraf terbarunya tetapi jika purata gabungan adalah kurang baik, maka taraf Semester II dikekalkan.

Pelajar dengan PNG kurang dari 2.00 pada satu-satu semester akan diberi taraf PERCUBAAN 1 (P1). Taraf PERCUBAAN II (P2) pula diberikan kepada pelajar yang mendapat purata kurang dari 2.00 bagi dua semester berturut-turut. Jika pelajar masih mendapat kurang dari 2.00 bagi PNG pada semester berikutnya, pelajar berkenaan tidak akan dibenarkan meneruskan pengajian, melainkan sekiranya PNGK pelajar melebihi 2.00, dan pihak Universiti memperakukannya. Pihak Universiti berkuasa menamatkan pengajian mana-mana pelajar yang didapati tidak memenuhi prestasi dan kemajuan akademik yang ditetapkan.

Tempoh Minimum / Maksimum Pengajian Pelajar

Pelajar Sarjana Muda Kejuruteraan dan Sarjana Muda Teknologi Kejuruteraan perlu menamatkan program pengajian dalam tempoh masa yang telah ditetapkan, iaitu minimum 8 semester (4 tahun) dan tempoh maksimum 14 semester (7 tahun) . Walau bagaimanapun, bagi pelajar yang memperolehi pengecualian kredit, tempoh maksimum yang dibenarkan adalah tidak boleh kurang daripada 6 semester (3 tahun) dan tidak lebih daripada 12 semester (6 tahun).

Manakala pelajar Sarjana Muda Perniagaan pula, perlu menamatkan program pengajian dalam tempoh masa minimum 6 semester (3 tahun) dan tempoh maksimum 10 semester (5 tahun). Walau bagaimanapun, bagi pelajar yang memperolehi pengecualian kredit, tempoh maksimum yang dibenarkan tertakluk kepada pengecualian kredit yang diberikan oleh pihak Universiti. Tempoh Minimum/Maksimum pengajian pelajar adalah seperti berikut:

Program Pengajian	Minimum (Semester)	Maksimum (Semester)
Ijazah Sarjana Muda Kejuruteraan	8	14
Ijazah Sarjana Muda Teknologi Kejuruteraan	8	14
Ijazah Sarjana Muda Perniagaan	6	10

Kursus Kuratif

Kursus Kuratif diadakan selepas Semester II. Pendaftaran Kursus Kuratif adalah amat terhad dan tertakluk kepada penawaran semula kursus tersebut oleh Pusat Pengajian dengan kelulusan Senat. Pelajar hanya dibenarkan mengambil maksimum 10 unit (3 jenis) Kursus Kuratif pada satu-satu masa. Pengajaran-pembelajaran adalah dalam bentuk tutorial sahaja. Kursus Kuratif biasanya mengandungi 2 minggu pembelajaran dan 1 minggu peperiksaan.

Pengecualian Kredit

Pengecualian kredit ditakrifkan sebagai pengecualian daripada pendaftaran dan mengikuti kursus yang ditetapkan untuk sesuatu program pengajian berdasarkan kursus yang diambil oleh pelajar sebelum diterima masuk ke program pengajian universiti ini sebagaimana yang diluluskan oleh Dekan Pusat Pengajian/Dekan Pengurusan Akademik. Pengecualian kredit diberikan kepada pelajar yang telah mendapat sekurang-kurangnya gred C dalam mata pelajaran tertentu, mengikut sistem gred Universiti dan tertakluk kepada terma-terma dan syarat-syarat yang ditetapkan oleh Universiti.

Pengecualian kredit boleh diberi kepada pelajar yang telah mengambil satu kursus yang sama atau setara dengan 1/3 kandungan pembelajarannya adalah sama dan lulus sekurang-kurangnya C mengikut sistem penggredan Universiti. Ianya juga terpakai untuk kursus-kursus berkaitan yang boleh digabungkan [2 kursus atau lebih] bagi satu kursus di UniMAP untuk diberi pengecualian.

Pengecualian kredit bagi kursus – kursus yang tertentu bergantung kepada senarai kursus yang diluluskan Pusat Pengajian masing – masing yang telah diluluskan Senat.

Sistem Peperiksaan Dan Penilaian

Peperiksaan bertulis diadakan pada hujung semester. Setiap pelajar mestilah terlebih dahulu memenuhi syarat-syarat kuliah, tutorial, amali dan sebagainya sebelum layak menduduki peperiksaan. Tempoh peperiksaan adalah seperti berikut:

Jadual 7: Tempoh peperiksaan

Nilai Kursus	Tempoh Peperiksaan
1 unit	2 jam
2 – 4 unit	3 jam

Keputusan peperiksaan pelajar ditentukan berdasarkan penilaian secara berterusan dari komponen kerja kursus dan peperiksaan bertulis. Sumbangan kerja kursus menjadi 100% jika sesebuah kursus itu keseluruhannya berbentuk makmal. Kerja kursus biasanya merangkumi tugasan, laporan makmal dan ujian. Penilaian prestasi pelajar adalah berdasarkan kepada gred abjad dan mata penilaian seperti berikut:

Jadual 8: Gred abjad dan mata penilaian

GRED	MATA NILAI	STATUS
A	4.00	LULUS
A-	3.75	
B+	3.50	
B	3.00	
B-	2.75	
C+	2.50	
C	2.00	
C-	1.75	TIDAK LULUS
D+	1.50	
D	1.00	
D-	0.75	
F	0.00	

Jadual 9: Pengiraan GPA dan CGPA:

KURSUS	UNIT	NILAI GRED [NG]	GRED [G]	JUMLAH NG
EKT121	3	3.75	A-	11.25
EMT102	4	2.50	C+	10.00
EMT111	4	3.50	B+	14.00
EMT112	4	4.00	A	16.00
EQT102	3	1.75	C-	5.25
EUT122	2	2.75	B-	5.50
	20			62.00
PNG = 62.00/20 = 3.10				
ECT200	3	3.50	B+	10.50
EKT212	4	2.00	C	8.00
EKT230	4	4.00	A	16.00
EKT240	4	3.50	B+	14.00
EQT203	3	3.75	A-	11.25
	18			59.75
PNG = 59.75/18 = 3.32				
PNGK = $\frac{\text{Jumlah NG Terkumpul}}{\text{Jumlah Bil. Unit Terkumpul}}$ = $\frac{62.00 + 59.75}{20 + 18}$ = 3.20				

Rayuan Penyemakan 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 selama 15 hari selepas keputusan rasmi peperiksaan dikeluarkan oleh Jabatan Pendaftar. Permohonan selepas tempoh ini tidak akan dipertimbangkan.

Pelajar perlu menghantar borang HEA-15m [Borang Rayuan Penyemakan Semula Keputusan Peperiksaan] kepada Unit Peperiksaan & Pengijazahan, Bahagian Pengurusan Akademik, Jabatan Pendaftar. Borang rayuan hendaklah dikemukakan dalam tempoh 15 hari selepas keputusan rasmi diumumkan. Pelajar perlu mengisi dalam dua (2) salinan. Satu (1) salinan adalah untuk simpanan pelajar.

Kadar bayaran rayuan ialah RM50 untuk setiap kursus. Pembayaran secara tunai atau Wang Pos / Pos Malaysia / Draf Bank / Cek atas nama BENDAHARI UNIMAP.

Penggunaan Bahasa

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

Sistem Rakan Pendamping Siswa (RPS)

Sistem Penasihatan 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 diminta 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.

Pusat-Pusat Pemantapan Akademik

Pusat-pusat ini ditubuhkan untuk menyokong UniMAP dari segi mencapai kecemerlangan akademik..

1. **Pusat Teknologi Komunikasi dan Pembangunan Insan (PTKPI)**
   Pusat Teknologi Komunikasi dan Pembangunan Insan (PTKPI) menawarkan kursus-kursus Keperluan Universiti dan pelbagai kursus yang membawa saluran pengetahuan sosial dan kemanusiaan. Maklumat lanjut mengenai pusat ini diberikan di bahagian lain buku ini.

2. **Pusat Kejuruteraan**
   Pusat Kejuruteraan ditubuhkan bagi mengendalikan makmal dan bengkel umum (gunasama) yang diperlukan oleh pelbagai program yang ditawarkan di UniMAP.

   Pusat Kejuruteraan juga menyokong aktiviti penyelidikan dan reka bentuk di UniMAP. Terdapat beberapa kursus yang ditawarkan di sini seperti Kemahiran Kejuruteraan yang wajib diambil oleh semua pelajar dari PPK Sistem Elektrik, PPK Mikroelektronik, PPK Mekatronik, PPK Komputer & Perhubungan, PPK Bahan, PPK Pembuatan, PPK Bioproses dan PPK Alam Sekitar serta sebahagian pelajar dari program Teknologi Kejuruteraan.

3. **Institut Matematik Kejuruteraan**
   Institut Matematik Kejuruteraan (IMK) adalah pusat untuk merancang dan mengendalikan kurikulum

Matematik Kejuruteraan di UniMAP. Ia berperanan sebagai pusat rujukan dalam menyediakan kepakaran dalam kaedah penyelidikan matematik, simulasi dan kaedah statistik. Pusat ini juga berfungsi sebagai pusat latihan di dalam kampus dan personel luar kampus dalam bidang yang berkaitan dengan matematik.

4. **Pusat Kerjasama Industri**
   Pusat Kerjasama Industri berperanan menjalin hubungan dengan pihak industri dalam pelbagai aspek, terutama dalam program- program yang berkaitan terus dengan pembelajaran pelajar. Program seperti program pendedahan kepada industri, forum bersama industri, Latihan Perindustrian Staf dan beberapa lagi diselia dan diselaraskan oleh pusat ini. Sesetengah dari program ini wajib diambil oleh semua pelajar.

5. **Pusat Teknologi Maklumat dan Komunikasi**
   Pusat Teknologi Maklumat dan Komunukasi diwujudkan untuk menyokong penggunaan dan pelaksanaan teknologi maklumat di samping membantu fungsi akademik dan pentadbiran universiti. Pusat ICT juga membangun dan menyenggara sistem maklumat berkomputer Universiti, serta sistem rangkaian komunikasi kampus. Ia menyediakan khidmat pakar runding dalam bidang teknologi maklumat dan komunikasi, membantu membudayakan penggunaan teknologi maklumat di Universiti.

6. **Perpustakaan**
   Perpustakaan Universiti ditubuhkan untuk menyediakan kemudahan dan perkhidmatan yang berkualiti untuk menyokong pengajaran / pembelajaran dan penyelidikan di Universiti ini

7. **Pusat Hal Ehwal Antarabangsa (PHEA)**
   Pusat Hal Ehwal Antarabangsa adalah titik pertama kenalan untuk pelajar antarabangsa yang menawarkan pelbagai program yang menyokong pelajar antarabangsa dari segi enrolmen, pengajian dan kehidupan sosial, serta perkhidmatan rujukan kepada kemudahan di kampus dan dalam komuniti tempatan.

8. **Unit Pembangunan Lestari**
   Unit ini membantu ke arah menyelaras perkhidmatan yang meningkatkan profesionalisme staf akademik universiti. Unit ini juga merancang kursus, bengkel dan kaunseling untuk pelajar.

Bahagian Pengurusan Akademik Jabatan Pendaftar

Bahagian Pengurusan Akademik ini bertanggungjawab untuk mengendalikan urusan-urusan yang berkaitan kemasukan pelajar, pemprosesan data dan rekod pelajar, peperiksaan dan pengijazahan pelajar dan Senat Universiti.

Unit-unit yang terdapat di Bahagian Pengurusan Akademik, Jabatan Pendaftar terbahagi kepada:

1. **Unit Kemasukan dan Rekod Pelajar**
   Unit Kemasukan dan Rekod Pelajar bertanggungjawab untuk mengendalikan urusan-urusan yang berkaitan dengan kemasukan pelajar dan pemprosesan data dan rekod pelajar. Antara tugas dan tanggungjawab yang dijalankan adalah:
   i. Mengendalikan secara keseluruhan ke atas proses pengambilan dan pendaftaran pelajar dalam negara di peringkat ijazah pertama dan diploma.
   ii. Mengendalikan proses pengambilan dan pendaftaran pelajar antarabangsa di peringkat ijazah pertama.
   iii. Mengurus dan mengendalikan aspek-aspek pemprosesan data di dalam Sistem Maklumat Pelajar.
   iv. Menguruskan rekod peribadi pelajar dan status pelajar termasuk permohonan penangguhan pengajian dan pertukaran program pengajian pelajar.
   v. Menguruskan pendaftaran kursus pelajar secara online bagi setiap semester pengajian.
   vi. Menguruskan proses pemberian pengecualian unit dan pemindahan kredit pelajar.

2. Unit Peperiksaan dan Pengijazahan

Unit Peperiksaan bertanggungjawab untuk mengendalikan dan memantau perjalanan Peperiksaan Akhir Semester dan perkara-perkara yang berkaitan dengannya. Di antara tugas dan tanggungjawab yang dijalankan adalah seperti berikut:

i. Mengeluarkan Pekeliling Peperiksaan kepada Pusat Pengajian/ Pusat/Institut.
ii. Mengeluarkan Jadual Waktu Peperiksaan untuk Program Diploma dan Ijazah.
iii. Menguruskan Peperiksaan Akhir Semester di dalam jangkamasa yang ditetapkan.
iv. Menjadi Sekretariat kepada Majlis Peperiksaan Universiti.
v. Menguruskan pemprosesan data peperiksaan mengunakan Sistem Maklumat Pelajar.
vi. Mengeluarkan keputusan peperiksaan akhir semester.
vii. Menguruskan proses rayuan pelajar untuk menyemak semula keputusan peperiksaan.
viii. Mengeluarkan Transkrip Akademik selepas Konvokesyen.
ix. Mengendalikan pengurusan jubah dari segi peminjaman dan pemulangan jubah staf akademik.
x. Menyemak kelayakan pengijazahan untuk pelajar tahun akhir serta mengeluarkan surat penamatan pengajian dan kelayakan pengijzahan untuk pelajar yang layak bergraduat.
xi. Bertanggungjawab terhadap konvokesyen pelajar dari segi jemputan serta pinjaman dan pemulangan pakaian konvokesyen.
xii. Menguruskan proses penyediaan dan penyerahan skrol pengijazahan kepada graduan.
xiii. Merekod dan mengemaskini data-data graduan yang telah bergraduat.

3. Unit Senat

Unit Senat bertanggungjawab untuk mengendalikan urusan-urusan yang berkaitan dengan Senat Universiti. Antara tugas dan tanggungjawab yang dijalankan adalah:

i. Merancang aktiviti-aktiviti Senat dan Jawatankuasa di bawahnya, untuk memberi khidmat Urusetia dan menyelaraskannya dengan pihak-pihak lain yang berkaitan, di dalam penawaran program-program sedia ada dan baru.
ii. Menyediakan Kalendar Akademik, menguruskan senarai penawaran kursus serta berurusan dengan Kementerian Pendidikan Malaysia (KPM) dan Jabatan Perkhidmatan Awam (JPA) mengenai penawaran program baru, penubuhan pusat pengajian/Jabatan dan Unit.
iii. Menguruskan pencalonan penerima Ijazah Kehormat

Alamat:

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Academic Calendar Semester I Session 2013/2014

Bachelor Degree Programme

SEMESTER 1 9th September 2013 – 19th January 2014 (19 weeks)				
ACTIVITIES	**DATE**		**PERIOD**	**NOTES**
New student Registration / Orientation Week	1st September 2013	5th September 2013	5 days	-
Lecture	9th September 2013	13th Oktober 2013	5 weeks	**Malaysia Day** 16th September 2013
Mid Semester Break	14th Oktober 2013	20th Oktober 2013	1 week	**Hari Raya Aidiladha** 15th – 16th Oktober 2013
Lecture	21st Oktober 2013	22nd December 2013	9 weeks	**Deepavali** 2nd November 2013 **Awal Muharam/ Maal Hijrah 1434** 5th November 2013
Study week	23th December 2013	29th December 2013	1 week	**Christmas** 25th December 2013
Examination	30th December 2013	19th January 2014	3 weeks	**Maulidur Rasul** 14th January 2014
Semester Break	20th January 2014	16th February 2014	4 weeks	**Chinese New year** 31 January - 1 February 2014

Academic Calendar Semester II Session 2013/2014

Bachelor Degree Programme

SEMESTER 2 * 17th February 2014 – 27th Jun 2014 (18 Weeks)				
ACTIVITIES	**DATE**		**PERIOD**	**NOTES**
Lecture	17th February 2014	6th April 2014	7 weeks	-
Mid Semester Break	7th April 2014	13th April 2014	1 week	-
Lecture	14th April 2014	1st June 2014	7 weeks	**Labour Day** 1st May 2014 **Birthday of DYMM Tuanku Raja Perlis** 17th May 2014 **Hari Wesak** 25th May 2014 **Birthday of SPB Yang Di-Pertuan Agung** 7th June 2014
Study week	2nd June 2014	8th June 2014	1 week	**Israk Mikraj** 6th June 2014
Examination	9th June 2014	27th June 2014	3 weeks	-
Semester Break	28th June 2014	31st Ogos 2014	9 weeks	**Nuzul Al-Quran** 15th July 2014 **Hari Raya Aidilfitri** 28th & 29th July 2014

** Note : Academic Calendar for Semester II 2012/2013 above does not apply to students in Year 3 Bachelor of Engineering and students in Year 2 Bachelor of Business (Entrepreneurship Engineering). Academic Calendar fo these students can be reffered at the next page*

Academic Calendar Semester II Session 2013/2014

for 3rd Year Students of Bachelor of Engineering and 2nd Year Students of Bachelor of Business (Entrepreneurship Engineering)

SEMESTER 2 10th February 2014 – 15 June 2014 (18 weeks)				
ACTIVITIES	**DATE**		**PERIOD**	**NOTES**
Lecture	10th February 2014	6th April 2014	8 weeks	-
Mid Semester Break	7th April 2014	13th April 2014	1 week	-
Lecture	14th April 2014	25th May 2014	6 weeks	**H Labour Day** 1st May 2014 **Birthday of DYMM Tuanku Raja Perlis** 17th May 2014 **Hari Wesak** 25th May 2014 **Birthday of SPB Yang Di-Pertuan Agung** 7th June 2014
Study week	26th May 2014	1st June 2014	1 week	**Israk Mikraj** 6 June 2014
Examination	2nd June 2014	15th June 2014	2 weeks	-
Semester Break / Industrial Training	16th June 2014	7th September 2014	12 weeks	**Nuzul Al-Quran** 15th July 2014 **Hari Raya Aidilfitri** 28th & 29th July 2014

BAHASA INGGERIS (ENGLISH)

Admission Requirements for Undergraduate Degree Program
Academic Session of 2013/2014
International Students

Country	General Requirements	Specific Requirements		
China	• Completed 12 years of education in 3 levels of schools (Primary School, Junior Middle School, and Senior Middle School). • Graduated from Senior Middle School with Senior High School Certificate. • Obtain minimum average score of 60% in Senior High School Certificate. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 a re required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%
Indonesia	• Completed 12 years of education in 3 levels of schools (Primary School, Junior Secondary School, and Senior Secondary School @ Sekolah Menengah Atas). • Pass Senior Secondary @ Sekolah Menengah Atas examination. • Pass with minimum Grade Point Average (GPA) of 6.00 in Senior Secondary @ Sekolah Menengah Atas examination. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%

<table>
<tr><th>Country</th><th>General Requirements</th><th colspan="3">Specific Requirements</th></tr>
<tr><td rowspan="5">Saudi Arabia</td><td rowspan="5">• Completed 12 years of education in 3 levels of schools (Elementary School, Intermediate School, and General Secondary School/Technical Junior College)

• Pass and obtain at least 60% in General Secondary Education Certificate (Tawjihiyah)/ Secondary Vocational School Diploma/ Secondary Commercial School Diploma/ Secondary Agricultural School Diploma examination.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
• Mathematics
• Physics / Chemistry</td><td>60%
60%
60%</td></tr>
<tr><td colspan="2">(Bio-Based)</td></tr>
<tr><td>• English
• Mathematics
• Physics / Chemistry / Biology</td><td>60%
60%
60%</td></tr>
<tr><td>Bachelor of Business</td><td>• English
• Mathematics
• Physics / Chemistry / Biology
or
Business / Economics / Commerce / Accounting</td><td>60%
60%
60%

60%</td></tr>
<tr><td rowspan="5">Iraq</td><td rowspan="5">• Completed 11 or 12 years of education in 3 levels of schools (Primary School, Intermediate Secondary School, and Preparatory Secondary School/ Vocational Secondary School)

• Pass and obtain at least 60% in Preparatory Secondary School/Vocational Secondary School.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
• Mathematics
• Physics / Chemistry</td><td>60%
60%
60%</td></tr>
<tr><td colspan="2">(Bio-Based)</td></tr>
<tr><td>• English
• Mathematics
• Physics / Chemistry / Biology</td><td>60%
60%
60%</td></tr>
<tr><td>Bachelor of Business</td><td>• English
• Mathematics
• Physics / Chemistry / Biology
or
Business / Economics / Commerce / Accounting</td><td>60%
60%
60%

60%</td></tr>
</table>

Country	General Requirements	Specific Requirements		
Nigeria	• Completed 12 years of education in 2 or 3 levels of schools (Primary School, Junior Secondary School and Senior Secondary School/Technical Secondary School) • Pass and obtain at least B+ in five (5) subjects in Senior School Certificate. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%
Thailand	• Completed 12 years of education in 3 levels of schools (Primary School, Lower Secondary School and Upper Secondary School/Religious School) • Pass and obtain at least CGPA 2.4 or 60% in Higher Secondary School Certificate (Mathayam Suksa 6) • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%

<table>
<tr><th>Country</th><th>General Requirements</th><th colspan="3">Specific Requirements</th></tr>
<tr><td rowspan="5">Uzbekistan</td><td rowspan="5">• Completed 11 or 12 years of education in 2 levels of schools (Primary School, General Secondary School and Technical Secondary School/ Upper Secondary School /Specialized Secondary School)

• Pass and obtain at least 60% in Technical Secondary School/ Upper Secondary School / Specialized Secondary School.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
• Mathematics
• Physics / Chemistry</td><td>60%
60%
60%</td></tr>
<tr><td colspan="2">(Bio-Based)</td></tr>
<tr><td>• English
• Mathematics
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60%
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<tr><td>Bachelor of Business</td><td>• English
• Mathematics
• Physics / Chemistry / Biology
or
Business / Economics / Commerce / Accounting</td><td>60%
60%
60%

60%</td></tr>
<tr><td rowspan="5">Yemen</td><td rowspan="5">• Completed 12 years of education in 2 levels of schools (Basic and Upper Secondary School / Vocational Secondary School)

• Pass both Intermediate School Certificate (ISC) and General Secondary School Certificate (Al-Thanawiya) examination.

• Obtain at least 60% in General Secondary School Certificate (Al-Thanawiya).

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
• Mathematics
• Physics / Chemistry</td><td>60%
60%
60%</td></tr>
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<tr><td>• English
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60%
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<tr><td>Bachelor of Business</td><td>• English
• Mathematics
• Physics / Chemistry / Biology
or
Business / Economics / Commerce / Accounting</td><td>60%
60%
60%

60%</td></tr>
</table>

Country	General Requirements	Specific Requirements		
Somalia	• Completed 12 years of education in 2 levels of schools (Primary School and Secondary School) • Pass and obtain at least 60% in Secondary School Leaving Certificate (SSLC) or Technical Secondary School Certificate. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%
Mauritius	• Completed 12 years of education in 3 levels of schools (Primary School, Lower Secondary School and Upper Secondary School) • Pass Higher School Certificate / General Certificate of Education A-level examination and pass at least three (3) subjects (Advanced Level). • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%

<table>
<tr><th>Country</th><th>General Requirements</th><th colspan="3">Specific Requirements</th></tr>
<tr><td rowspan="5">Sudan</td><td rowspan="5">• Completed 11 years of education in 2 levels of schools (Basic School and Secondary School / Technical School)

• Pass and obtain at least 60% in Sudan Secondary School Certificate.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
• Mathematics
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60%
60%

60%</td></tr>
<tr><td rowspan="5">Syria</td><td rowspan="5">• Completed 12 years of education in 3 levels of schools (Basic Education I School, Basic Education II School and General Secondary School / Technical Secondary School)

• Pass and obtain at least 60% in Al-Shahada Al Thanawiyah Al Amma @ Secondary School Leaving Certificate / Al Shahada Al-Thanawiyah Al-Fanniyya @ Technical Baccalaureat.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
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Business / Economics / Commerce / Accounting</td><td>60%
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60%</td></tr>
</table>

Country	General Requirements	Specific Requirements		
Jordan	• Completed 12 years of education in 2 levels of schools (Basic School and Secondary School / Vocational Secondary School) • Pass and obtain at least 60% in Al-Tawjihi @ General Secondary Education Certificate / Vocational Certificate. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%
Pakistan	• Completed 12 years of education in 2 levels of schools (Secondary School and Higher Secondary School) • Pass and obtain at least 60% in Higher Secondary School Certificate (HSSC). • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%

<table>
<tr><th>Country</th><th>General Requirements</th><th colspan="3">Specific Requirements</th></tr>
<tr><td rowspan="5">Libya</td><td rowspan="5">• Completed 12 years of education in 2 levels of schools (Basic School and Secondary School)

• Pass and obtain at least 60% in Secondary Education Certificate.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
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Business / Economics / Commerce / Accounting</td><td>60%
60%
60%

60%</td></tr>
<tr><td rowspan="5">Ethiopia</td><td rowspan="5">• Completed 12 or 13 years of education in 3 levels of schools (Primary School, General Secondary School and Preparatory Secondary School/ Technical/Vocational School)

• Pass and obtain at least Grade C for 5 subjects in Ethiopian Higher Education Entrance Examination (EHEEE) or Technical/Vocational School Certificate.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
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• Physics / Chemistry / Biology
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Business / Economics / Commerce / Accounting</td><td>60%
60%
60%

60%</td></tr>
</table>

Country	General Requirements	Specific Requirements		
Iran	• Completed 12 years of education in 3 levels of schools (Primary School, Secondary School and Pre-University) • Pass Secondary/High School Diploma and Pre-University Certificate (KONKUR) with minimum score of 13 in KONKUR. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%
Palestine	• Completed 12 years of education in 2 levels of schools (Basic School and Secondary School/ Technical Secondary School) • Pass and obtain at least 60% in Secondary School Certificate (Al-Tawjihi). • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%

<table>
<tr><th>Country</th><th>General Requirements</th><th colspan="3">Specific Requirements</th></tr>
<tr><td rowspan="5">Chad</td><td rowspan="5">• Completed 13 years of education in 2 levels of schools (Primary School and Secondary School)

• Pass and obtain at least 60% in Baccalaureat.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
• Mathematics
• Physics / Chemistry</td><td>60%
60%
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<tr><td>Bachelor of Business</td><td>• English
• Mathematics
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or
Business / Economics / Commerce / Accounting</td><td>60%
60%
60%

60%</td></tr>
<tr><td rowspan="5">Algeria</td><td rowspan="5">• Completed 13 years of education in 2 levels of schools (Primary School and Secondary School)

• Pass Diploma of Secondary Education (Baccalaureat) with minimum score of 15.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
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60%
60%

60%</td></tr>
</table>

<table>
<tr><th>Country</th><th>General Requirements</th><th colspan="3">Specific Requirements</th></tr>
<tr><td rowspan="5">United Arab Emirates (UAE)</td><td rowspan="5">• Completed 12 years of education in 3 levels of schools (Primary School, Preparatory School and Secondary School)

• Pass and obtain at least 60% in Secondary School Leaving Certificate (Al-Tawjihiyya).

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
• Mathematics
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• Mathematics
• Physics / Chemistry / Biology
or
Business / Economics / Commerce / Accounting</td><td>60%
60%
60%

60%</td></tr>
<tr><td rowspan="5">Lebanon</td><td rowspan="5">• Completed 12 years of education in 3 levels of schools (Primary School, Intermediate School and Secondary School)

• Pass and obtain at least 12/20 in Baccalauréat Libanais.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
• Mathematics
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<tr><td>• English
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<tr><td>Bachelor of Business</td><td>• English
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60%
60%

60%</td></tr>
</table>

<table>
<tr><th>Country</th><th>General Requirements</th><th colspan="3">Specific Requirements</th></tr>
<tr><td rowspan="5">Myanmar</td><td rowspan="5">• Completed 11 years of education in 3 levels of schools (Primary School, Middle School, and High School)

• Pass University Entrance Examination and obtain minimum average score of 360/600 or 60%.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
• Mathematics
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<tr><td>• English
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<tr><td>Bachelor of Business</td><td>• English
• Mathematics
• Physics / Chemistry / Biology
or
Business / Economics / Commerce / Accounting</td><td>60%
60%
60%

60%</td></tr>
<tr><td rowspan="5">Tunisia</td><td rowspan="5">• Completed 13 years of education in 2 levels of schools (Primary School and Secondary School)

• Pass and obtain at least 12/20 in Baccalauréat.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
• Mathematics
• Physics / Chemistry</td><td>60%
60%
60%</td></tr>
<tr><td colspan="2">(Bio-Based)</td></tr>
<tr><td>• English
• Mathematics
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<tr><td>Bachelor of Business</td><td>• English
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60%

60%</td></tr>
</table>

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Country	General Requirements	Specific Requirements		
Cameroon	• Completed 14 years of education in 2 levels of schools (Primary School, Secondary School and High School) • Pass GCE A-Level with average score of 60%/ equivalent, and obtain at least C in relevant subjects. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%
Egypt	• Completed 11 or 13 years of education in 3 levels of schools (Primary School, Preparatory School and General Secondary School/Technical Secondary School) • Pass and obtain at least 60% in Secondary Education Certificate (Thanaweya Amma). • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%

<table>
<tr><th>Country</th><th>General Requirements</th><th colspan="3">Specific Requirements</th></tr>
<tr><td rowspan="5">Cambodia</td><td rowspan="5">• Completed 12 years of education in 3 levels of schools (Primary School, Lower Secondary School and Upper Secondary School)

• Pass Diploma of Upper Secondary with minimum score of C/60%/equivalent.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
• Mathematics
• Physics / Chemistry</td><td>60%
60%
60%</td></tr>
<tr><td colspan="2">(Bio-Based)</td></tr>
<tr><td>• English
• Mathematics
• Physics / Chemistry / Biology</td><td>60%
60%
60%</td></tr>
<tr><td>Bachelor of Business</td><td>• English
• Mathematics
• Physics / Chemistry / Biology
or
Business / Economics / Commerce / Accounting</td><td>60%
60%
60%

60%</td></tr>
<tr><td rowspan="5">Vietnam</td><td rowspan="5">• Completed 12 years of education in 3 levels of schools (Primary School, Lower Secondary School and Upper Secondary School)

• Pass University Entrance Examination and obtain minimum average score of 6.0/60%/equivalent.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).

• Other requirements that have been endorsed by University Senate.</td><td rowspan="4">Bachelor of Engineering</td><td colspan="2">(Electronic-Based)</td></tr>
<tr><td>• English
• Mathematics
• Physics / Chemistry</td><td>60%
60%
60%</td></tr>
<tr><td colspan="2">(Bio-Based)</td></tr>
<tr><td>• English
• Mathematics
• Physics / Chemistry / Biology</td><td>60%
60%
60%</td></tr>
<tr><td>Bachelor of Business</td><td>• English
• Mathematics
• Physics / Chemistry / Biology
or
Business / Economics / Commerce / Accounting</td><td>60%
60%
60%

60%</td></tr>
</table>

Country	General Requirements	Specific Requirements		
Turkey	• Completed 12 years of education in 2 levels of schools (Basic School and High School) • Pass Lise Diplomasi and obtain minimum average score of 3.00/60%/equivalent. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%

Academic Systems

The Bachelor of Engineering and The Bachelor of Engineering Technology curriculum are designed to be completed in 4 years while the Bachelor in Business is to be completed in 3 years with each academic year divided into Semester I and Semester II. Each semester consists of 14 study weeks. Examination will be held at the end of each semester. Courses are divided into four levels; levels 100, 200, 300, and 400 which correspond to Year 1, 2, 3 and 4.

For graduation purposes, Bachelor of Engineering students must complete 120 units of Core Courses, and Bachelor of Engineering Technology students 123 units. Bachelor of Business students must complete 72 or 74 units of Core Courses (taken according to specialization) and 30 units of Elective Courses.

Students are also required to complete University Requirement courses of 17 units for the Bachelor of Engineering degree, 19 units for the Bachelor of Engineering Technology degree and 20 units for the Bachelor of Business degree.

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 CGPA of at least 2.00.

Programme Structure

The Bachelor of Engineering, Bachelor of Engineering Technology and Bachelor of Business programme structures are shown in the following Tables. Students are required to complete 137 units for Bachelor of Engineering, 142 units for Bachelor of Engineering Technology and 122 or 124 units for Bachelor of Business in order to graduate as shown in Table 1(a), 1(b), 1(c) and 1(d).

Table 1(a): Programme Structure for Bachelor of Engineering

BACHELOR OF ENGINEERING	
COURSES	**UNIT (S)**
ENGINEERING CORE COURSES	**120**
UNIVERSITY REQUIREMENT COURSES	**17**
a. Engineering Entrepreneurship	2
b. Thinking Skills	2
c. University Malay Language	2
d. University English Language	2
e. Islamic and Asian Civilization	2
f. Ethnic Relations	2
g. Co- Curriculum	3
h. Optional Course	2
TOTAL	**137**

Table 1(b): Programme Structure for Bachelor of Engineering Techology

BACHELOR OF ENGINEERING TECHNOLOGY	
COURSES	**UNIT (S)**
ENGINEERING TECHNOLOGY CORE COURSES	**123**
UNIVERSITY REQUIREMENT COURSES	**19**
a. Engineering Entrepreneurship	2
b. Thinking Skills	2
c. University Malay Language	2
d. University English Language	2
e. Islamic and Asian Civilization	2
f. Ethnic Relations	2
g.Skills and Technology in Communication	2
h. Co- Curriculum	3
i. Optional Course	2
TOTAL	**142**

Table 1(c): Programme Structure for Bachelor of Business (Engineering Entrepreneurship)

BACHELOR OF BUSINESS (ENGINEERING ENTREPRENUERSHIP)	
COURSES	**UNIT (S)**
BUSINESS CORE COURSES	**72**
ELECTIVE COURSES	**30**
UNIVERSITY REQUIREMENT COURSES	**20**
a. Engineering Entrepreneurship	2
b. Thinking Skills	2
c. University Malay Language	2
d. University English Language	2
e. Islamic and Asian Civilization	2
f . Ethnic Relations	2
g. Skills and Technology in Communication	2
h. Business Communication	3
i. Co- Curriculum	3
TOTAL	**122**

Table 1(d): Programme Structure for Bachelor of Business (International Business)

BACHELOR OF BUSINESS (INTERNATIONAL BUSINESS)	
COURSES	**UNIT**
BUSINESS CORE COURSES	**74**
ELECTIVE COURSES	**30**
UNIVERSITY REQUIREMENT COURSES	**18**
a. Engineering Entrepreneurship	2
b. Thinking Skills	2
c. University Malay Language	2
d. University English Language	2
e. Islamic and Asian Civilization	2
f. Ethnic Relations	2
g. . Skills and Technology in Communication	2
h. Business Communication	3
i. Co- Curriculum	3
TOTAL	**124**

Types of Courses

1. **University Core Courses:**
   University Core Courses are courses which are NOT the students' major. These courses are offered by the Centre for Communication Technology and Human Development (PTKPI), the Centre for International Language (CIL) and the Co-Curriculum Centre. All of this courses are compulsory and need to pass with grade C to graduate. The University Core Courses are:

   a. **Engineering Entrepreneurship (2 units)**
   Students are required to take 2 units of Engineering Entrepreneurship course. Students are advised to take other courses in the 'entrepreneurship' category, where the units collected will cover the Optional Course requirement.

   b. **Ethnic Relations (2 units)**
   Ethnic Relation is compulsory for all students.

   c. **Islamic and Asian Civilization (2 units)**
   Islamic and Asian Civilization is compulsory for all students.

   d. **University Malay Language (2 units)**
   University Malay Language course is compulsory for all students.

   e. **University English Language (2 units)**
   University English Language course is compulsory for all students and is an entry requirement. Students who acquire band 1, 2 or 3 in MUET need to take Foundation English and pass with grade C before enrolling for University English. For students who acquire band 4 or 5 in MUET can take two additional units of Foundation English and can be counted as an Optional Courses.

   f. **Thinking Skills (2 units)**
   Thinking Skills is compulsory for all students.

g. **Skills and Technology in Communication (2 units)**
Skills And Technology in Communication is compulsory for all Bachelor of Engineering Technology and Bachelor of Business students.

h. **Business Communication (3 units)**
Students of Bachelor of Business need to take this course.

i. **Co- Curriculum Programme**
All students are required to collect 3 units for Co-Curriculum during their study at UniMAP. Of the 3 units, 2 units are to be collected from Uniform Bodies (1st unit in Semester 1 and 2nd unit in Semester 2), while the other unit can be collected from any other Co-Curriculum courses in any semester.

2. **Core Courses (Bachelor of Engineering)**
Core Courses are engineering courses that are compulsory for Bachelor of Engineering students. These courses are part of the requirements for graduation. Students who fail Core Courses must repeat them before they can graduate.

3. **Core Courses (Bachelor of Engineering Technology)**
Core Courses are Engineering Technology courses that are compulsory for Bachelor of Engineering Technology students. These courses are part of the requirements for graduation. Students who fail Core Courses must repeat them before they can graduate.

4. **Core Courses (Bachelor of Business)**
There are teo types of Core Courses for the Bachelors of Business:

i. **Business Core Courses:** Business Core Courses are contemporary courses in the business field. It is compulsory for business students to take these courses.

ii. **Programme Core Courses:** Programme Core Courses meanwhile are offered based on the students' major.

These courses are part graduation requirement. Students who fail any of the core courses must repeat them before they can graduate.

5. **Elective Courses (Bachelor of Business)**
Students can choose Elective courses based on their interests.

6. **Optional Courses**
Optional Courses are courses which are offered by the Centre for Communication Technology and Human Development (PTKPI) for the students of Engineering and Engineering Technology. Two units of Optional Courses has to be taken by students of Bachelor of Engineering and Bachelor of Engineering Technology during their study in UniMAP.

The Unit System

Each course is given a value known as the UNIT except for courses approved by the Senate. The unit is based on the scope and depth of a course. With the exception of certain cases, the value of a unit for each Teaching/Learning mode is in Table 2:

Table 2 : Unit Evaluation per week for 14-week Semester

Form of Contact	Unit Value	Total Contact/ Week
Lecture	1	1 hour
Laboratory /Tutorial	1	2 hours
Final Year Project	1	3 hours
Assisted learning involving delivery modes such as Problem-based Learning (PBL), e-learning modules), visits etc..	1	3 hours
Industrial Training	1*	Depends on the programme of study

** Note: The value of one (1) unit of the Industrial Training is equivalent to two (2) weeks of training.*

Teaching and Learning Approaches at UniMAP

Many of the core courses offered include a theory component and a practical component, the value of contact hours for which is detailed below:

1. **Theory Component**
   One (1) unit of theory component is equivalent to 1 hour of lecture/ tutorial/ reading per week or 14 hours per semester.

2. **Practical Component**
   One (1) unit of practical component is equivalent to 2 contact hours per week or 28 hours per semester.

For most of the Core courses, students are required to complete a mini project and sit for an examination or a viva voce at the end of the semester.

The practical component consist of the following teaching and learning modes:

1. **Lab Intensive Learning –** two to 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.

2. **Teaching Factory Learning –** five to six students carry out a process run in a group using actual scale equipment used in industry.

3. **E- Learning –** a learning approach that is reinforced using ICT, complementing the conventional approach. Through the UniMAP website, students obtain access to course moduls and topics. The modules consist of lecture notes in multimedia format such as audio, video, graphic, animation, simulation, games and other interactive activites.

4. **Exposure to Industry –** Students will make multiple visits to industry for a certain period of time throughout their study at UniMAP. These include IndEx (Industrial Exposure) programmes, InTra (Industrial Training), Industrial Entrepreneurship and many others.

Bachelor Of Engineering

UniMAP places great emphasis on teaching and learning approaches, theoretical or practical components, which are in tandem with industrial development. Students' understanding of theoretical component is enhanced through practical learning session apart from product design, problem solving, team-work, preparation and presentation of reports.

Generally, a four unit core course comprises three units of theory component and one unit of practical component. One unit of the theory component normally comprises one-hour of lecture while the one unit of practical component usually comprises two hours of lab work. Due to logistical restrictions, these courses are arranged in a such a way that for the four-unit course, students will undergo a two-hour lecture followed by two hours of lab work followed by another hour of lecture in a week. Some of the courses offered are 100% lab oriented courses.

Industrial Training

Industry training is a 4 unit course for Bachelor of Engineering students, 12 units for Bachelor of Engineering Technology students and 6 units for Bachelor of Business students.

3rd year Engineering students are required to undergo 12 weeks of Industrial Training in order to collect 4 credits for this course. 4th Year Bachelor of Engineering Technology students are required to undergo 12 weeks of Industrial Training in order to collect 12 credits for this course.

Students of Bachelor of Business (International Business) are required to do Industrial Training during the 2nd and 4th semester. Students have two options to choose from, Option 1 (2+2) or Option 2 (3+1).

For the Optin 1 (2+2), students will undergo two phases (2 months +2 months) of Industrial Training in selected multinational companies in Malaysia. For Option 2 (3+1), students will undergo industrial training in selected multinational companies in Malaysia for the first three months, followed by an educational trip abroad (International Business Field Trips).

Bachelor of Business (Engineering Entrepreneurship) will go for practical training via the Business Incubator Prgramme for 12 weeks. They will earn 6 credits hours after the 4th semester.

Contact hours evaluation (working hours for designated organization/corporation) is calculated based on an average of 8 contact hours per day for 5 days a week, where 8 hours per day X 5 days = 40 hours per week.

The main objectives of the Industrial Training are to:

1. Instill professionalism in students
2. Raise students' awareness on the importance and connection between industrial training, lab – intensive work and engineering theories.
3. Provide students with early exposure on the 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.

The Center for Industrial Collaboration (CIC) coordinates programmes which require the involvement of industry, with relevent units and centres:

1. Industrial Exposure (IndEx) - for students who have completed Year 1
   a. Short term exposure programme – 1 day
   b. Talks, briefing, demonstrations by and dialogs with experts, managers and engineers from industry
   c. Visits to industry

2. Industrial Entrepreneurship Exposure (IndEnt) – for Year 2 students
   a. Short term exposure programme – 1 day
   b. Briefing, demonstrations by and dialogs with small sector industries, R&D firms and government bodies such as the Ministry of Entrepreneur and Cooperative Development.

Business Incubator Programme

This programme is based on a three-year coursework that is equivalent to 6 semesters on a full-time basis. In addition to lectures and tutorials, this programme includes practical training via the Business Incubator Programme. After the fourth semester, students will participate in the Business Incubator Programme for twelve (12) weeks earning them 6 credit hours.

Students are mentored by companies in business incubators, providing them the opportunity to be part of a team involved in product development which may even lead to commercialisation. They will experience how ideas and innovations can lead to products for consumers. In addition to that, they will see for themselves the flow of business processes.

At the end of the Business Incubator Programme, students are required to submit a report on their experiences throughout the Business Incubator Programme.

Malaysian business incubators form a tightly-knit group under the National Incubator Network Association (NINA) which is affiliated with the Association of Asean Business Incubation (AABI). Its members include Technology Park Malaysia, Malaysian Technology Development Corporation, Sirim and Kulim Technology Park Corporation. UniMAP works closely with these organisations to ensure the success of the programme.

International Business Field Trips

Students will undergo industrial training in their second and fourth semester. They have two options to choose from Option 1 (2+2) or Option 2 (3+1). For the Option 1 (2+2), students will undergo two phases (2 months +2 months) of Industrial Training in selected multinational companies in Malaysia. Coordination will be conducted with collaboration from the UniMAP Centre for Industrial Collaboration.

For Option 2 (3+1), students will undergo Industrial Training in selected multinational companies in Malaysia for the first three months and then proceed an educational trip abroad. Students are given the freedom to choose any of the two options for their Industrial Training according to their interest and financial abilities.

University Core Courses

1. **Engineering Entrepreneurship (2 units)**
   Students are required to take 2 units of Engineering Entrepreneurship course. Students are advised to take other courses in ‘entrepreneurship’ category, whereby the units that are collected will be counted as Optional Courses. Students need to pass with at least a C.

2. **Ethnic Relations (2 units)**
   2 units of Ethnic Relation course is compulsory for all students. Students need to pass with at least a C.

3. **Islam and Asian Civilization (2 units)**
   Islam and Asian Civilization is compulsory for all students. Students need to pass with at least a C.

4. **University Malay Language (2 units)**
   2 units of University Malay Language course is compulsory and is a requirement for graduation. Students need to pass with at least a C.

5. **University English Language (2 units)**
   2 units of University English Language course is compulsory and is a requirement for graduation. However, students who acquired band 1, 2 and 3 in MUET need to take Foundation English before enrolling for University English. The two extra units from Foundation English are counted as Optional Courses. Students need to pass with at least a C for University English Language.

6. **Thinking Skills (2 units)**
   It is compulsory for students to take 2 units of Thinking Skills course. Students need to pass with at least a C.

7. **Skills and Technology in Communication (2 units)**
   It is compulsory for students to take 2 units of skills and technology in communication course. Student need to pass with at least C.

8. **Business Communication (3 units)**
   Students from Bachelor of Business need to take this course and pass with at least a C.

9. **Co- Curriculum Programme**
   Students need to undergo at least one unit of co-curriculum throughout their study in UniMAP. Only 3 units are required for graduation. 1 unit is compulsory while the other 2 units are considered as Optional Courses.

Course Code

Each course is assigned a code. For Bachelor of Engineering, Bachelor of Business and Bachelor of Engineering Technology programmes, the course code are summarized in Table 3 (a), 3 (b) and 3 (c) below:

Table 3 (a): First Alphabet - Type of programme offered at the Bachelor Degree level.

First Alphabet in the code	Type of program offered
E	Bachelor of Engineering
B	Bachelor of Business
P	Bachelor of Engineering Technology
U	General Course (This subject can be taken by all programs)

Table 3 (b): Second Alphabet - Faculty offering Courses
Second Alphabet in the code Faculty offering courses

Second Alphabet in the code	Faculty offering courses
E	School of Electrical Systems Engineering
M	School of Microelectronic Engineering
K	School of Computer & Communication Engineering
N	School of Mechatronic Engineering
B	School of Material Engineering
P	School of Manufacturing Engineering
R	School of Bioprocess Engineering
A	School of Environmental Engineering
D	School of Mechanical Engineering Technology
G	School of Electronic Engineering Technology
L	School of Electrical Engineering Technology
S	School of Civil Engineering Technology
T	School of Chemical Engineering Technology
C	Engineering Centre
Q	Institute of Engineering Mathematics
I	Centre for Industrial Collaboration
F	Centre of Business Innovation and Techno Entrepreneur (PPIPT)
U	Centre for Communication Technology and Human Development (PTKPI)
Z	Co-Curriculum Centre

Table 3 (c): Third Alphabet - University Requirements and Core Courses;

Third Alphabet in the code	Types of Courses (University's Requirements or Core Courses)
T	Core Courses
W	University's Requirements Courses

The three numbers which follow the Alphabet Codes represent the following – the first number represents the level of course. The second and third represent numbers assigned to the course. The codes are simplified in Table 4:

Table 4: Course Code

A	B	C	1	2	3	4	NUMBERS	DESCRIPTION
↓	↓	↓	↓	↓	↓	↓		
↓	↓	↓	↓	↓	↓	→	4	Units/Credits
↓	↓	↓	↓	↓	∟	→	3	Course numbers. (The determination of the course number is determined by each School)
↓	↓	↓	↓	∟	→	→	2	
|	|	|	∟	→	→	→	1	Level of courses: • 1= 1st year subjects, • 2= 2nd year subjects, • 3= 3rd year subjects, • 4= 4th year subjects,
↓	↓	∟	→	→	→	→	**TYPES OF COURSES**	**Refer Table 3(c)**
↓	∟	→	→	→	→	→	**FACULTIES**	**Refer Table 3(b)**
∟	→	→	→	→	→	→	**TYPES OF PROGRAM**	**Refer Table 3(a)**

Course Registration

All active students are required to register for courses for each semester. The course registration is done online by all students. Course registration must be completed within the dates specified by the Admissions and Student Records Unit via email and portals.

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Students are required to discuss with their Rakan Pendamping Siswa (RPS) regarding courses that they will have to register for each semester. Students must bring the registration their slip for verification by the RPS in the system during the discussion session. Registration of courses without the RPS 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 third week of the semester. Students must complete HEA-09 [Late Course Application Form] and obtain the approval of the Dean.

New students will register online on a specified date during orientation week according to their School. Students will be briefed by their School about courses in their programme of study during the orientation week.

Students are responsible to check and ensure that all particulars stated in Course Registration Slips are correct. Students who apply to add/drop/withdraw registration after the prescribed period without reasons deemed acceptable by the University may be fined. Registration after the prescribed period will be only be considered by the Dean of the School for students who have specific reasons. Students are not allowed to register add/drop/withdraw during examination week.

Students who do not register for a maximum of two (2) consecutive semesters without any reason can be terminated through the submission of Form HEA 20 (Borang Penamatan Pengajian Pelajar).

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 verification required). Each approved re-admission will be imposed a penalty of RM100.

1. Active Student Course Registration

All "Active" students are allowed to register online not more than twenty two [22] units and not less than ten [10] units except for those who are involved in Industrial Training and the Final Year Project. Students who wish to register more than twenty two [22] units, need to abtain approval from their RPS and verification by the Dean. Students must also fill Form HEA-09a (Borang Pendaftaran Kursus). Table 5 below summarises units that students can register for each semester based on their status:

Table 5: Summary of Units

Student Status	Minimum	Maximum
Active Student	10	22
Active student with Industrial Training (LI) and Final Year Project (FYP)	10	28

**** Students who do not take FYP or LI can take more than 22 units but must get approval from the Dean.*

2. Probation Student Registration [P]

Studenst with "Probation" status are not allowed to register online, on their own. The students need to meet up with their Academic Advisor to obtain confirmation from the Dean. They also need to fill up Form HEA-09b [Borang Pendaftaran Kursus-Percubaan (P)] before handing it to the School Assistant Registrar. Only Assistant Registrar of Schools/Registrar Office are allowed to register the subjects in this case. The number of units allowed is as in Table 6 below:

Table 6: Number of Units Allowed

Student Status	Minimum	Maximum
Probation (P1)	10	12
Probation (P2)	8	10

Add Courses / Drop Courses / Course Withdrawal

1. **Adding Courses**
   a. The period of time allowed for the addition of courses is up to week 3 (week of study).
   b. Students are required to fill in Form HEA-11 [BORANG TAMBAH KURSUS] before submitting it to the Assistant Registrar of the School to be updated in the system.

2. **Dropping Courses**
   a. The period of time allowed to drop courses is up to the week 7 (week of study).
   b. Students must use Form HEA-10 [BORANG GUGUR KURSUS], to be signed by the course lecturer, Dean of the School and then submit it to the Assistant Registrar of the School to be updated in the system.

3. **Course Withdrawal (TD)**
   a. With the consent of the Course Lecturer and Dean of the School, a student may apply to withdraw from a course registered in a semester not later than the last day of work in week 13 (week of study).
   b. Permission to allow students to withdraw a course is subject to the minimum unit alloweded except with permission from the Dean.
   c. Status “Tarik Diri” (TD) will be recorded in the records of registration and academic transcript. However, the grade will not be included to contribute towards the GPA and CGPA.

Course Prerequisite

Prerequisite is a course that must be taken and pass by the students before register the next course that has been specified in the academic structure of the particular Bachelor’s degree programme. To register for the course which have prerequisite, students need to pass the prerequisites.Student who fail the prerequisite and wish to sit for it in the same semester as the course needing the prerequisite must apply and obtain approval form the school Dean.

Change of Programme

Change of programme means changing a pogramme of study to another programme for reasons agreed to by both the current Dean and Dean of the School offering the intended programme.

We do not encourage change of programme as it involves the redistribution of resources which have been planned at the beginning of each academic session. However, an appeal to change programme can be considered based on the following conditions:

1. Applications can only be made by the student upon completion of at least one semester of study. The students will have to complete Form HEA-12 (Application Form Study Exchange Program). Application forms are available at the Registrar or the School. However, for certain cases, change of programme at beginning of study may be considered for approval by the Vice Chancellor / Deputy Vice-Chancellor (Academic & International).

2. Applications must be submitted within the first 2 weeks of the semester. The application form must be attached together with a copy of the last semester results or Matriculation / STPM / Diploma result.

3. Students can only apply for change of program no later than the first two semesters of study at UniMAP. An application after the third semester of study will not be considered.

4. Every application for change of program must be accompanied by strong reasons for the change. Applications must be approved by the Rakan Pendamping Siswa (RPS) (the current program and the intended program), Deans of the School (the current program and the intended program), the Dean of Academic Management and the Vice Chancellor / Deputy Vice-Chancellor (Academic & International).

5. For students who have obtain schorlarships or receive PTPTN funds or other types of sponsorships, they must get approval from their respective sponsors. Students need to deal directly with their sponsors. Further advice may be obtained from the Student Affairs and Alumni Department.

6. If the application is successful, the student must register for new courses offered in the new programme.

7. Students who change programmes in the same field can apply for credit transfer for Core Courses and University Core Course or a similar course in the curriculum of the new programme. While the other courses which have been taken but not related to the curriculum of the new programme will remain in academic transcript, the GPA / CGPA and credit amassed will not be taken into account.

8. Students who change programmes across different fields can only apply for credit transfer for University Core courses only or similar courses in the curriculum of the new programme. While other courses which have been taken but are not related to the curriculum of the new programme will remain in academic transcript, the GPA / CGPA and credits amassed will not be taken into account.

Postponement of Study

Postponement of study is permission granted to students for not attending study in a semester for reasons allowed by the University.

Postponement of study is permitted for students with health problems and whose illness is verified by government hospitals or University panel doctors or Pusat Kesihatan UniMAP. For certain cases, medical certificate from hospitals other than that mentioned, must be approved by Pusat Kesihatan UniMAP. An application made due to reasons other than ill health may be considered if it is reasonable approved by the Vice Chancellor / Deputy Vice Chancellor (Academic and International).

Students can apply for postponement of study by filling in Form HEA/HEP-13 (Borang Penangguhan Pengajian / Postponement of Study Application) which can be obtained from Registrar Department or schools. Applications must be:

1. recommended by the Rakan Pendamping Siswa (RPS),
2. recommended by the Dean of School,
3. recommended by the Dean of Student Affairs and Alumni,
4. recommended by the Counselor (if applicable)
5. recommended by the Dean of Academic Management, and
6. approved bt the Vice-Chancellor or Deputy Vice-Chancellor (Academic & International)

Application for postponement of study should be submitted before the seventh (7th) week of an academic session. Application made after that period will only be allowed for medical reasons and other reasons with the Approval of the Vice-Chancellor or Deputy Vice-Chancellor (Academic & International).

Students are not allowed to postpone their studies more than two (2) semesters consecutively except with the approval of the Vice-Chancellor or Deputy Vice-Chancellor (Academic & International). In the case not related to health reasons, students are only allowed to leave the university after the application for postponement is approved by university. Students who leave the university before the approval is granted, do so is at their own risk.

For students who postpone their studies due to health problem, the current semester in which s/he is registered will not be taken into account for graduation (without penalty). For case without penalty, courses registered in the particular semester will be dropped, and results varified by the Majlis Peperiksaan University (MPU) (if any), will be canceled.

Students who postpone their studies due to reasons other than health, the current semester in which s/he is registered will be taken into account for graduation (with penalty) unless permitted with the approval of the Vice-Chancellor or Deputy Vice-Chancellor (Academic & International). For cases with penalties, courses registered in the particular semester will not be dropped and will be taken into account for that semester. Results verified by the MPU are valid and will appear in the academic transcript.

A warning letter will be issued to students who do not register for the present semester without submitting any application to postpone their studies. Students who fail to submit an application for the postponement of studywithin a period of time will be terminated from the university. Their names will be dropped from the List of Registered Students and verified as quitting from the university.

Student Study Level

A student's academic performance is measured using the Grade Point Average (GPA) system throughout the university academic session. A student who obtains at least a 2.00 for their GPA in a semester will be awarded the 'Active' (A) status and will be allowed to continue to the next semester. Students are also required to obtain a minimum Cumulative Grade Point Average (CGPA) of 2.00 in order to graduate.

For students who are allowed to take Curative Courses (courses offered during long semester break), the examination results will be combined with their semester 2 examination results in order to determine the GPA and the student academic status. If the combined average is better, then the student will be given a new status, but if the combined average is less than the results for Semester II, then the status of Semester II will be maintained.

A student with a GPA lower than 2.00 in a given semester, will be given the Probation 1 (P1) status. The Probation 2 (P2) status is given to students with a GPA lower than 2.00 for two consecutive semesters. If the GPA of the student is still lower than 2.00 for the following semester, the student will not be allowed to continue his/her studies, unless the CGPA of those students exceeded 2.00 and with the University approval. The University authorities have the right to terminate any students who does not perform and fulfil academic requirements stated by the university.

Minimum and Maximum Period of Study

Bachelor of Engineering and Bachelor of Engineering Technology students have to complete their study within the duration given, which is a minimum of 8 semesters (4 years) and a maximum of 14 semesters (7 years). However, for students who are given credit exemptions, the duration given to complete their study cannot be less than 6 semesters (3 years) and not more than 12 semesters (6 years).

Bachelor of Business students, are required to complete the programme within a minimum of 6 semesters (3 years) and a maximum of 10 semesters (5 years). However, for students who obtain credit exemption, the maximum period allowed is subject to the exemption granted by the university.

Programme	Minimum (Semester)	Maximum (Semester)
Bachelor Of Engineering	8	14
Bachelor Of Engineering Technology	8	14
Bachelor Of Business	6	10

Curative Courses

Curative Courses are offered after Semester II. Registration for Curative Courses is very limited and depends on whether the particular course is offered by the school and is approved by the Senate. Students are only allowed to take a maximum of 10 units (3 courses) at any one time. Only tutorials will be conducted for these courses. Curative courses normally comprise 2 weeks of tutorials and one week of examinations.

Credit Exemptions

Credit Exemption is defined as an exemption from the registration and study of a course prescribed for a program, based on the courses taken by the student before being accepted into the university program as approved by the Dean of the School / Dean of Academic Management. Grade and Points Value for the courses given credit exemptions will not be taken into account in the calculation of Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA).

Credit Exemption is given to a student who has obtained the minimum grade of C in a subject according to the University grade system and subject to terms and conditions determined by the University.

A student who has taken a course which content is at lease 1/3 similar to, or has 1/3 equivalences to another course and has passed with a minimum of C according to the University grading may be given Credit Exemption. This also applies to the merging of courses (2 course or more) for one UniMAP course to be considered for exemption.

Exemption of credits for specific courses depends on the list of courses apporoved Schools, which has been approved by the Senate.

Examination and Evaluation System

Written examination is conducted at the end of each semester. Every student must fulfil the requirements for lecture, tutorial, practicum and others requirements (which will be informed) before being eligible to sit for an exam. The duration for exams is as follows:

Figure 6: Examination Duration

Course Value	Examination Duration
1 unit	2 hours
2 – 4 units	3 hours

Students' examination results are based on course work component and written examination. A course work carries the value of of 100% if the entire course is lab structured. Coursework consists of assignments, lab reports and test. Students' achievement is based on letter grades and points as follows:

Figure 7: Letter grades and points

Grade	Grade Point	Status
A	4.00	PASS
A-	3.75	
B+	3.50	
B	3.00	
B-	2.75	
C+	2.50	
C	2.00	
C-	1.75	FAIL
D+	1.50	
D	1.00	
D-	0.75	
F	0.00	

Figure 8: Calculation of GPA and CGPA:

Courses	Units	Value Gred [NG]	Gred [G]	Total NG
EKT121	3	3.75	A-	11.25
EMT102	4	2.50	C+	10.00
EMT111	4	3.50	B+	14.00
EMT112	4	4.00	A	16.00
EQT102	3	1.75	C-	5.25
EUT122	2	2.75	B-	5.50
	20			62.00
GPA = 62.00/20 = 3.10				
ECT200	3	3.50	B+	10.50
EKT212	4	2.00	C	8.00
EKT230	4	4.00	A	16.00
EKT240	4	3.50	B+	14.00
EQT203	3	3.75	A-	11.25
	18			59.75
GPA = 59.75/18 = 3.32				
CGPA = $\frac{\text{Total Accumulated Gred Value}}{\text{Total Accumulated Unit}}$ $= \frac{62.00 + 59.75}{20 + 18}$ = 3.20				

Appeal to Revise Examination Results

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 a duration of fifteen (15) days after the examination results are officially released by the Registrar. Applications after this duration will not be considered.

Students must submit Form HEA-15m [Examination Results Review Appeal Form] to the Examination & Graduation Unit, Academic Management Division, Registry Department. The appeal form must be submitted within a period of fifteen (15) days after the official result is announced. Students will keep one (1) copy of the form.

Students will be charged RM50 per course for their appeal. Payment can be made in cash or using Money Order / Pos Malaysia / Bank Draft / Cheque in the name of BENDAHARI UNIMAP.

Languages

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

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 the registration is done online, students are advised to meet with their Buddy or Academic Advisor during the registration exercise.

In the system, an academic staff supervises a small group of students for the whole duration of the students' study at UniMAP. 'Supervision' here entails frequent meetings under informal settings, where students can relax with their staff ("buddies") and discuss academic and social issues that concern them. Students who do not hold satisfactory academic performance will have to look to their buddies as 'mentors', in which case the student becomes the 'mentee' of the buddy, who helps the student out every step of the way.

Academic Support Centres

These centres are established to support UniMAP students to achieve academic excellence.

1. **Centre for Communication Technology and Human Development**
   Centre for Communication Technology and Human Development (PTKPI) offers University Requirement courses and other courses that promote knowledge in humanities and social sciences. More information about this centre is given elsewhere in this book.

2. **Engineering Centre**
   The Engineering Centre manage labs and common workshops that are needed for courses offered in UniMAP.

   Engineering Centre also supports research and design activities at UniMAP. Courses offered here include Engineering Skills which is compulsory for all students from School of Electrical System Engineering, School of Microelectronic Engineering, School of Mechatronic Engineering, School of Materials Engineering, School of Bioprocess Engineering, School of Environmental Engineering, School of Manufacturing Engineering, School of Computer & Communication Engineering and some of the students of Engineering Technology programmes.

3. **Institute of Engineering Mathematics**
   The Institute of Engineering Mathematics (IMK) is a centre for planning and handling engineering mathematics curriculum in UniMAP. It also serves as as a reference centre in providing expertise in mathematical research method, simulation and

statistical method. IEM also serves as a training center for in-campus and out-campus personnels in fields related to mathematics.

4. Centre of Industrial Cooperation
Centre of Industrial Cooperation liaises with industrial sectors in many aspects, especially in programmes directly related towards student's learning. Programmes such as exposure to industry, industrial forum, staff industrial training and others are handled by this centre. Some of these programmes are compulsory for all students.

5. Information Technology and Communication Centre
Information Communication and Technology Centre is established to implement ICT while assisting with academic and university's administration. ICT Centre also develops and facilitates computerized information system in the university. It also provides consultants in ICT and helps to promote the usage of technology in University.

6. Library
The University's Library is established to provide facilities and quality services to support the teaching/learning and research in this University.

7. The Centre for International Affairs
The Centre for International Affairs is the first point of contact for international students and it offers a wide range of programmes supporting UniMAP international students with regard to their enrolment, study and social life. It also provides referral service to students on facilities at campus and within the local community.

8. Sustainable Development Unit
This unit helps coordinate services to enhance the university's academic staff professionalism. This unit also plans courses, workshops and counselling for students.

Academic Management Division, Registrar's Department

Academic Management Division is responsible for handling affairs related to student enrollment, data processing and student records, examinations and graduation of students and the Senate.

The units in the Academic Management Division, Registrar's Department are:

1. Admissions and Student Records Unit
Admissions and Student Records Unit is responsible for handling matters related to the admission of the students,student records and processing of data. Tasks and duties carried out by this unit are:

i. Conduct the overall process of recruitment and registration of local of students at first degree and diploma level.
ii. Conduct the process of recruitment and enrollment of international students at undergraduate level.
iii. Manage and operate the data processing aspects of the Student Information System.
iv. Manage the students' personal records and student status, including students' application of Postponement of Studies and change of programs.
v. Manage students' online course registration every semester.
vi. Manage the process of unit exemptions and credit transfer for students.

2. Examinations and Graduation Unit
Examination and Graduation Unit is responsible to manage and monitor the process of Final Examinations and other matters related. The duties and responsibilities of this unit are as follows:

i. Issue the Examination Circular to School / Centre / Institute.
ii. Issue Examination Schedules for Diploma and Degree Program.

iii. Manage the Final Examination in the prescribed period.
iv. Secretariat for the Council of the University Examination.
v. Manage the process of exanmination data using the Student Information System.
vi. Issue Final Exam results.
vii. Manage the appeal process for students to review the examination results.
viii. Issue academic transcripts after the Convocation.
ix. Conduct the process of borrowing and returning robes for academic staffs.
x. Review the eligibility to graduate for final year students and issue Completion of Study letter.
xi. Responsible for the students convocation process in term of invitation, borrowing and returning robes.
xii. Manage the preparation and delivery of graduation scrolls to the graduates.
xiii. Record and update data of graduates who have graduated.

3. The Senate Unit

The Senate Unit is responsible for handling matters related to the Senate. The tasks and duties carried out are:

i. Plan the activities of the Senate and Committee, as secretariat and coordinate with other relevant parties in offering new and existing programs.
ii. Provide Academic Calendar, manage the list of course offered as well as dealing with the Ministry of Education Malaysia (MOE) and the Public Service Department (JPA) of new programs offered, the establishment of schools / departments and units.
iii. Manage the nomination of Honorary Degree recipients

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KELUAR

School of Microelectronic Engineering

Programmes Offered

- Diploma of Engineering (Microelectronic Engineering)
- Bachelor of Engineering with Honours (Microelectronic Engineering)
- Bachelor of Engineering with Honours (Electronic Engineering)
- Bachelor of Engineering with Honours (Photonic Engineering)
- Masters of Science (M.Sc in Microelectronic Engineering)
- Doctor of Philosophy (Ph.D)

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Introduction

School of Microelectronic Engineering (SoME), among the pioneer schools established in UniMAP, is a comprehensive institution, offering formative undergraduate degrees with research and design elements. Our undergraduate degrees provide the opportunity to gain knowledge and develop personal skills on an intensive high-quality programme at the cutting edge of technology.

Our undergraduate degrees are offered based on demands from the industry and fulfilled the requirement of professional bodies. In SoME, creating the environment in which forefront teaching and learning process can flourish and highly demanded expertise can be produced is always our top priority. As a SoME undergraduate student, you will have the opportunity to take advantage of our great study environment and best quality facilities of industrial standards.

Some of the facilities available at SoME

- Award winning Micro Fabrication Cleanroom
- State of the art Nano Fabrication Cleanroom
- IC Design Laboratory
- IC Fabrication Laboratory
- Nano Biochip Laboratory
- Failure Analysis Laboratory

Come and reinvent yourself, join our BEng programmes and create your future at SoME.

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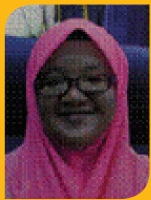

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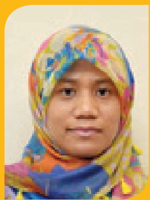

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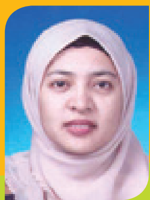

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Bachelor Of Engineering (Honours) (Microelectronic Engineering)

Programme Objectives (PEO)

PEO1:
Graduates who are leaders in the field of electronic engineering or chosen field as demonstrated through career advancement

PEO2:
Graduates who are members of and contribute to professional society

PEO3:
Graduates who engaged in life-long learning or continuous education opportunities

PEO4:
Graduates who contribute towards research and development

PEO5:
Graduates who are entrepreneurial engineers

Program Outcomes (PO)

PO1:
Ability to acquire and apply knowledge of mathematics, science, engineering and in-depth technical competence in Electronic (Microelectronic) engineering discipline to the solution of complex engineering problem

PO2:
Ability to identify, formulate and solve complex engineering problems

PO3:
Ability to design solutions for complex engineering problems and systems, components or processes to meet desired needs.

PO4:
Ability to conduct investigation into complex problems as well as to analyze and interpret data.

PO5:
Ability to use techniques, skills and modern engineering tools necessary for complex engineering practices so as to be easily adaptable to industrial needs.

PO6:
Ability to understand the social, cultural, global and environmental responsibilities of a professional engineer.

PO7:
Ability to demonstrate understanding of entrepreneurship, the process of innovation and the need for environmental and sustainable development.

PO8:
Ability to understand the professional and ethical responsibilities and commitment to the community.

PO9:
Ability to function on multi-disciplinary teams.

PO10:
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large

PO11:
Ability to understand the need for, and an ability to engage in life-long learning

PO12:
Ability to demonstrate understanding of project management and finance principles

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Microelectronic Engineering)

YEAR	YEAR 1		YEAR 2		YEAR 3			YEAR 4	
SEMESTER	**I**	**II**	**III**	**IV**	**V**	**VI**		**VII**	**VIII**
Engineering Core	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT203/3 Engineering Mathematics III	EQT271/3 Engineering Mathematics IV	EMT353/3 Digital Integrated Circuit Design	EMT360/3 Control Engineering	EIT 302/4 Industrial Training & Engineering Innovation	EMT 445/2 Final year Project	EMT 446/4 Final Year Project
	EMT114/3 Introduction to Electric Circuit	EMT124/3 Fundamental of Electrical Engineering	EMT282/3 Principles of Engineering Materials	EMT243/3 Introduction to IC Design	EMT 357/3 Fundamental of Microelectronic Fabrication	EMT 367/3 Microelectronic Fabrication		EMT470/3 Semiconductor Packaging	EMT454/3 Nanoelectronic Engineering
	ECT111/3 Engineering Skills	EMT125/3 Digital Electronic Principles I	EMT235/3 Digital Electronic Principles II	EMT245/3 Introduction to Microprocessor Design	EMT358/3 Communication Engineering	EMT369/3 Power Electronics		EMT475/3 Computer Organization and Architecture	**EMTXXX/3 Elective course
	EMT 181/3 Physics for Electronics	EMT115/3 Programming Language	EMT271/3 Semiconductor Fundamental	EMT293/3 Signal Analysis	EMT352/3 Advanced Devices	EMT 381/4 Microelectronic Design Project		EMT478/3 Instrumentation	EMT480/3 Reliability and Failure Analysis
	EMT111/3 Electronic Devices	EMT112/3 Analogue Electronics I	EMT238/3 Electromagnetic Theory	EMT212/3 Analogue Electronics II				EMT490/3 Micro-Electro-Mechanical Systems	
Non-Eng.		EUT122/2 Skills & Technology in Communication						EUT443/2 Engineering Management	EUT 440/3 Engineers in Society
University Required (15)	EUW410/2 University Malay Language				EUW235/2 Ethnic Relations	EUW233/2 Islamic & Asia Civilization			
	EUWXXX/1 Co-Curiculum		*EUWXXX/2 Option	EUW224/2 Engineering Entrepreneurship	EUW322/2 Thinking Skills	EUW212/2 University English			
138	**18**	**17**	**17**	**17**	**16**	**17**		**16**	**16**

* EUWXXX/2 if MUET Band 3 and below is compulsory to take EUW112/2 Basic English.

** EMT474/3 Optoelectronics System or EMT488/3 Digital Signal Processing

Bachelor of Engineering (Honours) (Electronic Engineering)

Programme Objectives (PEO)

PEO1:
Graduates who are leaders in the field of electronic engineering or chosen field as demonstrated through career advancement

PEO2:
Graduates who are members of and contribute to professional society

PEO3:
Graduates who engaged in life-long learning or continuous education opportunities

PEO4:
Graduates who contribute towards research and development

PEO5:
Graduates who are entrepreneurial engineers

Program Outcomes (PO)

PO1:
Ability to acquire and apply knowledge of mathematics, science, engineering and in-depth technical competence in Electronic engineering discipline to the solution of complex engineering problem

PO2:
Ability to identify, formulate and solve complex engineering problems

PO3:
Ability to design solutions for complex engineering problems and systems, components or processes to meet desired needs.

PO4:
Ability to conduct investigation into complex problems as well as to analyze and interpret data.

PO5:
Ability to use techniques, skills and modern engineering tools necessary for complex engineering practices so as to be easily adaptable to industrial needs.

PO6:
Ability to understand the social, cultural, global and environmental responsibilities of a professional engineer.

PO7:
Ability to demonstrate understanding of entrepreneurship, the process of innovation and the need for environmental and sustainable development.

PO8:
Ability to understand the professional and ethical responsibilities and commitment to the community.

PO9:
Ability to function on multi-disciplinary teams.

PO10:
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large

PO11:
Ability to understand the need for, and an ability to engage in life-long learning

PO12:
Ability to demonstrate understanding of project management and finance principles

Curriculum Structure 2013/2014

Bachelor of Engineering (Honours) (Electronic Engineering)

YEAR	YEAR 1		YEAR 2		YEAR 3			YEAR 4	
SEMESTER	I	II	III	IV	V	VI		VII	VIII
Engineering Core	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT203/3 Engineering Mathematics III	EQT271/3 Engineering Mathematics IV	EMT353/3 Digital Integrated Circuit Design	EMT360/3 Control Engineering	EIT 302/4 Industrial Training & Engineering Innovation	EMT 445/2 Final year Project	EMT 446/4 Final Year Project
Engineering Core	EMT114/3 Introduction to Electric Circuit	EMT124/3 Fundamental of Electrical Engineering	EMT 282/3 Principles of Engineering Materials	EMT243/3 Introduction to IC Design	EMT 355/3 Microcontroller	EMT363/3 VLSI Design		EMT473/3 MEMS Design and Fabrication	EMT483/3 Systems on Chip
Engineering Core	ECT111/3 Engineering Skills	EMT125/3 Digital Electronic Principles I	EMT235/3 Digital Electronic Principles II	EMT245/3 Introduction to Microprocessor Design	EMT358/3 Communication Engineering	EMT 382/4 Electronic Design Project		EMT475/3 Computer Organization and Architecture	**EMTXXX/3 Elective course
Engineering Core	EMT 111/3 Electronic Devices	EMT115/3 Programming Language	EMT271/3 Semiconductor Fundamental	EMT293/3 Signal Analysis	EMT 368/3 Reliability and Testability in Integrated Circuit Design	EMT369/3 Power Electronics		EMT478/3 Instrumentation	EMT488/3 Digital Signal Processing
Engineering Core	EMT 181/3 Physics for Electronics	EMT 112/3 Analogue Electronics I	EMT238/3 Electromagnetic Theory	EMT 212/3 Analogue Electronics II				EMT479/3 Analogue Integrated Circuit Design	
Non -Eng.		EUT122/2 Skills & Technology in Communication						EUT443/2 Engineering Management	EUT 440/3 Engineers in Society
University Required (15)	EUW410/2 University Malay Language		*EUWXXX/2 Option	EUW224/2 Engineering Entrepreneurship	EUW322/2 Thinking Skills EUW235/2 Ethnic Relations	EUW233/2 Islamic & Asia Civilization			
University Required (15)	EUWXXX/1 Co-Curiculum					EUW212/2 University English			
138	18	17	17	17	16	17	4	16	16

* EUWXXX/2 if MUET Band 3 and below is compulsory to take EUW112/2 Basic English.

** EMT474/3 Optoelectronics System or EMT480/3 Reliability and Failure Analysis

School of Microelectronic Engineering

Bachelor Of Engineering (Honours) (Photonic Engineering)

Programme Objectives (PEO)

PEO1:
Graduates who are leaders in the field of electronic engineering or chosen field as demonstrated through career advancement

PEO2:
Graduates who are members of and contribute to professional society

PEO3:
Graduates who engaged in life-long learning or continuous education opportunities

PEO4:
Graduates who contribute towards research and development

PEO5:
Graduates who are entrepreneurial engineers

Program Outcomes (PO)

PO1:
Ability to acquire and apply knowledge of mathematics, science, engineering and in-depth technical competence in Electronic (Photonic) engineering discipline to the solution of complex engineering problem

PO2:
Ability to identify, formulate and solve complex engineering problems

PO3:
Ability to design solutions for complex engineering problems and systems, components or processes to meet desired needs.

PO4:
Ability to conduct investigation into complex problems as well as to analyze and interpret data.

PO5:
Ability to use techniques, skills and modern engineering tools necessary for complex engineering practices so as to be easily adaptable to industrial needs.

PO6:
Ability to understand the social, cultural, global and environmental responsibilities of a professional engineer.

PO7:
Ability to demonstrate understanding of entrepreneurship, the process of innovation and the need for environmental and sustainable development.

PO8:
Ability to understand the professional and ethical responsibilities and commitment to the community.

PO9:
Ability to function on multi-disciplinary teams.

PO10:
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large

PO11:
Ability to understand the need for, and an ability to engage in life-long learning

PO12:
Ability to demonstrate understanding of project management and finance principles

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Photonic Engineering)

YEAR	YEAR 1		YEAR 2		YEAR 3			YEAR 4	
SEMESTER	I	II	III	IV	V	VI		VII	VIII
Engineering Core	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT203/3 Engineering Mathematics III	EQT271/3 Engineering Mathematics IV	EMT 393/3 Advanced Optics	EMT360/3 Control Engineering	EIT 302/4 Industrial Training & Engineering Innovation	EMT 445/2 Final year Project	EMT 446/4 Final Year Project
	EMT114/3 Introduction to Electric Circuit	EMT124/3 Fundamental of Electrical Engineering	EMT 294/3 Principles of Optics	EMT 212/3 Analogue Electronics II	EMT 394/3 Photonic Materials and Devices	EMT 395/3 Photonic Fabrication Engineering		EMT 496/3 Micro-Optical-Electro-Mechanical-System	EMT474/3 Optoelectronic System
	ECT111/3 Engineering Skills	EMT125/3 Digital Electronic Principles I	EMT235/3 Digital Electronic Principles II	EMT245/3 Introduction to Microprocessor Design	EMT358/3 Communication Engineering	EMT 383/4 Photonic Design Project		EMT475/3 Computer Organization and Architecture	EMT 494/3 Optical Communication
	EMT111/3 Electronic Devices	EMT115/3 Programming Language	EMT 295/3 Quantum Mechanics	EMT293/3 Signal Analysis	EMT 396/3 Principles of Integrated Circuit Design	EMT369/3 Power Electronics		EMT478/3 Instrumentation	**EMTXXX/3 Elective Course
	EMT 181/3 Physics for Electronics	EMT 112/3 Analogue Electronics I	EMT238/3 Electromagnetic Theory	EMT 297/3 Physics of Semiconductor				EMT 491/3 Optical Design	
Non -Eng.		EUT122/2 Skills & Technology in Communication						EUT443/2 Engineering Management	EUT 440/3 Engineers in Society
University Required (15)	EUW410/2 University Malay Language		*EUWXXX/2 Option	EUW224/2 Engineering Entrepreneurship	EUW235/2 Ethnic Relations	EUW233/2 Islamic & Asia Civilization			
	EUWXXX/1 Co-Curiculum				EUW322/2 Thinking Skills	EUW212/2 University English			
138	18	17	17	17	16	17	4	16	16

* EUWXXX/2 if MUET Band 3 and below is compulsory to take EUW112/2 Basic English.

** EMT488/3 Digital Signal Processing or EMT480/3 Reliability and Failure Analysis

Course Syllabus

EMT 111/3
Electronic Devices

Course Synopsis

This course will expose students to the basic electronic devices. The topic covered the fundamental concept of electronic devices. Students will expose to basic operation of diode and biasing circuits using data sheet. Students also will expose to diode application. The topics covered including Half wave rectifiers, Full wave rectifiers, Power Supply Filter and Regulators, Clipper and Clamper Diode circuits and Voltage Multipliers. Bipolar Junction Transistors (BJTs) and various types of Field Effect Transistors (FETs) are also covered in this course. The topics focus on the transistor structure, basic operation, characteristics and parameters, biasing and troubleshooting.

Course Outcomes

CO1: Ability to explain and analyze the fundamental concept of semiconductor devices.
CO2: Ability to explain and analyze the basic operation and characteristic of diode, BJTs and FETs.
CO3: Ability to analyze and evaluate the biasing circuit of diode, BJTs and FETs.

References

1. Floyd, T., Electronic Devices, 7th Edition, Prentice Hall, 2002.
2. Boylestad, R.L, Nashelsky, L., Electronic Devices and Circuit Theory, 8th Edition, Prentice Hall, 2002.
3. Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, 10th Edition, Prentice Hall, 2008.
4. Ben Streetman and Sanjay Banerjee, Solid State Electronic Devices (6th Edition), Prentice Hall, 2005.
5. Thomas L. Floyd, Electronics Fundamentals: Circuits, Devices and Applications, 7th Edition, Prentice Hall, 2006.

EMT 112/3
Analogue Electronics I

Course Synopsis

This course exposes the students to the basic knowledge in analogue circuits. The exposure encompasses amplifier design based on bipolar and field effect transistor, for single as well as multistage designs, power amplifiers, frequency response of amplifiers and also exposure to a few specialize device such as Shockley Diodes, SCS, Diac, Triac, SCR, Optotransistor, LASCR and Optocouplers. Emphasize is placed on basic designs aspects and applications. The course has been design to provide basic analogue electronics skills covering theories and practical.

Course Outcomes

CO1: Ability to explain and deduce the characteristics of the analogue circuits.
CO2: Ability to analyze and deduce the basic operations and applications of semiconductor devices.
CO3: Ability to analyze and deduce the equivalent circuit and the frequency response of analogue circuit.

References

1. Donald A. Neamen, *'Microelectronic: Circuit Analysis & Design, 4th Ed.'*, McGraw Hill International Edition, 2012.
2. Thomas L. Floyd, *'Electronic devices: Conventional Current Version',* 9th ed.', Prentice Hall, 2011.
3. Robert L. Boylestead & Louis Nashelsky, '*Electronic Devices and Circuit Theory*', 10th ed, Prentice Hall, 2011.

EMT181/3
Physics For Electronics

Course Synopsis

This course provides the principles of Physics, specifically as a foundation course for electronics, microelectronics and photonics. It is a calculus based course. The course is similar to undergraduate basic physics course consisting from classical physics of mechanics, thermodynamics, basic optics, electricity and magnetism, modern physics and the introductory to the electric conductivity for solid.

Course Outcomes

CO1: Ability to understand and formulate the principle concepts of physics in mechanics, waves and thermodynamics.
CO2: Ability to explain and calculate the principles of electricity and magnetism in basic electronics.
CO3: Ability to analyze and solve the problems related to the principles of optics and modern physics specifically on physics of materials.

References

1. P.A. Tipler and G. Mosca, "Physics for Scientist and Engineers (with Modern Physics)", Freeman Company (2008).
2. Serway and Jewett, "Physics for Scientist and Engineers (with Modern Physics)", 9th ed., Brooks/Cole, (2013).
3. J.D. Cutnell, K.W. Johnson, and K.D. Fisher, "Physics", 9th Ed., John-Wiley & Sons, (2012).
4. D. Halliday and R. Resnick, "Fundamental of Physics", Ext. 7th Ed. Wiley, (2004).
5. A.D. Kraus, A.V-Cohen, "Design and Analysis of Heat Sinks (Thermal Management of Microelectronic and Electronic System Series)", Wiley-Interscience, (1995).

EMT114/3
Introduction To Electric Circuits

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, circuit analytical technique, passive & active elements. Second part, it emphasize on ac circuit. It is 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

CO1: Ability to analyze and solve the circuit problems using the basic circuit theory.
CO2: Ability to choose and apply circuit analysis techniques for circuit problems.
CO3: Ability to apply knowledge of problem solving in circuit analysis for integrated circuit systems.

References

1. Alexander, C.K, Sadiku, M.N.O, Fundamental of Electric Circuit, 3rd Editions, Mc Graw-Hill, 2009
2. Nilsson, J.W. Riedel, S.A, Electric Circuit, 6th Edition, Prentice Hall, 2001
3. Irwin, J.D, Nelms, R.M, Basic Engineering Circuit Analysis, 8th Edition, John Wiley, 2005
4. Robbins, A.H, Miller, W.C, Circuit Analysis: Theory and Practice, 3rd Edition, Thomson/Delmar Learning, 2003
5. Hyat, W.H, Durbin, S.M, Kimmerly, J.E, Engineering Circuit Analysis, 6th Edition, Mc Graw Hill, 2002

EMT115/3
Programming Language

Course Synopsis

Integrating hardware and software is one aspect to be a good engineer, thus an electronic engineer should be competence in programming. This course will focus on the computer software program development using C programming language which is widely used programming language for creating computer programs. The syllabus will cover the theory of programming concepts and principles in order to solve the engineering problems. The students will be exposed to the coding, executing and debugging techniques during C program development.

Course Outcomes

CO1: Ability to analyze programming concepts and principles to solve engineering problems.
CO2: Ability to demonstrate coding, executing and debugging the computer software program.
CO3: Ability to design computer software programs to solve engineering problems.

References

1. Paul Deitel, Harvey Deitel, "C: How to Program, 7th Edition", Prentice Hall, 2009.
2. Harry H. Cheng, "C for Engineers and Scientists, an Interpretive Approach", McGraw Hill, International Edition, 2010.
3. Deitel and Deitel, Sudin, S., Ahmad, R.B. and Yacob, Y., "C How To Program", Pearson-Prentice Hall, 2006.
4. K. N. King, "C Programming: A Modern Approach, 2nd Edition", W. W. Norton & Company, 2008.
5. Noel Kalicharan, "C Programming - An Advanced Course", CreateSpace, 2008.

EMT 124/3
Fundamental Of Electrical Engineering

Course Synopsis

This course focuses on the fundamental of electrical engineering and power electronics which consists of two parts; electrical machinery and instrumentation. This course will provide the basic knowledge in power transmission, machinery, power processing devices and metering. The topics covered in this course are transformers, AC and DC machines, AC and DC meters, AC and DC bridges, AC and DC converters, and sensors & transducers.

Course Outcomes

CO1: Ability to solve and analyze concept of transformers, DC and AC machines.
CO2: Ability to solve and analyze the operations of AC and DC meters & AC and DC bridges.
CO3: Ability to solve and analyze problems for sensors & transducers.

References

1. Chapman.S.J. (2005). *Electric Machinery Fundamentals*. 4th ed. Singapore: McGraw Hill.
2. Larry. D. Jomes and A.F. Chin. (1991). *Electronic Instruments and Measurements.* USA: Prentice Hall.
3. Z.A. Yamayee and J.L. Bala. (1993). *Electromechanical Energy Devices & Power Systems*. USA: Wiley & Sons.
4. C.S Rangan, G.R. Sarma & V.S. Mani, "Instrumentation Devices & System" Tata, McGraw-Hill Publishing Company Limited, 2004.
5. Bhas S. Guru & Huseyin R. Hiziroglu, "Electric Machinery and Transformers", 2001, Oxford University Press.

EMT 125/3
Digital Electronic Principles I

Course Synopsis

This course provides introductory of digital concept mainly numbering system, operation & codes, Boolean Algebra, and basic logic gates. Students are exposed to logic design, particularly combinational logic functions and sequential circuit design.

Course Outcomes

CO1: Ability to define, convert and demonstrate arithmetic in various number systems.
CO2: Ability to illustrate, apply and analyze Boolean Algebra to minimize the design of a logic circuit.
CO3: Ability to describe, illustrate, demonstrate and evaluate combinational logic circuits design.
CO4: Ability to identify, illustrate, analyze and deduce synchronous and asynchronous sequential circuits design.

References

1. T. L. Floyd, "Digital Fundamentals", 10th Edition, Prentice Hall, 2009.
2. Rafikha Aliana, Norina Idris, Phak Len Eh Kan, Mohammad Nazri, Digital Electronics Design, 1st Ed. Prentice Hall, 2007.
3. R. H. Katz and G. Borriello, "Contemporary Logic Design", 2nd Edition, Prentice Hall, 2005.
4. R. J. Tocci, N. S.Widmer and G. L. Moss, "Digital Systems: Principles and Applications", 10th Edition, Prentice Hall, 2006.
5. Digital Design 4th Ed., M. M. Mano and M. D. Ciletti, Prentice Hall, 2008.

EMT 271/3
Semiconductor Fundamental

Course Synopsis

Introduction to semiconductor devices and technology, energy bands and carrier concentration in thermal equilibrium, carrier transport phenomena, p-n junction, bipolar transistor, MOS diode and MOSFET.

Course Outcomes

CO1: Ability to formulate the theory and physics of semiconductor.
CO2: Ability to manage the different semiconductor processes in terms of its problems and performances.
CO3: Ability to formulate the behaviours in semiconductor devices.

References

1. S. M. Sze, K. K. Ng, *Physics of semiconductor devices*, John Wiley, 2007, USA.
2. F. P. Robert *Advanced Semiconductor Fundamentals*, 2nd ed. 2003, Prentice Hall, USA.
3. Peter Y. Yu, M. Cardona, *Fundamental of Semiconductors: Physics and materials properties (advanced text in physics)*, Springer-Verlag, 2001, Germany.
4. G. G. Streetman, S. K. Banerjee, *Solid State Electronic Devices*, Prentice Hall, 2006, USA.
5. K. Kramer, W. Nicholas, G. Hitchon, *Semiconductor Devices: A Simulation Approach*, Prentice Hall, 1997, USA.
6. D. A. Neamen, Semiconductor physics and devices, McGraw hill, 3rd ed. 2003, USA.

EMT 235/3
Digital Electronic Principles II

Course Synopsis

This course exposes the students to Digital Systems Design Concepts, focusing on Sequential Systems, Computer Design Basics as well as the Memory Unit.

Course Outcomes

CO1: Ability to explain and examine digital design concepts.
CO2: Ability to define, construct, and compare various types of counters; to interpret state tables, state diagrams (Finite State Machines, FSM), and Algorithmic State Machines (ASM) charts; and to construct sequential circuit designs.
CO3: Ability to define the basic concepts of memory used in digital circuits; to explain the principles of datapaths, Arithmetic Logic Unit (ALU), Shifter and Control Word; and to construct a simple ALU.

References

1. M. M. Mano, Floyd - Digital Electronics Design, Prentice Hall. 2007.
2. Digital Fundamentals 10th Ed., Thomas L. Floyd, Pearson Prentice Hall, 2009.
3. Digital Principles and Design, Donald D. Givone, McGraw-Hill, 2002.
4. Digital Design 4th Ed., M. M. Mano and M. D. Ciletti, Prentice Hall, 2008.
5. Logic and Computer Design Fundamentals, M. Morris Mano and Charles R. Kime, Prentice Hall, 4th Ed., 2008.
6. Fundamentals of Digital Logic with Verilog/VHDL Design, Stephen Brown and Zvonko Vranesic, McGraw Hill 2009.
7. Digital Design – Principles and Practices 4th Ed., John F. Wakerley, Prentice Hall, 2007.

EMT 212/3
Analogue Electronics II

Course Synopsis

This course offers the students an exposure to the Operational Amplifier: Operation, differential, common-mode, parameters, basic op-amp, practical op-amp circuits, op-amp datasheet; Applications of op-amp and frequency response: Summing amplifier, Voltage Follower, Comparator, Integrator, Differentiator, frequency response and compensation; Feedback Circuits: Concepts of feedback, types of feedback connection, practical feedback circuit, feedback amplifier; Oscillator: Basic operating, principles of an oscillator, phase shift, Wien Bridge, Crystal oscillator, uni-junction; Active filter: Basic filter, filter response characteristics, low-pass filter, high-pass filter, band-pass filter, band-stop filter, frequency response measurement. Design of filter, Butterworth, Chebychev and Elliptic; Voltage regulators: Basic series and basic shunt regulators, IC regulators and applications.

Course Outcomes

CO1: Ability to analyze analogue circuits for op-amp characteristic.
CO2: Ability to analyze analogue circuits for op-amp application.
CO3: Ability to design and evaluate oscillator, filter and voltage regulator circuits using op-amps.

References

1. Donald A. Neaman, *Electronic Circuit Analysis and Design*, 2nd Ed., Mc-Graw Hill, 2006
2. Floyd, T., Electronic Devices, 7th Ed., Pearson Education. Inc.,2005
3. Boylestead, R.L, and Nashelsky, L., Electronic Devices and Circuit Theory, 7th Ed., Prentice-hall, 1999

EMT 238/3
Electromagnetic Theory

Course Synopsis

This purpose of this subject is to learn and understand the basic theory of electromagnetism. Students should be able to understand the core concepts of electrostatics and magnetism as well as the combined electromagnetism effect.

Course Outcomes

CO1: Ability to evaluate, derive, and analyze Maxwell's Equation for wave propagation
CO2: Ability to evaluate the concepts and interaction of electromagnetism in media

References

1. John D. Krauss & Daniel A. Fleisch, Electromagnetics with Applications, 5th ed., Mc Graw Hill
2. Matthew N.O.Sadiku, Elements of electromagnetics, Third Edition, Oxford University Press, 2001
3. Stewart, Joseph V, Intermediate Electromagnetic Theory, world Scientific,2001
4. Branislav M. Notaros, Electromagnetics, Pearson 2011
5. William H. Hayt,John A. Buck, Emgineering Electromagnetics, Mc-Graw Hill 2011

EMT 243/3
Introduction To IC Design

Course Synopsis

The course provides the students an exposure on basic logic circuits design, layout design, layout simulation of integrated circuits, as well as basic integrated circuits design techniques.

Course Outcomes

CO1: Ability to apply Boolean Algebra and analyze logic circuits at transistor level using schematic.
CO2: Ability to design the layout of a circuit based on the design rules specified.
CO3: Ability to evaluate the CMOS transistor characteristics.

References

1. Wolf, Rabeay, Jan M. Weste, Neil H.E, Compiled by Norina Idris, Norhawati Ahmad, Rizalafande Che Ismail, Muammar Mohamad Isa, Siti Zarina Md. Naziri, Muhammad Imran Ahmad, "CMOS VLSI; A Design Perspective", Pearson, 2008.

2. R. Jacob Baker, "CMOS Circuit Design, Layout, and Simulation, 3rd Edition (IEEE Press Series on Microelectronic Systems)", Wiley-IEEE Press, 2010.
3. Neil Weste, David Harris, "CMOS VLSI Design: A Circuits and Systems Perspective, 4th Edition", Addison Wesley, 2010.
4. Wayne Wolf, "Modern VLSI Design: IP-Based Design, 4th Edition", Prentice Hall, 2009.
5. Yuan Taur, Tak H. Ning, "Fundamentals of Modern VLSI Devices, 2nd Edition", Cambridge University Press, 2009.

EMT 245/3
Introduction To Microprocessor Design

Course Synopsis

The aim of this course is to study the microprocessor architecture and relate that knowledge to the design of microprocessor based systems. This includes the design technique for memory, input and output for the systems. The study of 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

CO1: Ability to analyze the theory of microprocessor structure and design.

CO2: Ability to write and classify the microprocessor programming, interfacing and operation using assembly language.

CO3: Ability to design and evaluate a microprocessor program to solve engineering related problem.

References

1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming, and Applications with the 8085", Prentice Hall, 2002
2. N. Senthil Kumar, M Saravanan, S Jeevananthan, "Microprocessors and Microcontrollers", Oxford University Press, USA, 2011
3. Richard C. Detmer, "Introduction to 80x86 Assembly Language and Computer Architecture", Jones & Bartlett Publishers, 2009
4. Barry B. Brey, "Intel Microprocessors, The (8th Edition)", Prentice Hall, 2008
5. Richard C. Detmer, "Introduction to 80x86 Assembly Language and Computer Architecture", Jones & Bartlett Publishers, 2009
6. John Crisp, "Introduction to Microprocessors and Microcontrollers", Newnes, 2004

EMT 293/3
Signal Analysis

Course Synopsis

This course aims to introduce students to the basics of signals and its analysis. To learn how certain input to a system will produce the required output. To understand signal spectra and the methods to analyze signal and its relations.

Course Outcomes

CO1: Ability to reproduce, analyze and solve signal waveforms in analogue form.

CO2: Ability to identify, analyze and solve signals and systems via Continuous Time Fourier Series and Transform.

CO3: Ability to identify, analyze and evaluate signals and systems via Z-Transform for analogue filter application.

References

1. Simon Haykin, Barry Van Veen "*Signals and Systems",* 2nd. Ed., Wiley, 2003.
2. Bhagwandas Pannalal Lathi,"*Signal processing and linear systems*", Oxford University Press, 2000
3. Charles L. Philips, John M. Parr, Eve A. Riskin, "*Signals, Systems and Transforms"*, 3rd Ed., Prentice Hall International Edition, 2003
4. Fred J. Taylor, "*Principles of Signals and Systems"*, McGraw Hill International Ed. 1994.

EMT 353/3
Digital Integrated Circuit Design

Course Synopsis

This course provides the students an exposure to hardware modelling using Verilog Hardware Description Language, as a means of design entry, simulation and verification of digital circuits. The ModelSim software is used.

Course Outcomes

CO1: Ability to explain and analyze the hardware and software principles of digital design using Verilog HDL
CO2: Ability to design a complete digital system consisting of control and datapath unit
CO3: Ability to explain and analyze the principles of field programmable gate array (FPGA) and design examples.

References

1. Ciletti M. D., *"Verilog 2001 for Beginners"*, Compiled by Norina Idris et al., Prentice Hall, 2008.
2. Ciletti M. D., "Modelling, Synthesis and Rapid Prototyping with the Verilog HDL", Prentice Hall, 1999.
3. Palnitkar S., "Verilog HDL, A Guide To Digital Design And Synthesis", Prentice Hall, 2003.
4. Vahid F. and Lysecky R., "Verilog for Digital Design", John Wiley & Sons, Inc., 2007.
5. Katz R. H. and Borriello G., "Contemporary Logic Design", 2nd Edition, Prentice Hall, 2005.

EMT 354/3
Photonic Devices

Course Synopsis

To educate students on the concepts, principles and operation of various major photonics devices. The course assumes basic knowledge of optics, semiconductor and electromagnetic waves. Devices covered in this course are: waveguide and couplers, nonlinear photonics, lasers and semiconductor optoelectronics.

Course Outcomes

CO1: Ability to evaluate principles of passive optical devices such as planar lightwave circuits and fibre based devices.
CO2: Ability to evaluate principles of active optical devices such as optical amplifiers and modulators, photodiodes, photovoltaics and lasers

References

1. Liu, Jia Ming, "Photonic Devices", Cambridge, 2005.
2. B.E.A. Saleh, M.C. Teich, "Photonics", Wiley Interscience, 2nd ed. 2007.
3. Kwok. K. Ng,"Complete Guide to Semiconductor Devices, 2nd ed., Wiley Interscience, 2002.
4. M. Born, E. Wolf, "Principles of optics", Cambridge University Press, 7th ed. 2001.
5. Chai Yeh, "Applied Photonics", Academic Press, 1994.
6. J. Chrostowski, "Applications of Photonic Technology", Springer, 1995.
7. Bishnu P. Pal, "Guided Wave Optical Components and Devices: Basics, Technology, and Applications (Optics and Photonics)," Academic Press, 2005.

EMT 355/3
Microcontroller

Course Synopsis

The aim or this course is to study the concept and requirement of embedded system. This includes the characteristic of embedded system, hardware and software development, single chip microcontroller and programming technique in assembly language and C, basic multitasking concept, developing and embedded system application.

Course Outcomes

CO1: Ability to define, summarize, illustrate and classify the concept and requirement of embedded system
CO2: Ability to define, summarize, illustrate, classify and design a structured programmed in assembly language and C for the system application
CO3: Ability to define, summarize, illustrate, classify and design embedded system based in a single chip microcontroller

References

1. Muhammad Ali Mazidi & Janice Gillispie Mazidi, The 8051 Microcontroller and Embedded Systems, Prentice Hall 2000
2. W. Kleitz, Microprocessor and Microcontroller Fundamentals: The 8085 and 8051 Hardware and Software, Prentice Hall, 1998.
3. James W. Stewart & Kai X. Miao, The 8051 Microcontroller: Hardware, Software and Interfacing, Prentice Hall 2nd Ed. 1999

EMT 357/3
Fundamental Of Microelectronic Fabrication

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

CO1: Ability to name, define and explain the essential aspects of the semiconductor fabrication technology which include materials, processes, facilities and standard practices.

CO2: Ability to state, define, explain, demonstrate and determine important parameters of wafer cleaning, etching and thermal processes.

CO3: Ability to state, define, explain, demonstrate and determine important parameters of photolithography process, chemical vapour deposition and physical vapour deposition.

References

1. Hong Xiao. (2001). *Introduction to Semiconductor Manufacturing Technology*. Prentice Hall.
2. Peter Van lant. (2000). *Microchip Fabrication: A Practical Guide to Semiconductor Processing*. Mc Graw Hill.
3. Campbell, S. A. (2001). *Science And Engineering of Microelectronics Fabrication*. New York: Oxford University Press.
4. Handbook of Contamination Control in Microelectronics - Principle, Applications and Technology. Edited by Tolliver, D. (1998). Noyes Publications.
5. Introduction to Microelectronic Fabrication, Volume V, Second Edition, Richard C. Jaeger, Prentice Hall, 2002.
6. Semiconductor Devices, Physics and Technology, 2nd Edition, S.M. Sze, John Wiley & Sons, Inc, 2002.
7. Silicon VLSI Technology: Fundamentals, Practice and Modelling, James D. Plummer, Michael D. Deal and Peter B. Griffin, Prentice Hall, 2000.

EMT 358/3
Communication Engineering

Course Synopsis

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

Course Outcomes

CO1: Ability to define basic principles of analogue and digital communication, and the essential of communication system in real world.

CO2: Ability to define and explain the analogue modulation, solve the problems related to the types of analogue modulation.

CO3: Ability to define and explain the digital modulation, solve the problems related to the types of digital modulation.

CO4: Ability to define and explain the digital transmission, solve the problems related to the types of digital modulation.

References

1. Wayne Tomasi," Electronic Communication System, Fundamental Through Advanced", 5th Ed. Pearson Prentice Hall,2004
2. Paul Young, Electronics Communications Techniques, 5th Edition, Prentice Hall, 2004
3. Mullet," Basic Telecommunications: The Physical Layer", Thomson Learning, 2003.
4. S. Haykin, "Communication Systems", 5th Ed. Wiley, 2009.
5. B.P.Lathi, Zhi Ding, "Modern Digital and Analogue Communication Systems", 4th Ed. Oxford Univ Press, 2009.
6. A.B.Calson, P. Crilly, "Communication Systems", 5th Ed. McGraw Hill, 2009.

EMT 360/3
Control Engineering

Course Synopsis

This is an introduction course to control systems engineering. Students will be exposed to the mathematical modelling for mechanical, electrical as well as electro-mechanical systems using transfer functions, signal-flow graphs and Mason's rule. They will conduct system performance analysis in time and frequency domain. System stability will also be studied along with root locus analysis. Finally the students will be introduced to system compensation design using PID and lead-lag controllers.
The laboratory sessions will be conducted to enable the students to test the theory.

Course Outcomes

CO1: Ability to obtain the mathematical model for electrical/electronic and mechanical systems.
CO2: Ability to perform system's time-domain analysis with response to test inputs. Analysis includes the determination of the system stability.
CO3: Ability to perform system's frequency-domain analysis with response to test inputs. Analysis includes the determination of the system stability.
CO4: The ability to design P, PI, PD, PID, lead, lag controllers based on the analysis of the system's response in time and frequency domain.

References

1. Modern Control Systems 11th Edition, Richard C. Dorf and Robert H. Bishop, 2008
2. Control Systems Engineering 4th Edition, Norman S. Nise, John Wiley & Sons, 2004.
3. Modern Control Engineering 5th Edition, Ogata K., Prentice Hall, 2010.
4. Automatic Control Systems Farid Golnaraghi and Benjamin Kuo, 2009.
5. Stubberud, I. William, J. DiStefano, "Schaum's Outline of Feedback and Control Systems", 4th Ed. McGraw Hill, 2006.

EMT 363/3
VLSI Design

Course Synopsis

This course will cover various important elements for VLSI design such as sequential circuit, clock tree, wire interconnect and power dissipation and low power design.

Course Outcomes

CO1: Ability to design and analyse the performance of sequential.
CO2: Ability to design and analyse the performance of clock-tree circuit.
CO3: Ability to design and analyse DSM Interconnect and low power circuit.

References

1. Niel H.E. Waste, David Harris (2005). CMOS VLSI Design: A Circuits and Systems Perspective, 3rd Edition Addison Wesley.
1. Jan M. Rabaey, Anantha Chandrakasan, Borivoje Nikolic (2003). Digital Integrated Circuits: A Design Perspective. 2nd Edition. Prentice Hall.
2. Keating and Pierre Bricaud (2002). Reuse Methodology Manual for System-on-a-Chip Designs. 3rd Edition. Springer.

3. Surviving the SOC Revolution - A Guide to Platform-Based Design (1999). by Henry Chang, Lee Todd, Andrew McNelly, Grant Martin, Merrill Hunt, Larry Cooke. 1st Edition Springer
4. Wayne Wolf. (2002). *Modern VLSI Design: System-on-Chip Design*. 3rd ed. Prentice Hall PTR.

EMT 366/2
Engineering Writing II

Course Synopsis

To educate students on the concepts of technical writing for engineers. The topics covered in this course varies from grammar and punctuation in research reports, to technical how to in writing documentations and up to presentation and business communications.

Course Outcomes

CO1: Ability to explain and distinguish the concept and principles of proper English grammar and punctuation.
CO2: Ability to explain, discuss and solve any research report task in English
CO3: Ability to explain, solve and analyse group work involving presentations, reports and communication task

References

1. Leo Finkelstein Jr (2008). Pocket Book of Technical Writing for Engineers and Scientist. (New York: McGraw Hill International Edition)
2. Ballard, B. and Clanchy J. (1991). Essay writing for students: a practical guide. (Melbourne: Longman Cheshire.)
3. Taylor, G. (1989). The student's writing guide for the arts and social sciences. (Cambridge: Cambridge University Press.)
4. Alley, M., The Craft of Scientific Writing, 3rd ed. (New York: Springer-Verlag New York, Inc., 1996).
5. Alley, M., The Craft of Editing: A Guide for Managers, Scientists, and Engineers (New York: Springer-Verlag New York, Inc., 2000).
6. Alley, M., The Craft of Scientific Presentations (New York: Springer-Verlag New York, Inc., 2003).

EMT 367/3
Microelectronic Fabrication

Course Synopsis

This course focuses on the fabrication process module of the CMOS technology. The students should be able to design, produce a mask, prepare the runcard (process flow of the MOSFET), fabricate the MOSFET, analyse and characterise the devices electrically. The students should also able to understand the important CMOS process modules such as well technology, isolation technology, multi level interconnect technology as well as related device issues mainly associated with the device miniaturisation.

Topics covered in this course are as follow:

1. Microelectronic fabrication overview
2. Standard CMOS process flow and cross section
3. CMOS process sub-integration module:
   - i) Well technology
   - ii) MOS device isolation technology
   - iii) Gate oxide integrity and characterisation,
   - iv) Multilevel interconnect technology (metallisation and multilevel dielectrics, planarisation, contact and via),
   - v) MOS scaling effect; short channel effect, hot carrier effect, device characterisation;
   - vi) IV and CV test.

Course Outcomes

CO1: Ability to explain and construct the essential aspects of the device technology.
CO2: Ability to discuss and design the major CMOS process module for advanced CMOS process technology.

CO3: Ability to analyze, predict and characterise the major CMOS process and device issues in circuit level.

References

1. Hong Xiao. (2001). Introduction to Semiconductor manufacturing Technology. Prentice Hall.
2. Michael Quirk & Julian Serba. (2001). Semiconductor Manufacturing Technology. Prentice Hall.
3. S.Wolf & R.N. Tauber. (1986). Silicon processing for the VLSI Era – Volume 1 Process Technology.
4. S.Wolf & R.N. Tauber. (1986). Silicon processing for the VLSI Era – Volume 2 Process Integration.
5. S.Wolf & R.N. Tauber. (1986). Silicon processing for the VLSI Era – Volume 3 Submicron MOSFET.

EMT 369/3
Power Electronic

Course Synopsis

Topics covered are: Fundamental Concepts of Power Electronics, Power Semiconductor Devices, Power Electronic Circuits, AC-DC Conversion, AC-AC Conversion, DC-DC Conversion and DC-AC Conversion.

Course Outcomes

CO1: Ability to explain power electronic systems operation, applications area and need for efficiency design.

CO2: Ability to describe different types of power semiconductor device; power diode, SCR, BJT, IGBT, GTO and MOSFET.

CO3: Ability to analyze and design AC-DC conversion, AC-AC conversion, DC-DC conversion and DC-AC conversion.

References

1. Mohan, Undeland, Robbins. (1995). *Power Electronics: Converters, Applications & Design.* 2nd ed. John Wiley and Sons, Inc.
2. Cyril W. Lander. (1993). Power Electronics. 3rd ed. McGraw-Hill.
3. Daniel W Hart (1997), Introduction to Power Electronics, Prentice Hall International.
4. J.S.Chitode (2007), Power Electronics, Technical Publications Pune.
5. Issa Batarseh (2004), Power Electronic Circuits, John Wiley & Sons, Inc.

EMT 445/2
Final Year Project

Course Synopsis

An exposure to the students in microelectronic/electronic/photonic based research project

Course Outcomes

CO1: Ability to apply theory into practice.

CO2: Ability to possess enhancement in problem solving skill.

CO3: Ability to strengthen capability in working independently

CO4: Ability to undertake project planning, design, implementation and management

References

Based on project title

EMT 470/3
Semiconductor Packaging

Course Synopsis

Students will be exposed to Microsystems packaging, the role of packaging in microelectronics, fundamental of IC assembly, general semiconductor process flow, design for reliability, thermal management, sealing and encapsulation, packaging material and processes, and latest packaging technology trend via latest scientific papers. The students will also be exposed to identifying critical packaging parameters and interpreting data of their own designed experiment. Mathematical modelling in packaging are also introduced.

Course Outcomes

CO1: Ability to understand and explain the semiconductor packaging process flow.

CO2: Ability to identify the critical parameters in semiconductor packaging process.

CO3: Ability to discuss the technology trend in semiconductor packaging.

CO4: Ability to identify, analyze and tackle the common problems that occur in semiconductor packaging industry.
CO5: Ability to identify the materials, process and technology needed to package the semiconductor product.

References

1. Rao Tummala. 2001. Fundamentals of Microsystem Packaging. Mc-Graw Hill Professional.
2. M. Datta, T.Osaka, J.W Schultze (Editor). 2005. *"Microelectronic Packaging"*. CRC Press, Florida U.S
3. Glenn R. Blackweel, 2000. *"The Electronic Packaging Handbook".* CRC Press LLC. Florida U.S.
4. William D. Brown (Editor). 1999," *Advanced Electronic Packaging with Emphasis on Multichip Modules*", IEEE Press Series on Microelectronics Systems. The Institute of Electrical and Electronics Engineers, Inc. New York.

EMT 432/3
MEMS Design And Fabrication

Course Synopsis

The aim of this course is to provide the introduction and overview of MEMS market, scaling laws, MEMS devices and applications, MEMS materials and fabrication methods, and basic MEMS concepts including pressure and acceleration.

Course Outcomes

CO1: Ability to explain the overview of MEMS, MEMS materials and micromachining technologies.
CO2: Ability to analyze MEMS structures in automotive, photonic, life sciences and RF applications.
CO3: Ability to solve scaling law problems in miniaturization.
CO4: Ability to solve, explain and differentiate MEMS packaging and reliability issues.

References

1. Nadim Maluf & Kirt Williams 'An Introduction to Microelectromechanical Systems Engineering",2nd edition, Artech House Inc, 2004
2. Tai-Ran Hsu, MEMS and Microsystems; Design and Manufacture, Boston, McGraw Hill 2000
3. Hong Xiao, Introduction to Semiconductor Manufacturing Technology, Prentice Hall, 2001
4. Tai-Ran Hsu. MEMS Packaging (2004). EMIS Processing Series 3. INSPEC.
5. James J. Allen. Micro Electro Mechanical System Design (2005). CRC Press. Taylor & Francis Group.

EMT 422/3
Computer Organization And Architecture

Course Synopsis

This subject will focus on the computer system with various designs of interface techniques, organization and architecture. The syllabus will covered 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

CO1: Ability to differentiate and classify the theory of computer system components and the interactions between the components.
CO2: Ability to illustrate and classify the theory of operation in terms of central processing and control unit.
CO3: Ability to design and evaluate a computer simulation program to solve engineering related problem.

References

1. William Stallings "Computer Organization and Architecture: Designing for Performance", 8th Edition, Prentice Hall, 2010.
2. John L. Hennessy and David A. Patterson "Computer Architecture: A Quantitative Approach", 4th Edition, Morgan Kaufmann, 2006.

3. Linda Null "The Essentials of Computer Organization and Architecture", Jones & Bartlett Pub., 2006
4. Miles J. Murdocca and Vincent P. Heuring "Computer Architecture and Organization: An Integrated Approach", Wiley, 2007

EMT 478/3
Instrumentation

Course Synopsis

This course covers the fundamental of electronic instrumentation. This includes the working principle and transduction properties of sensors and transducers. Importance and techniques of signal conditioning is emphasized. Element and principle of data acquisition and their applications are discussed. Modern stand-alone and computer-based measurement instruments are covered.

Course Outcomes

CO1: Ability to apply the fundamental concept of Electronic instrumentation.
CO2: Ability to evaluate an instrument comprising of sensors, data acquisition and embedded system.
CO3: Ability to demonstrate and use stand-alone and computer - based instrument.

References

1. Kalsi, H.S. "Electronic Instrumentation", Tata McGraw-Hill Publishing Co. Ltd., 2005
2. C.S. Rangan, G.R. Sarmaand V.S. Mani. "Instrumentation Devices & Systems", Tata McrGraw-Hill Publishing Co. Ltd., 2004
3. A.K. Sawhneyand P. Sawhney. "A Course in Electronic and Electrical Measurement and Instrumentation", Dhanpat Rai & Co. (P) Ltd., 2001

EMT 479/3
Analog Integrated Circuit Design

Course Synopsis

The course covers MOS characteristics, Second order effects, Basic Cells, Single stage Amplifier, Differential amplifier, MOS Op amp and Op-amp Application.

Course Outcomes

CO1: Ability to solve transistor behaviour using basic laws and circuit theorem
CO2: Ability to design analogue sub-circuit using basic laws and circuit theorem
CO3: Ability to design and evaluate analogue system to meet specifications
CO4: Ability to analyse and design operational amplifier and its application to solve the project given.

References

1. Behzad Razavi, Design of Analogue CMOS Integrated Circuit, McGraw-Hill, 2000.
2. Phillip E. Allen, Douglas R. Holberg, CMOS Analogue Circuit Design, Oxford University Press, 2002.
3. Paul R. Gray, Analysis and Desgn of Analogue Integrated Circuit, 4th Ed, Wiley.
4. R. Jacob Baker, CMOS Circuit Design, Layout, and Simulation, Revised Second Edition Wiley-IEEE Press; 2th edition, 2007,
5. Niel H.E. Waste, David Harris. CMOS VLSI Design: A Circuits and Systems Perspective, Addison Wesley, 4th edition, 2010

EMT 491/3
Optical Design

Course Synopsis

To expose students to optical components and system design. The course covers Basic Optics & Optical System Specifications, Stops, Pupils, and Other Basic Principles, Diffraction, Aberrations, and Image Quality, The Concept of Optical Path Difference, Review of Specific Geometrical Aberrations, Material Selection, Spherical and Aspherical Surfaces, Design Forms & Processes, Gaussian Beam Imagery, Illumination System Design and Tolerancing, Producibility, Evaluation & Manufacturing. Students will be familiar with design softwares.

Course Outcomes

CO1: Ability to understand the fundamentals of optical communication system.
CO2: Ability to understand the design of various display system such as plasma, LCD, LED and OLED displays and imaging systems including Fourier optics.
CO3: Ability to understand the design of photonic band gap devices.
CO4: Ability to design collimated and non-collimated optical systems and interferometric test system.

References

1. Robert F. Fischer, Bijana Tadic, "Optical System Design", McGraw-Hill Professional; 1st edition (2000).
2. W. J. Smith, "Modern Lens Design", 2nd ed., McGraw-Hill, (2005).
3. D. Malabar, & Z. Malacara, "Handbook of Optical Design", 2nd ed., Marcel-Dekker, (2004).
4. Warren J. Smith, "Modern Optical Engineering", McGraw-Hill Professional; 3rd edition (2000)

EMT 446/4
Final Year Project

Course Synopsis

An exposure to the students in microelectronic/electronic/photonic based research project.

Course Outcomes

CO1: Ability to apply theory into practice
CO2: Ability to possess enhancement in problem solving skill
CO3: Ability to strengthen capability in working independently
CO4: Ability to undertake project planning, design, implementation and management

References

Based on project title

EMT 480/3
Reliability & Failure Analysis

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

CO1: Ability to define, illustrate, explain and solve Reliability-based problems
CO2: Ability to define and explain the failure analysis process flow and the related terms
CO3: Ability to identify, compare, explain and illustrate (where applicable) the different tools and techniques available in FA, its importance and the details operation principle
CO4: Ability to conduct various experiment, investigate, analyze, make a hypothesis and develop solution based on a failure given

References

1. Patrick O'Connor (2002). Practical Reliability Engineering, Wiley
2. Ebeling, C. E. (1997). Reliability and Maintainability Engineering, McGraw Hill
3. Lawrence C. Wagner, (1999). *Failure Analysis of Integrated Circuits: Tools and Techniques.* Kluwer Academic Publishers.
4. Perry L. Martin (1999). *Electronic Failure Analysis Handbook.*: McGraw Hill
5. E. Ajith Amerasekera and Farid N. Najm (1997). *Failure Mechanisms in Semiconductor Devices.* 2nd Ed.: John Wiley & Sons
6. Friedrich Beck (1998). *Integrated Circuit Failure Analysis: A Guide to Preparation Techniques.*: John Wiley & Sons.

EMT 483/3
System On Chips

Course Synopsis

This course will cover system on chip design including design methodology, IP design and platform-based design. This course will also cover various important elements for chip design such as sequential circuit, clock tree, low power design, power distribution and deep submicron interconnect.

Course Outcomes

CO1: Ability to define, summarize, illustrate classify, design the System-On-Chip architecture

CO2: Ability to define, summarize, illustrate classify, produce results in terms of circuit performance for Clock and Flip-flop

CO3: Ability to define, summarize, illustrate classify, develop DSM interconnection and power distribution system.

References

1. Niel H.E. Waste and David Harris "CMOS VLSI Design: A Circuits and Systems Perspective", 3rd ed., Addison Wesley, 2004
2. Jan M. Rabaey, Anantha Chandrakasan and Borivoje Nikolic "Digital Integrated Circuits: A Design Perspective", 2nd ed., Prentice Hall, 2003
3. Keating and Pierre Bricaud "Reuse Methodology Manual for System-on-a-Chip Designs", 3rd ed., Springer, 2002.
4. Sudeep Pasricha and Nikil Dutt "On-Chip Communication Architectures: System on Chip Interconnect", Morgan Kaufmann, 2008
5. Wayne Wolf "Modern VLSI Design: System-on-Chip Design", 3rd ed., Prentice Hall PTR, 2002

EMT 474/3
Optoelectronic System

Course Synopsis

The students studying this course will develop a basic understanding of the principles and practices of modern optoelectronic device includes fibre 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 fibre systems and measurement will also be acquired.

Course Outcomes

CO1: Ability to define, describe and analyze light properties, principle in optical fibre fundamental and optical component and passive device.

CO2: Ability to explain, solve and evaluate the concept, principles and operation of LEDS principles and operation of lasers concept,

CO3: Ability to define and analyze laser Diode and Photodetectors

CO4: Ability to analyze electro optics, construct non linear optics activity, acoustic optics and systems and applications for display

References

1. John Wilson and John Hawkes, Opto-Electronics: An Introduction, 3rd Edition, Prentice-Hall, 1998.
2. S.O.Kasap.Optoelectronics and Photonics, Principles and Practices, Prientice Hall, 2001
3. Amnon Yariv, Pochi Yeh, Photonics: Optical electronics in Modern Communications, 2007
4. Ghatak and Thyagarajan, Introduction to Fiber Optics, Cambridge University Press, 1998.
5. John M. Senior, Optical Fiber Communications; Principles and Practice, 2nd Edition, Prentice-Hall, 1992.

EMT 488/3
Digital Signal Processing

Course Synopsis

This course is a continuation from introduction to signal analysis course that will more emphasize to digital signal analysis. This course will cover the topics related to Discrete Time Signal, Fourier Transform, Sampling process, IIR and FIR digital filter design.

Course Outcomes

CO1: Ability to reproduce, analyze and solve signal waveform in digital form

CO2: Ability to identify, analyze and solve signals and systems via discrete time Fourier Transform

CO3: Ability to identify, analyze and solve signals and systems via Z Transform for digital filter application

References

1. Ifeachor & Jervis,"Digital Signal Processing: a practical Approach", 2/e, Prentice Hall.
2. Sanjit K. Mitra, "Digital Signal Processing, A Computer-Based Approach", 4/e., McGraw Hill, 2005
3. Proakis and Manolakis, "Digital Signal Processing", Pearson, 4/e
4. S. Orfanidis," Introduction to Signal Processing", PH 1996
5. C.T.Chen," Digital Signal Processing", Oxford 2001
6. B.P.Lathi," Signal Processing and Linear Systems", Oxford

EMT 490/3
Micro-Electro-Mechanical-Systems

Course Synopsis

This course will focus on design and simulation of MEMS devices. The design will include various of analysis types such as structural, electrical and mechanical while the fabrication technology will focus on bulk and surface micromachining. This course will also discuss the application and technology of MEMS packaging in various fields.

Course Outcomes

CO1: Ability to explain and apply the fundamental concept of MEMS and its technology.

CO2: Ability to analyze and derive the concept and formula of electrical and mechanical aspects of MEMS Micromachined sensor.

CO3: Ability to design and analyze MEMS sensors and actuators.

CO4: Ability to explain and design MEMS packaging and reliability issues.

References

1. Chang Liu. Foundation of MEMS. Pearson International Edition (2006). Prentice Hall.
2. Tai-Ran Tsu. MEMS & Microsystems Design and Manufacture (2002). McGraw Hill.
3. Tai-Ran Hsu. MEMS Packaging (2004). EMIS Processing Series 3. INSPEC.
4. James J. Allen. Micro Electro Mechanical System Design (2005). CRC Press. Taylor & Francis Group.
5. Hong Xiao, Introduction to Semiconductor Manufacturing Technology, Prentice Hall, 2001

Career Opportunities

There are a lot of demand for microelectronic, electronic & photonic engineers that are capable either in the private or government sectors, mainly in the field of designing, fabrication & IC testing. Job prospects and careers for graduates are definitely great.

Among the electronic, microelectronic and photonic graduates specific abilities and skills that can be undertaken as a career are:

- Semiconductor/Microelectronic fabrication
- IC Design for digital, analogue, mixed signals & RF-IC
- IC Layout Design, System On Chip for digital, analogue, mix signal and RF-IC.
- Mask design
- ASICs (Application Specific ICs) design & VLSI (Very Large Scale Integration)
- MEMS (Micro Electro Mechanical Systems) design
- Photonic design
- Design based on Verilog HDL / VHDL (Very High-Speed IC Hardware Description Language)
- Fast-prototype device for IC fabrication
- Device & process simulation
- Failure analysis & testing
- IC Packaging
- IC Testing
- Reverse-Engineering on ICs
- Optical Communications design

School of Computer and Communication Engineering

Programmes Offered

- Diploma in Computer Engineering
- Bachelor of Engineering (Hons.) (Computer Engineering)
- Bachelor of Engineering (Hons.) (Communication Engineering)
- Bachelor of Engineering (Hons.) (Computer Network Engineering)
- Bachelor of Electronic Engineering Technology (Hons.)(Electronic Network Design)
- Bachelor of Electronic Engineering Technology (Hons) (Electronic Telecommunication Design)
- Master of Science (Computer Engineering)
- Master of Science (Communication Engineering)
- Master of Science (Embedded System Design Engineering)
- Doctor of Philosophy (Ph.D)

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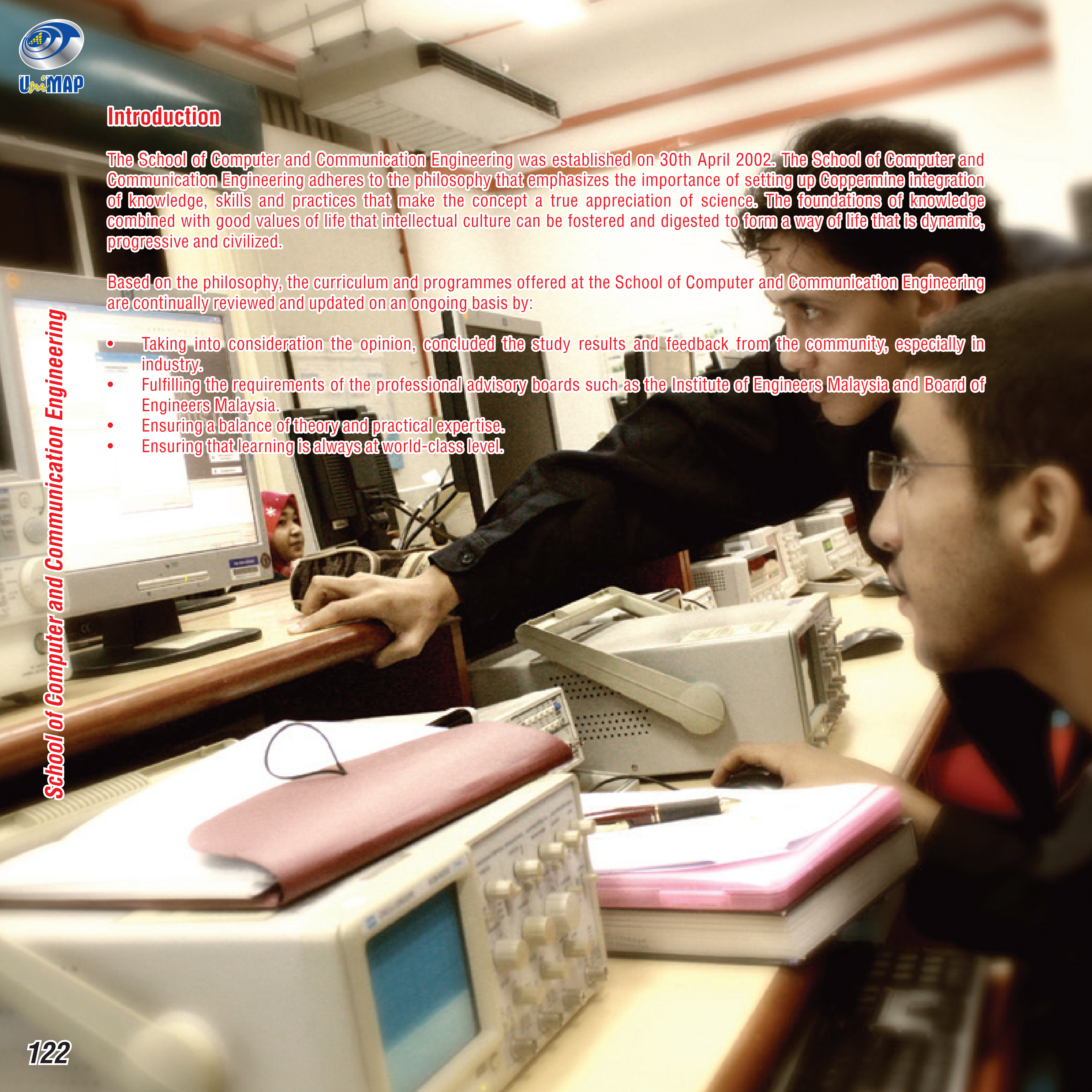

Introduction

The School of Computer and Communication Engineering was established on 30th April 2002. The School of Computer and Communication Engineering adheres to the philosophy that emphasizes the importance of setting up Coppermine integration of knowledge, skills and practices that make the concept a true appreciation of science. The foundations of knowledge combined with good values of life that intellectual culture can be fostered and digested to form a way of life that is dynamic, progressive and civilized.

Based on the philosophy, the curriculum and programmes offered at the School of Computer and Communication Engineering are continually reviewed and updated on an ongoing basis by:

- Taking into consideration the opinion, concluded the study results and feedback from the community, especially in industry.
- Fulfilling the requirements of the professional advisory boards such as the Institute of Engineers Malaysia and Board of Engineers Malaysia.
- Ensuring a balance of theory and practical expertise.
- Ensuring that learning is always at world-class level.

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Bachelor Of Engineering (Honours) Communication Engineering

Programme Objectives (PEO)

PEO1
Graduates who are leaders in the field of Computer engineering or chosen field as demonstrated via career advancement.

PEO2
Graduates who are members of and contribute to professional society.

PEO3
Graduates who engaged in life-long learning or continuous education opportunities.

PEO4
Graduates who contribute towards research and development.

PEO5
Graduates who are entrepreneurial.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in computer engineering discipline to solve the complex engineering problem

PO 02
Ability to identify, formulate and solve complex engineering problems.

PO 03
Ability to design solutions for complex engineering problems and systems, components or processes to meet desired needs.

PO 04
Ability to conduct investigation into complex problems as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for complex engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to have entrepreneurship, the process of innovation and the need for environmental and sustainable development.

PO 08
Ability to understand the professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large.

PO 11
A recognition of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate the understanding of project management and finance principles.

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Computer Engineering)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	**I**	**II**	**III**	**IV**	**V**	**VI**		**VII**	**VIII**
Engineering Core (97)	EKT101/4 Electric Circuit Theory	EKT111/3 Electric Circuit Theory II		EKT242/3 Electromagnetic Theory	EKT343/3 Principles of Communication Engineering		EIT 302/4 Industrial Training	EKT445/2 Final Year Project I	EKT446/4 Final Year Project II
	EKT102/3 Basic Electronic Engineering	EKT104/4 Analog Electronic Circuits I	EKT214/4 Analog Electronic Circuits II	EKT232/3 Signals and Systems	EKT 353/3 Principles of Digital Signal Processing	EKT318/3 Modern Control Systems		EKT424/4 Real-Time Systems	EKT421/3 Software Engineering
		EKT124/3 Digital Electronics I	EKT221/4 Digital Electronics II	EKT222/4 Microprocessor Systems	EKT322/4 Embedded Systems Design	EKT303/4 Principles of Computer Architecture		Program Elective I /3	Open Elective/3
		EKT 103/3 Electrical Engineering		EKT212/4 Measurement and Instrumentation		EKT309/3 Capstone Project		Program Elective II/ 3	
	EKT120/4 Computer Programming		EKT224/3 Algorithm and Data Structures		EKT336/3 Computer Networks	EKT333/3 Modern Operating Systems			
Non Engineering (19)	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II				EUT440/3 Engineers in Society		EUT443/2 Engineering Management	
	EUT122/2 Skills and Technology in Communication		EQT221/3 Discrete Mathematics and Linear Algebra	EQT272/3 Probability and Statistic					
University Required (17)	EUWXXX/1 Co-curriculum		EUW212/2 University English		EUW224/2 Engineering Entrepreneurship	EUW233/2 Islam & Asia Civilisation (TITAS)		EUW235/2 Ethnic Relation	EUWXXX/2 Option Subjects
		EUWXXX/1 Co-curriculum	EUWXXX/1 Co-curriculum		EUW322/2 Thinking Skills				EUW410/2 University Malay Language
137	**17**	**17**	**17**	**17**	**17**	**18**	**4**	**16**	**14**
Total Units for Graduation 133 + 4 (Industrial Training) = 137									

Open Elective: Any subjects offered by the school or other schools.
Elective I & II: EKT466 Artificial Intelligence, EKT 422 Parallel Computing, EKT 426 Database Management System, EKT 345 Microwave Engineering, EKT 460 Image Processing, EKT428 Mobile Computing, EKT465 Optical Communication Systems, EKT 450Network Security, EKT454 Wireless Network & Communication.

Bachelor Of Engineering (Honours) Communication Engineering

Programme Objectives (PEO)

PEO1
Graduates who are leaders in the field of Communication engineering or chosen field as demonstrated via career advancement.

PEO2
Graduates who are members of and contribute to professional society.

PEO3
Graduates who engaged in life-long learning or continuous education opportunities.

PEO4
Graduates who contribute towards research and development.

PEO5
Graduates who are entrepreneurial engineers.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in communication engineering discipline to solve the complex engineering problem

PO 02
Ability to identify, formulate and solve complex engineering problems.

PO 03
Ability to design solutions for complex engineering problems and systems, components or processes to meet desired needs.

PO 04
Ability to conduct investigation into complex problems as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for complex engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to have entrepreneurship, the process of innovation and the need for environmental and sustainable development.

PO 08
Ability to understand the professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large

PO 11
A Recognition of the need for, and an ability to engage in life-long learning

PO 12
Demonstrate the understanding of project management and finance principles

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Communication Engineering)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	**I**	**II**	**III**	**IV**	**V**	**VI**		**VII**	**VIII**
Engineering Core (97)	EKT101/4 Electric Circuit Theory	EKT 103/3 Electrical Engineering	EKT221/4 Digital Electronics II	EKT222/4 Microprocessor Systems	EKT303/4 Principles of Computer Architecture	EKT357/3 Digital Communication Engineering	EIT 302/4 Industrial Training	EKT445/2 Final Year Project I	EKT446/4 Final Year Project II
	EKT120/4 Computer Programming	EKT124/3 Digital Electronics I	EKT204/4 Analog Electronic Circuits	EKT232/3 Signals and Systems	EKT343/4 Principles of Communication Engineering	EKT318/3 Modern Control Systems		EKT440/4 Telecommunication Switching & Network	EKT441/3 Mobile Communication Systems
	EKT102/3 Basic Electronic Engineering	EKT112/4 Principles of Measurement and Instrumentation		EKT242/3 Electromagnetic Theory	EKT341/4 Antenna and Propagation	EKT 356/4 Microwave Communication		Program Elective I /3	Open Elective / 3
		ECT111/3 Engineering Skills		EKT214/4 Analog Electronic Circuits II	EKT353/3 Principles of Digital Signal Processing	EKT314/4 Instrumentation Electronics		Program Elective II /3	
Non Engineering (19)	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT272/3 Probability and Statistic			EUT440/3 Engineers in Society		EUT443/2 Engineering Management	
	EUT122/2 Skills and Technology in Communication		EQT221/3 Discrete Mathematics and Linear Algebra						
University Required (15)	EUWXXX/1 Co-curriculum	EUW410/2 University Malay Language	EUW212/2 University English	EUW224/2 Engineering Entrepreneurship	EUW235/2 Ethnic Relation				EUWXXX/2 Option Subjects
			EUW322/2 Thinking Skills	EUW233/2 Islam & Asia Civilisation (TITAS)					
135	**17**	**18**	**18**	**18**	**17**	**17**	**4**	**14**	**12**
Total Units for Graduation 131 + 4 (Industrial Training)= 135									

Open Elective: Any 4th year subjects offered by the school or other schools.
Elective I & II and Open Elective: EKT 467 Radar Engineering, EKT446 Advanced Digital Communication, EKT447 Communication Hardware Design, EKT448 Radio And Television Engineering, EKT449 Advanced Digital Signal Processing, EKT 460 Image Processing, EKT 461 Audio & Video Signal Processing, EKT462 Digital And Data Communication Systems, EKT 463 Satellite Communication, EKT 464 Communication Links, EKT465 Optical Communication Systems, EKT466 Artificial Intelligence, EKT468 Waveform Coding.

Bachelor Of Engineering (Honours) (Computer Network Engineering)

Programme Objectives (PEO)

PEO 01
Graduates are leaders in the field of Computer Network engineering or chosen field as demonstrated through career advancement.

PEO 2
Graduates who are members and contribute to professional society.

PEO 3
Graduates who engaged in life-long learning or continuous education opportunities.

PEO 4
Graduates make contribute towards research and development.

PEO 5
Graduates who are entrepreneur engineer.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in Computer Network engineering discipline to solve complex engineering problem.

PO 02
Ability to identify, formulate and solve engineering problems.

PO 03
Ability to design a system, solutions for complex engineering problems and systems, components or processes to meet desired needs.

PO 04
Ability to conduct investigation into complex problems as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to have entrepreneurship, the process of innovation and the need for environmental and sustainable development.

PO 08
Ability to understand professional and ethical responsibilities and commitment to the society.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large.

PO 11
A recognition of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Computer Network Engineering)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	I	II	III	IV	V	VI		VII	VIII
Engineering Core (97)	EKT101/4 Electric Circuit Theory	EKT 103/3 Electrical Engineering	EKT221/4 Digital Electronics II	EKT222/4 Microprocessor Systems	EKT303/4 Principles of Computer Architecture	EKT355/4 Advanced Computer Network	EIT 302/4 Industrial Training	EKT445/2 Final Year Project I	EKT446/4 Final Year Project II
	EKT120/4 Computer Programming	EKT124/3 Digital Electronics I	EKT204/4 Analog Electronic Circuits	EKT232/3 Signals and Systems	EKT343/4 Principles of Communication Engineering	EKT318/3 Modern Control Systems		EKT433/4 Network Modeling	EKT434/3 Network Programming
	EKT102/3 Basic Electronic Engineering	EKT112/4 Principles of Measurement and Instrumentation		EKT242/3 Electromagnetic Theory	EKT335/3 Principles of Computer Network	EKT333/3 Modern Operating Systems		Program Elective I /3	Open Elective / 3
		ECT111/3 Engineering Skills		EKT214/4 Analog Electronic Circuits II	EKT334/4 Algorithm and Data Structures	EKT314/4 Instrumentation Electronics		Program Elective II /3	
Non Engineering (19)	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT272/3 Probability and Statistic			EUT440/3 Engineers in Society		EUT443/2 Engineering Management	
	EUT122/2 Skills and Technology in Communication		EQT221/3 Discrete Mathematics and Linear Algebra						
University Required (15)	EUWXXX/1 Co-curriculum	UUW114/2 University Malay Language	UUW223/2 University English	UUW224/2 Engineering Entrepreneurship	UUW235/2 Ethnic Relation				UUWXXX/2 Option Subjects
			UUW322/2 Thinking Skills	UUW233/2 Islam & Asia Civilisation (TITAS)					
135	17	18	18	18	17	17	4	14	12
Total Units for Graduation 131 + 4 (Industrial training)= 135									

Open Elective: Any 4th Year subjects offered by the school or other schools.
Elective I & II: EKT 353 Principles of Digital Signal Processing, EKT466 Artificial Intelligence, EKT 422 Parallel Computing, EKT 426 Database Management System, And Open EKT 345 Microwave Engineering, EKT 460 Image Processing, EKT428 Mobile Computing, EKT465 Optical Communication Systems, Electives EKT 450 Network Security, EKT454 Wireless Network & Communication.

Course Syllabus

EKT 101/4
Electric Circuit Theory

Course Synopsis

Basically this introductory circuit course can be divided into two parts. Part I, consisting of chapter 1 through 4, is devoted to DC circuits. It covers fundamental laws and theorems, circuit analytical techniques, passive and active elements. Part 2, consisting of chapter 5 through 8, deals with AC circuits. It introduces phasors, sinusoidal steady state analysis, using previous analytical techniques under sinusoidal steady state excitation, RLC circuits, AC power calculations and power factor correction, rms values and three-phase balanced systems.

References

1. Alexander, C.K., Sadiku, M.N.O., Fundamentals of Electric Circuits, 4th Editions, McGraw-Hill, 2008.
2. Nilsson, J.W., Riedel, S.A., Electric Circuits, 9th Edition, Prentice Hall, 2010.
3. Irwin, J.D., Nelms, R.M., Basic Engineering Circuit Analysis, 9th edition, John Wiley, 2008.
4. Robbins, A.H, Miller, W.C., Circuit Analysis: Theory and Practice , 4th edition,Thomson/Delmar Learning, 2006.
5. Hyat, W.H., Durbin, S.M., Kimmerly, J.E., Engineering Circuit Analysis, 7th Edition, McGraw Hill, 2007.

EKT 102/3
Basic Electronic Engineering

Course Synopsis

This course will expose the students to the basic electronic devices. The topic covered including introduction to semiconductor: Atomic Structures, Semiconductors, Conductors, and Insulators, Covalent Bonds, Conduction in Semiconductor, N -Type and P-Type Semiconductor, the Diode, Biasing the Diode, Voltage-Current characteristic of a Diode, Diode Models, Testing a Diode.

Students will also expose to the diode application. The topic covered including Half-Wave Rectifiers, Full-Wave Rectifiers, Power Supply Filters and Regulations, Diode Limiting and Clamping Circuits, Voltage Multipliers, The Diode Data Sheet, Troubleshooting, Special Purpose Diodes: Zener Diodes, Zener Diode Applications, Varactor Diodes, Optical Diodes, Other Types of Diodes and Troubleshooting.

Bipolar Junction Transistors (BJT's) and various types of FET are also covered in this course. The topics including Transistor Structure, Basic Transistor Operation, Transistor Characteristic and parameters. The Transistor as an Amplifier, The Transistor as a Switch, Transistor Packages and Terminal Identification,Troubleshooting, Transistor Bias Circuits:The DC Operating Points, Voltage Divider Bias, Other Bias Methods. Field-Effect Transistor (FETs), The JFET, JFET Characteristic & parameters, JFET Biasing, The MOSFET, MOSFET Characteristic and Parameters, MOSFET Biasing, Troubleshooting.

References

1. Floyd, T., "Electronic Devices", 8th Edition, Prentice Hall, 2007.
2. Boylestad, R.L., "Electronic Devices and Circuit Theory", 10th Edition, Prentice Hall, 2008.
3. Grob Bernard, Schultz Mitchel E., Basic Electronics, Student Edition with Multisim, 5th Edition, McGraw-Hill 2002.
4. U.S. Bureau of Naval Personnel, Basic Electronics, Dover Publications 1973.
5. McWhorter G., Evans A.J., Basic Electronics, Master Publishing 2004.

EKT 103/3
Electrical Engineering

Course Synopsis

This subject will expose the students to the basic electrical machines, electronic instrumentation and measurement and power quality. For the electrical machines and machine control, the topics covered include the Power Transformers, DC machines and AC machines. General concepts and basic principle of operation for each electrical machine are covered includes the characteristics and performance analysis. For the instrumentation part, the topics covered include general DC and AC meters, DC and AC bridges and sensors and transducers. Constructions and principles of operation for each part are covered in this part. In addition to that students are exposed to the principle of power quality.

References

1. Chapman S.J.,"Electric Machinery Fundamentals", Fourth Edition, 2005, McGraw Hill, Singapore.
2. Z.A. Yamayee & J.L. Bala, " Electromechanical Energy Devices & Power Systems", 1993, Wiley & Sons, USA.
3. Larry D. Jomes & A.F. Chin, "Electronics Instruments and Measurement", 1991, Prentice Hall, USA.
4. Edward Hughes, John Hiley, Keith Brown, Ian McKenzie-Smith, "Electrical and Electronic Technology", 10th Edition, Jun 2008.
5. Austin Hughes, "Electric Motors and Drives: Fundamentals, Types and Applications", Third edition 2006.

EKT 104/4
Analog Electric Circuits 1

Course Synopsis

This course exposes the student the basic knowledge in analog electronic. The exposure encompases amplifier design based on bipolar and field effect transistors, for single and multi stage, power amplifier, frequency response analysis of amplifiers and also exposure to a few specialized device such as Shockley diodes, SCS, Diac, Triac, SCR, Optotransistor, LASCR and Optocouplers. Emphasis is placed on basic design aspects and applications. The course has been designed to provide basic analog electronic skilss covering theories and practicals.

References

1. Donald A. Neamen, 'Electronic Circuit Analysis and Design, 4th Ed., McGraw-Hill, 2010.

2. Boylestad, R.L., Nashelsky, L., 'Electronic Devices and Circuit Theory', 10th Ed., Prentice Hall, 2009.
3. Floyd, T., 'Electronic Devices', 8th Ed., Pearson Education, Inc, 2008.
4. Bogart, T.F., 'Electronic Devices and Circuits',6th Ed., Prentice Hall, 2004.
5. Adel S. Sedra, Kenneth C. Smith, 'Microelectronic Circuits', 6th Ed., Oxford University Press, 2009.

EKT 111/3
Electric Circuit Theory II

Course Synopsis

This is a core subject. Students will expose to the circuit analysis using Laplace Transform, Fourier Series and Fourier Transform techniques. Students also should be able to explain the concept of frequency responce of AC circuit and two port network.

References

1. Sadiku, M. N. O, Alexander, C. K., Fundamentals of Electric Circuits, Singapore, 4th ed., McGraw-Hill, 2009.
2. Nilsson, J. W. and Riedel, S.A., Electric Circuits, 9th ed, Prentice Hall, 2011.
3. Boylestad, R.L, Introductory Circuit Analysis, 12'h ed., Prentice Hall, 2010.
4. Dorf, R.C., Svodoba, J.A., Introduction to Electric Circuits, 8th ed., John Wiley, 2010.
5. Robins, A.H., Miller, W.C., Circuit Analysis: Theory and Practise, 2nd ed., Delmar Learning, 2006.

EKT 112/4
Principles of Measurement and Instrumentation

Course Synopsis

This course covers Theory and Constructional details of Analog instruments. In this course, sources of errors in Energy Meter and their compensation are included together with different types of Power Factor Meters. This course also discusses the use of Cathode ray Oscilloscope and the importance of their components.

References

1. A.K. Ghosh. Introduction to Measurement and Instrumentation 2nd Ed., Prentice Hall of India, 2007.

2. A.J. Diefenderfer. Principles of Electronic Instrumentation 3rd Ed., Thomson, 1994.
3. H.S. Kalsi. Electronic Instrumentation, Tata McGraw-Hill Publishing Company Limited, 2005.
4. C.S. Rangan, G.R. Sarma and V.S. Mani. Instrumentation Devices & Systems, Tata McGraw-Hill Publishing Company Limited, 2004.
5. A.K. Sawhney and P. Sawhney. A Course in Electronic and Electrical Measurement and Instrumentation, Dhanpai Rai & Co. (P) Ltd., 2001

EKT 120/4
Computer Programming

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 with programming, to be able to do analysis with the programming tools such as organization chart, IPO chart, flowchart and pseudo code and then to implement them by developing C program.

References

1. Deitel and Deitel, Sudin, S., Ahmad, R.B. and Yacob, Y., "C How To Program", Pearson-Prentice Hall, 2006.
2. Cheng, H., "C for Engineers and Scientists", McGraw Hill, 2010.
3. Hanly, J.R. and Koffman, E.B., "C Program Design for Engineers", 2nd Ed., Addison-Wesley, 2001.
4. Tan, H.H. and D'Orazio, T.B., "C Programming for Engineering & Computer Science", McGraw Hill, 1999.
5. Sprankle and Maureen, "Problem Solving and Programming Concepts" 7th Ed., Prentice Hall, 2006.

EKT 124/3
Digital Electronics I

Course Synopsis

Introduction and discussion of the fundamental of digital circuit design and analysis. The lecture and laboratory exercise covers the following topics: Boolean Algebra, Numbering System, Basic Logic Gates, Combinational Circuit Design, Timing Diagram, Bi-Stable Memory Device and Sequential Circuit Design.

References

1. Rafikha Aliana A Raof, Norina Idris, Phaklen Eh Kan, Mohammad Nazri Md. Noor. (2006). Digital Electronics Design. 1st Edition. Malaysia: Prentice Hall.
2. Floyd. TL. (2006). Digital Fundamentals. 9th Edition. New Jersey: Prentice Hall.
3. Ronald J. Tocci. (2003). Digital Systems – Principles and Applications. 7th Ed. New Jersey: Prentice Hall.
4. M. Morris Mano. (2005). Digital Design. 3rd Edition. Prentice Hall.
5. Fundamentals of Digital Logic and Microcomputer Design. Fifth Edition. John Wiley & Sons, Inc.

EKT 204/4
Analog Electric Circuits

Course Synopsis

This course exposes the student the basic knowledge in analog electronic. The exposure encompases amplifier design based on bipolar and field effect transistors, for single and multi stage, power amplifier, frequency response analysis of amplifiers and also exposure to a few specialized device such as Shockley diodes, SCS, Diac, Triac, SCR, Optotransistor, LASCR and Optocouplers. Emphasis is placed on basic design aspects and applications. The course has been designed to provide basic analog electronic skilss covering theories and practicals.

References

1. Donald A. Neamen, 'Electronic Circuit Analysis and Design, 4th Ed., McGraw-Hill, 2010.

2. Boylestad, R.L., Nashelsky, L., 'Electronic Devices and Circuit Theory', 10th Ed., Prentice Hall, 2009.
3. Floyd, T., 'Electronic Devices', 8th Ed., Pearson Education, Inc, 2008.
4. Bogart, T.F., 'Electronic Devices and Circuits', 6th Ed., Prentice Hall, 2004.
5. Adel S. Sedra, Kenneth C. Smith, 'Microelectronic Circuits', 6th Ed., Oxford University Press, 2009.

EKT 214/4
Analog Electronic Circuits II

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, op-amp datasheet, applications of op-amp and frequency response and compensation; feedback circuits: Concepts and feedback, types of feedback connection, practical feedback circuit, feedback amplifier; Oscillator: basic operating principles of an oscillator, phase shift, Wien bridge, crystal oscillator, uni-juction; action 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, chebchev and Elliptic; Voltage regulators: Basic series and basic shunt regulators, basic switching regulator, IC regulators and applications

References

1. Floyd, T., 'Electronic Devices', 8th Ed., Pearson Education, Inc, 2008.
2. Boylestad, R.L., Nashelsky, L., 'Electronic Devices and Circuit Theory', 10th Ed., Prentice Hall, 2009.
3. Malvino, A. (1999). Electronic Principles. 6th ed. Mc Graw Hill.
4. Bogart, T.F., 'Electronic Devices and Circuits', 6th Ed., Prentice Hall, 2004.
5. Kasap S.O. 'Principles of Electronics Materials and Devicies', McGraw-Hill Science/ Engineering/Math; 3rd Ed., 2005.

EKT221/4
Digital Electronics II

Course Synopsis

This course exposes the students to the Combinational Logic System Design, Sequential System, Memory and Programmable Logic Devices, Register Transfer and Datapath, Sequencing and Control as well as Computer Organisation.

References

1. Rafikha Aliana A Raof, Norina Idris, Phaklen Eh Kan, Mohammad Nazri Md. Noor. (2006). Digital Electronics Design. 1st Edition. Malaysia: Prentice Hall.
2. Mano, M. Morris and Kime, Charles R. (2004). Logic and Computer Design Fundamentals. 3rd Edition. New Jersey: Prentice Hall.
3. Wakerly, John F. (2003). Digital Design – Principles & Practices. 3rd Edition. New Jersey: Prentice Hall.
4. M. Morris Mano. (2005). Digital Design. 3rd Edition. Prentice Hall.
5. Introduction to Digital Logic Design, 1st Edition (1993). Addison-Wesley Longman Publishing Co., USA.

EKT222/4
Microprocessor System

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 interfacing 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.

References

1. R.S. Gaonkar (2002). Microprocessor Architecture, Programming, and Applications with the 8085. Prentice Hall, 5th Edition.

2. W. Kleitz. (1998). Microprocessor and Microcontroller Fundamentals: The 8085 and 8051 Hardware and Software. Prentice Hall.
3. B.B. Brey (1996). The 8085A Microprocessor: Software, Programming and Architecture. Prentice Hall, 2nd Edition.
4. J.A. Seeger. (1995). Introduction to Microprocessors with the INTEL 8085. Oxford University Press, USA
5. W. Routt. (2006). Microprocessor Architecture, Programming, And Systems Featuring The 8085. Delmar Cengage Learning.

EKT 224/3
Algorithm and Data Structures

Course Synopsis

This course introduces data types, algorithm and data structures. The topics of array, pointers, structure and union in C are revisited. Then, the linear data structure i.e. stack, queue linked list and non linear data structure i.e. tree and graph are discussed in depth. In addition, sorting and searching algorithm are also included.

References

1. Fundamentals of Data Structures in C (2/E),Horowitz, Sahni & Anderson-Freed, P silicon Press, 2008, USA
2. Data Structures in C and C++, Vinu V. Dass, New Age International, 2006, India
3. Algorithms & Data Structures: The Science of Computing(Electrical and Computer Engineering Series), Douglas Baldwin & Greg W. Scragg, Computer Engineering Series, 2004, USA
4. Data Structure and Algorithm Analysis in C++(3rd Ed.), Mark Allen Weiss, 2006
5. The Algorithm Design Manual, Steven S. Skiena, Springer-Verlag London Limited, 2008.

EKT 232/3
Signals and Systems

Course Synopsis

The course aims to introduce the concept of signals and systems analysis, the continuous signal and discrete signal functions and types of signal transformation. It begins with familiarization with different types of functions and relate them with convolution. To understand the Fourier series, Laplace-transform and Z-transform and familiarize with the properties involved, the transform and the inverse method. In general how the signals and systems are analyzed in the time and frequency domain.

References

1. Simon Haykin, Barry Van Veen. (2003). Signals and Systems. 2nd ed. John Wiley & Sons, Inc.
2. MJ Roberts. (2003). Signals and Systems, Analysis Using Transform Method and MATLAB. International Edition. McGraw-Hill
3. Charles L. Philips, John M. Parr, Eve A. Risking.(2003). Signals and Systems and Transforms. 3rd Edition. Prentice Hall International.
4. Alan V. Oppenheim and Alan S. Willsky. Signals and Systems, 2nd Edition Prentice Hall,1996.
5. Edward W. Kamen and Bonnie S. Heck. Fundamentals of Signals and Systems using the Web and Matlab Second Edition, Prentice Hall, 2000.

EKT 242/3
Electromagnetic Theory

Course Synopsis

The purpose of this course is to learn the basic theory and analysis of electromagnetic. Student should be able to understand the basic concept of electrostatics, magnetostatics and their effects. Student should also understand the theory and application of transmission line.

References

1. Stuart M Wentworth. (2005). Fundamentals of Electromagnetics with Engineering Applications. Wiley Ed..
2. William H.Hayt, John A Buck. (2001).Engineering Electromagnetics. McGraw Hill, International Edition.
3. Fawwaz T Ulaby (2004). Fundamentals of Applied Electromagnetics. Pearson, Prentice Hall.

4. Roald K. Wangsness. (1987). Electromagnetic Fields, John Wiley and Sons, 1987.
5. Bo Thidé. (2009). Electromagnetic Field Theory Second Edition.

EKT 303/4
Principles of Computer Architecture

Course Synopsis

This subject will focus on the computer system with various design of interface techniques, organisation and architecture. The syllabus will covered 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. The student are required to design a simple CPU during a Lab session by using Quartus II software provided by Altera. The lab session will complement the theories given in lectures. FPGA trainer board will be used as a design platform in the lab.

References

1. William Stallings. Computer Organization and Architecture. Seventh Edition. Prentice-Hall.
2. M. Morris Mano. Computer System Architecture. Third Edition. Prentice-Hall.
3. Carl Hamacher, Zvonko Vranesic, Safwat Zaky. Computer Organization. Fifth Edition. McGraw Hill.
4. Andrew S. Tanembaum. Structured Computer Organization. Fifth Edition.
5. Linda Null, The essentials of Computer Organization and Architecture. 2nd Edition. Jones and Bartlett Publishers.

EKT 309/3
Capstone Project

Course Synopsis

This course focuses on the methodologies, processes and elements for the design and implementation of an embedded computer system incorporating both significant hardware and software components and, in many cases, mechanical components as well. It covers the philosophy of embedded computer system design and evaluates all related design tools for an embedded computer system. It reviews all elements of an embedded computer system and introduces the first part of the embedded computer system design project.

References

1. Taura, T. and Nagai, Y., Concept Generation For Design Creativity: A Systematized Theory and Methodology., Springer-London, 2013
2. Phal, G. et. al., Engineering Design: A Systematic Approach, Springer, London, 2007.
3. Birnbaum, M. D., Electronic Design Automation. Prentice Hall, 2003.
4. Wang, L. T. and Chang, Y. W., Electronic Design Automation: Synthesis Verification and Test, 1st Edition, Morgan Kaufmann, 2009.
5. Bart Broekman, Edwin Notenboom, Testing Embedded Software, Pearson Addison Wesley, 2003.
6. Bergr, A., Embedded System Design: An Introduction to Processes, Tools and Techniques., 1st Edition, CMP Books, 2001.

EKT 314/4
Instrumentation Electronics

Course Synopsis

Introduce students to the basic of electronic instrumentations, sensors and transducers that can be applied to the modern instrumentation systems; expose students to the elements and principles of data acquisition system with appropriate applications. Practical involves the use of virtual instrumentation software, development of transducer circuits and signal conditioning circuits, interfacing to the microprocessor and the execution of DAQ system.

References

1. Kalsi, H.S. (2005). Electronic Instrumentation. Tata McGraw-Hill Publishing Company Limited.
2. Rangan, C.S., Sarma, G.R. and Mani, V.S. (2004). Instrumentation Devices & Systems. Tata McGraw-Hill Publishing Company Limited.

3. Sawhney, A.K. and Sawhney, P. (2001). A Course in Electronic and Electrical Measurement and Instrumentation. Dhanpat Rai & Co. (P) Ltd.
4. Bentley, J.P. (1995). Principles of Measurement Systems. Longman Singapore Publisher.
5. Kuphaldt T.R.(2009), Lessons in Industrial Instrumentation. Version 0.4 – 2009

EKT318/3
Modern Control Systems

Course Synopsis

The Objective of this course is to expose the students to the basic knowledge in the field of control systems. Students will be exposed to basic mathematical modeling of physical system using differential equation and state space representation, stability of linear systems, time response, root locus, frequency domain analysis, and design of control systems using lead and lag compensating networks.

References

1. Nise , Norman S. , “Control Systems Engineering”, John Wiley and Sons , Fourth Edition, 2004.
2. Kuo B.C., “Automatic Control Systems”, Prentice Hall, 8th Edition, 1995.
3. Ogata, K, “Modern Control Engineering”Prentice Hall, 1999.
4. Richard C. Dorf and Robert H Bishop. Modern Control Systems (10th Edition) Prentice Hall; 10th edition 2004.
5. Katsuhiko Ogata. Modern Control Engineering. Publisher: Prentice Hall, 3rd Sub edition 1996.

EKT 322/4
Embedded System Design

Course Synopsis

The aim of this course is to study the concept and requirement of embedded system. This includes the characteristic of embedded system, hardware and software development: single chip microcontroller and programming technique in assembly language and C, basic multitasking concept, developing an embedded system application.

References

1. Muhammad Ali Mazidi & Janice Gillispie Mazidi. (2000).The 8051 Microcontroller and Embedded Systems. Prentice Hall 2000
2. James W. Stewart & Kai X. Miao. (1999). The 8051 Microcontroller: Hardware, Software and Interfacing. Prentice Hall 2nd Edition
3. Michael J. Pont (2001).Patterns for Time-Triggered Embedded System. Addison –Wesley.
4. Dreamtech Software Team Programming for Embedded Systems (2002). John Wiley.
5. Scott Mackenzie and Raphael Chung-Wei Phan(2006). 8051 Microcontroller. 2006

EKT 333/3
Modern Operating System

Course Synopsis

This course introduces the fundamental of operating systems. It also covers theoretical and practical issues underlying operating system design and implementation. The topics include inter process communication, process scheduling, deadlock, memory management, virtual memory and file management system. Formal principles are illustrated with examples and case studies of modern operating system.

References

1. W. Stallings, Operating Systems: Internals and Design Principles, 6th Edition, Pearson Prentice Hall, 2005.
2. Silberchatz, Galvin & Gagne, Operating System Principles, 7th Edition. John Wiley, 2006.
3. A.S. Tanenbaum, A.S. Woodhull, Operating Systems Design and Implementation, 3rd Edition. Prrentice Hall. 2006.
4. Silberchatz, Galvin & Gagne, Operating System Concepts, 7th Edition. John Wiley, 2005.
5. I.M. Flynn and A.M. McHoes, Understanding Operating System, 2nd Edition. PWS Publishing Company, 1999.

EKT 334/4
Algorithm and Data Structures

Course Synopsis

This course introduces data types, algorithm and data structures. The topics of array, pointers, structure and union in C are revisited. Then, the linear data structure i.e. stack, queue linked list and non linear data structure i.e. tree and graph are discussed in depth. In addition, sorting and searching algorithm are also included.

References

1. Fundamentals of Data Structures in C (2/E),Horowitz, Sahni & Anderson-Freed, P silicon Press, 2008, USA
2. Data Structures in C and C++, Vinu V. Dass, New Age International, 2006, India
3. Algorithms & Data Structures: The Science of Computing(Electrical and Computer Engineering Series), Douglas Baldwin & Greg W. Scragg, Computer Engineering Series, 2004, USA
4. Data Structure and Algorithm Analysis in C++(3rd Ed.), Mark Allen Weiss, 2006
5. The Algorithm Design Manual, Steven S. Skiena, Springer-Verlag London Limited, 2008.

EKT 335/3
Principles of Computer Network

Course Synopsis

This course exposes students with the fundamental knowledge of computer networks. 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 computer networks. The topics covered are the application, transport and the network layers which setup the Internet network over the internet.

References

1. J.F. Kurose, Computer Networking A Top-Down Approach, 4th Edition. Addison Wesley, USA, 2008.
2. A. S. Tanenbaum. Computer Networks, 5th Edition, Prentice Hall, 2011.
3. Leon-Garcia and A. Widjaja, Communication Networks: Fundamental Concepts and Key Architectures. 2nd Edition. McGraw Hill Publication, 2004.
4. William Stallings, Data & Computer Communications, 6th Edition, Prentice Hall, 2000.
5. Behrouz Forouzan, Introduction to Data Communications and Networking. McGraw Hill, 1998.

EKT 336/3
Computer Network

Course Synopsis

This course exposes students with the kind and knowledge of computer networks. Computer network technologies cover so many aspects and it is expanding rigorously. Therefore this course focuses on the fundamental concept and theories, applications and advantages of computer networks. Related technologies such as Local Area Network, Wide Area Network and techniques use in data transmission as well as latest technologies use are introduced. 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.

References

1. A. L. Garcia and A. Widjaja. (2004). Communication Networks: Fundamental Concepts and Key Architectures. 2nd Edition. McGraw Hill Publication.
2. A. S. Tanenbaum. (2003). Computer Networks. Prentice Hall.
3. K. C. Mansfield Jr. and J. L. Antonakos (2002). An Introduction to Computer Network, Prentice Hall.
4. J.F. Kurose and K.W.Ross.(2002), Computer Networking: A Top-Down Approach Featuring the Internet. 2nd Edition. Addison Wesley, USA.

5. B. Forouzan, (2006), Data Communications and Networking. McGraw Hill.

EKT 341/4
Antenna and Propagation

Course Synopsis

The purpose of this course is to introduce the fundamental principle of the functions, types and characteristics of antenna. Student should be able to analyze the characteristics of wave and waveguide. Student should also have ability to explain the characteristics of radio wave propagation.

References

1. C.A. Balanis. (2005). Antenna Theory: Analysis and Design. 3rd Edition. Wiley Interscience.
2. Stuart M Wentworth (2005). Fundamentals of Electromagnetics with Engineering Applications. Wiley Edition.
3. Kraus, Marhefka. (2003). Antennas: For All Applications. International Edition. McGraw Hill.
4. Simon R. Saunders & Alejandro Aragón-Zavala. (2007). Antennas and Propagation for Wireless Communication Systems. Second Edition, published by John Wiley & Sons.
5. William Gosling. (1998). Radio Antennas and Propagation: Radio Engineering Fundamentals.

EKT 343/4
Principles of Communication Engineering

Course Synopsis

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

References

1. Wayne Tomasi. (2004). Electronic Communication System, Fundamental Through Advanced. 5th Ed. Pearson Prentice Hall. (Text)
2. K. Sam Shanmugan. (2002). Analog and Digital Communication. Wiley.
3. Simon Haykin. (2001). Communication Systems. 4th Ed. John Wiley.
4. J.M. Wozencraft and I.M. Jacobs. (2005). Principles of Communications Engineering.
5. Umesh Sinha. (2009). Principles Of Communication Engineering. Publisher, Satya Prakashan.

EKT 345/4
Microwave Engineering

Course Synopsis

This course aims to expose students with basic concept of parameters that are being used in microwave communication network. Analysis the device characteristics for microwave. To explain the importance and applications of microwave communication system. Additionally, the students are introduced how to design microwave's filters and amplifiers.

References

1. David M. Pozar. (2004). Microwave Engineering. Wiley Ed.
2. Max W. Medley Jr. (1993). Microwave and RF Circuits Analysis, Synthesis and Design. Artech House Inc.
3. Randall W.Rhea (2005). HF Filter Design and Computer Simulation. McGraw Hill Inc.
4. Om P. Gandhi, "Microwave Engineering And Applications", Maxwell Macmillan Int. Edition, 1989.
5. Collin, R.E., "Foundations For Microwave Engineering", McGraw Hill, 1992.

EKT 353/3
Principle of Digital Signal Processing

Course Synopsis

To introduce the applications and review of signal and systems including z-transform. Digital structures, discrete Fourier transform, mathematical analysis of discrete time signal and systems, FFT, IIR filters and their designs, FIR filters and their designs, finite word length effect, simple applications.

References

1. Ifeachor & Jervis. Digital Signal Processing: a practical Approach. 2/e, Prentice Hall.
2. Sanjit K. Mitra (2006) Digital Signal Processing, A Computer-Based Approach, 3/e. McGraw Hill
3. Proakis and Manolakis. Digital Signal Processing. Pearson. 4/e
4. S. Orfanidis. (1996). Introduction to Signal Processing. Prentica Hall.
5. C.T. Chen (2001). Digital Signal Processing. Oxford.
6. B.P. Lathi. Signal Processing and Linear Systems. Oxford

EKT 355/4
Advanced Computer Network

Course Synopsis

Comprehensive overview of communications software and hardware involved in wide area networks and their relationship to local area networks are introduces. The course is designed for computer networking majors. The students are able to identify the major components of the WANSs (Asynchronous Transfer Mode, Integrated Services Digital Network, Synchronous Optical Network, etc.) and the flow of data between the bridges and routers

References

1. A. L. Garcia and A. Widjaja, (2004). Communication Networks: Fundamental Concepts and Key Architectures, 2nd Edition, McGraw Hill Publication.
2. A. S. Tanenbaum, (2003). Computer Networks. Prentice Hall.
3. K. C. Mansfield Jr. and J. L. Antonakos (2002), An Introduction to Computer Network, Prentice Hall
4. J.F. Kurose and K.W.Ross, (2002), Computer Networking: A Top-Down Approach Featuring the Internet, 2nd Edition, Addison Wesley, USA.
5. B. Forouzan, (2006), Data Communications and Networking, McGraw Hill.

EKT 357/3
Digital Communication Engineering

Course Synopsis

This subject will cover all the principles and concepts of digital communications including signal analysis and transmission through channel, pulse modulations, speech signal digitization, base band transmission, digital modulation techniques and performance, spread spectrum communications. In addition, the basic telephony system also will be introduced to relate the students with the real application.

References

1. Skalar B. (2005). Digital Communications, Fundamentals and Applications. 2nd Ed. IE Prentice Hall.
2. Pursely M.B. (2005). Introduction to Digital Communications. IE Prentice Hall.
3. M. Schwartz. (2003). Information Transmission, Modulation and Noise. 3rd Ed. McGraw Hill.
4. Proakis, John G. (1995). Digital Communications. 3rd Ed. International Ed. - New York; Singapore. McGraw Hill.
5. John Proakis and Masoud Salehi. (2007). Digital Communications. 5th edition, McGraw-Hill.

EKT 421/3
Software Engineering

Course Synopsis

The course shall introduce principles and technique in software engineering, management integration concept, method or process and software metrics. In addition, this course exposes presentation and discussion on specific software engineering method, documentation and tools. It also covers object based need analysis and modeling. This course explains about relevant method to verify and validate prototype developed.

References

1. Lethbridge, T.C., Laganiere, R. [2005]. “Object Oriented Software Engineering”. 2nd Edition, McGraw Hill.
2. Schach, S.R .[2007]. “Classical and Object Oriented Software Engineering”. 7th Edition, McGraw Hill.
3. Sommerville, I. [2007], “Software Engineering”. 8th Edition, Addison Wesley Publication.
4. Pressman, R.S. [2007], “Software Engineering”. 6th Edition, McGraw-Hill Publication.
5. Larman, C. [2004], “Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development “. 3rd Edition, Prentice Hall PTR.

EKT 424/4
Real Time System

Course Synopsis

The course shall discuss concepts relevant to real time system and concept which differentiates ordinary operating system and real time operating system. Focus and in depth coverage shall be on techniques on developing real time system application which incorporates concurrent and synchronize process on a target embedded board which runs POSIX compliant open source operating system.

References

1. Jane W.S. Liu (2000). Real Time Systems. University of Illinois at Urbana-Campaign . Prentice Hall.
2. Sriram V Iyer. (2004). Embedded Real Time Systems. Tata McGraw Hill.
3. Glass, Graham and Ables, King. (1999). UNIX for programmers and users. Prentice Hall.
4. Bill Gallmeister. (1995) POSIX.4: Programming for the Real-World. O’Reilly and Associates.
5. Qing Lin and Caroline Yao (2003). Real-Time Concepts for Embedded Systems. CMP Books.

EIT 302/4
Industrial Training

Course Synopsis

The course will expose to technical and application aspect as well as other aspect such as company organization structure, company operation, department function, work procedure, safety procedure, management, communication, technical skills, project management and presentation. The students also required to submit their log book and final report at the end of Industrial Training. Overall, the course is a practical-based.

Reference

1. UniMAP Industrial Training Guideline Rev A (July 2008)
2. UniMAP Industrial Training Log Book

EKT 433/4
Network Modeling

Course Synopsis

This course introduces the principle and technique in modeling and analyzing the computer network using software and discrete event simulator technique. The simulation technique is a powerful tool to analyze the network without the possibilities to destroy the real network. The students are able to understand the concept of network model, develop and analyze the computer network using this simulation technique.

Reference

1. Hall, J. Banks, J. Carson, B. L. Nelson, D. Nicol, “Discrete-Event System Simulation, Fourth Edition, Prentice Hall 2005.
2. M. S. Obaidat, G. I. Papadimitriou, “Applied System Simulation: Methodologies and Applications”, Springer 2003.
3. M. Gen, R, Cheng & L. Lin, “Network Models and Optimization”, Springer, 2008.
4. D. P. Bertsekas, “ Network Optimization – Continuous and Discrete Models”, Athena Scientific,1998.
5. S. Evans, “Telecommunications Network Modeling, Planning and Design”, British Communication Technology, 2008.

EKT 434/3
Network Programming

Course Synopsis

The aims of this course are to introduce the students of the programming in computer network and get familiar with the mechanism of protocols that consists in the network. 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.

Reference

1. Harvey M. Deitel, Paul J. Deitel and Sean E. Santry, [2002], "Advanced Java™ 2 Platform How to Program" 2nd Edition, Prentice Hall.
2. Marty Hall and Larry Brown, " Core Web Programming: The Sun Microsystems Press JAVA Series" 2nd Edition, Prentice Hall, 2004
3. Jan Graba, "An Introduction to Network Programming with Java", 2nd Edition, Springer, 2007.
4. W. R. Steven, "Unix Network Programming, Networking APIs: Sockets and XTI", 2nd Edition, Addition-Wesley, 2004
5. E. R. Harold, "Java Network Programming", O'Reilly, 2005.

EKT440/4
Telecommunication Switching and Networks

Course Synopsis

This course is to discuss the technology applied in communication network, emphasized on application of concept architecture and layer, signal transmission technique, switching system and switching circuit network. It also discussed on multiplexing as well as to give an exposure of network application and basic network programming.

References

1. L. Garcia and A. Widjaja. (2004). Communication Networks: Fundamental Concepts and Key Architectures. 2nd Edition. McGraw Hill Publication.
2. S. Tanenbaum. (2003). Computer Networks. Prentice Hall.
3. K.C. Mansfield Jr. and J. L. Antonakos (2002). An Introduction to Computer Network. Prentice.
4. P. Gnanasivam. (2008). Telecommunication Switching and Networks" New Age Publications (Academic).
5. Viswanathan Thiagarajan (2010). Telecommunication Switching Systems And Networks Phi Learning Publication.

EKT441/3
Mobile Communication

Course Synopsis

The course aims to provide knowledge in mobile communications, especially different system characteristics and their effect on wireless network performance. The mobility puts high requirements on the communication system and these requirements together with possible solutions are an essential part of the course. The course focuses on

- wireless network performance and trade-offs
- cellular network planning and modeling
- radio resource management (RRM) and mobility management (MM)
- wireless wide area network (WWAN) architectures.

References

1. David Tse, Pramod Viswanath, Foundamentals of Wireless Communications, Cambridge Press, 2005.
2. G. L. Stuber, Principles of Mobile Communication, Kluwer Acdemic, 1996.
3. J. G. Proakis, Digital Communications, McGraw-Hill, 1995.
4. T. S. Rappaport, Wireless Communications: Principles and Practice, Prentice Hall, 1996.
5. W. C. Jakes, Microwave Mobile Communications, IEEE Press, 1974.

6. K. Feher, Wireless Digital Communications - Modulation & Spread Spectrum Applications, Prentice Hall, 1995.

EKT 445/2
Final Year Project I

EKT446/4
Final Year Project II

Course Synopsis

This course aims to expose students the method of problem solving, data analysis, prototype design and research in computer and communication engineering fields. The student will be given an engineering problem (or encourage to identify on their own) and gain expertise by problem solving, investigation, research writing and effective presentation of the research outcome in the form of thesis and seminar.

Career Opportunities

Employment and career prospects of graduates upon graduation are very encouraging. The graduates can work in the industry in the following areas:

- Product design and digital control system based on microcontroller systems.
- Design equipment components for optical telecommunication systems, wired and wireless.
- Research and Development of electronic-based Industry, University, MIMOS, SIRIM,
- National Remote Sensing Centre, Statutory Authorities and Government.

Careers Can Be Pursued:

- Electronic Engineers
- Product Engineer
- Telecommunications Engineer
- Design Engineer
- System Engineer
- Network Engineer
- Research & Development Engineer
- Executive Engineer
- Tech Entrepreneurs

School of Mechatronic Engineering

Programme Offered

- Diploma in Engineering (Mechatronic)
- Bachelor of Engineering (Hons) (Mechatronic)
- Bachelor of Engineering (Hons) (Mechanical)
- Bachelor of Engineering (Hons) (Biomedical Electronic)
- Master of Science (Mechatronic Engineering)
- Master of Science (Mechanical Engineering)
- Master of Science (Biomedical Electronic Engineering)
- Doctor of Philosophy (Mechatronic Engineering)
- Doctor of Philosophy (Mechanical Engineering)
- Doctor of Philosophy (Biomedical Electronic Engineering)

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Introduction

School of Mechatronic Engineering was established in 2003 to meet the ever growing needs of professionals – particularly in the field of electromechanical, mechanical and biomedical electronics engineering. This is in-line with demands of the industry consistent with the report of the Malaysian Industrial Master Plan (Laporan Pelan Induk Perindustrian). The curriculum has been designed with a balanced emphasis in both engineering science and practice. Additionally, teaching and learning activities are conducted via various approaches, including embedding theoretical knowledge with laboratory sessions using state-of-the-art equipments. This approach to engineering education greatly benefits UniMAP students and ensuring them in keeping abreast with the latest technological development.

The School of Mechatronic Engineering at UniMAP offers three exciting study programmes, namely the Mechatronic Engineering Programme, Mechanical Engineering Programme and Biomedical Electronic Programme. The curriculum of each programme is designed to produce graduate professionals who equipped with analytical skills and ability to work in all multidisciplinary engineering fields and industries. Additionally, the learning environment will be more enjoyable and competitive with a good mixture between local and international students.

Mechatronic Engineering programme is a multi-disciplinary field that is synergistic of electrical, mechanical, electronics, control and computer engineering disciplines which enables its graduates having good analytical and design knowledge of integrated mechatronic systems to cater for the needs in the robotics and automation industry.

The Mechanical Engineering programme emphasizes on the design and synthesis of mechanical components and systems. Mechanical engineers are usually involved in research and development, design and manufacturing, engine and thermal energy systems and also machinery. Mechanical engineering graduates are highly flexible and could work in almost every industrial engineering sector.

The Biomedical Electronic engineering programme combines knowledge of electrical, electronic and mechanical engineering, as well as medical science such as anatomy, physiology and radiology, with a strong emphasis in medical instrumentation and design. Combination of the knowledge in these areas enables engineers to understand principles in instrumentation and design of medical devices, and foster advances in medical technologies to cater for the needs in the biomedical industry.

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Bachelor Of Engineering (Honours) (Mechatronic Engineering)

Programmme Objectives (PEO)

PEO 01
Graduates who effectively demonstrate engineering knowledge and entrepreneurial skills by providing practical solutions.

PEO 02
Graduates who effectively demonstrate professionalism in multi-disciplinary engineering environment, leadership quality and teamwork.

PEO 03
Graduates who make contributions to knowledge and establish best engineering practice through research and development.

PEO 04
Graduates who demonstrate an ethical commitment to the community and the profession through involvement with professional organizations and society.

PEO 05
Graduates who engage in life-long learning as demonstrated through career advancement.

Programmme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in Mechatronic Engineering discipline.

PO 02
Ability to identify, formulate and solve engineering problems.

PO 03
Ability to design a system, component or process to meet desired needs.

PO 04
Ability to design and conduct experiments, as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
In-depth understanding of entrepreneurship, the process of innovation and the need for sustainable development.

PO 08
Understanding of professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively.

PO 11
A recognition of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Mechatronic Engineering)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	I	II	III	IV	V	VI		VII	VIII
Core Courses (98)	ENT 161/4 Electrical Circuits	ENT 162/4 Analogue Electronics	ENT 281/3 Signals & Systems	ENT 256/4 Machine Design	ENT 385/3 Control Engineering	ENT 372/4 Robotics	EIT302/4 Industrial Training	ENT 445/2 Final Year Project I	ENT 446/4 Final Year Project II
	ENT 141/3 Engineering Statics	ENT 153/4 Principles of Thermo-fluids and Materials	ENT 263/4 Digital Electronics	ENT 268/3 Electromagnetic Theory	ENT 374/3 Power Systems Engineering	ENT 363/4 Machine Vision Systems		ENT 475/3 Mechatronic Systems Design I	ENT 476/4 Mechatronic Systems Design II
	ECT111/3 Engineering Skills	ENT 142/3 Engineering Dynamics	ENT 286/3 Instrumentation & Measurements	ENT 288/3 Microprocessors	ENT 383/3 Network & Communication Engineering	ENT 386/3 Modern Control Engineering		ENT 471/4 Automation	Elective II/3
			ENT 289/3 Drives and Power Electronics		ENT 373/4 Embedded System Design and Applications	ENT 331/3 Management Production & Control of Quality		Elective I/3	
Non Engineering (22)	ENT189/3 Computer Programming	EQT 102/3 Engineering Mathematics II	EQT 241/3 Numerical Methods & Vector Calculus	EQT 271/3 Engineering Statistics				EUT440/3 Engineers in Society	EUT443/2 Engineering Management
	EQT 101/3 Engineering Mathematics I								
	EUT122/2 Skills and Technology in Communication								
University Requirement (17)	UZW XXX/1 Co-Curriculum	UUW 114/2 University Malay Language	UUW 233/2 Islamic & Asian Civilisations	UUW 322/2 Thinking Skills	UUW XXX/2 Option	UUW 235/2 Ethnic Relations			
		UZW XXX/1 Co-Curriculum	UZW XXX/1 Co-Curriculum	UUW 223/2 University English	UUW 224/2 Engineering Entrepreneurship				
	19	17	19	17	17	16	4	15	13
Total Units for Graduation 137									

Electives:
Elective I: ENT491/3 Robotic Control or ENT493/3 Advanced Control Systems or ENT488/3 Mobile Robotics
Elective II: ENT497/3 Artificial Intelligence in Engineering or ENT474/3 Intelligent Mechatronic Systems or ENT499/3 Digital Signal Processing & Applications

Bachelor Of Engineering (Honours) (Mechanical Engineering)

Programme Objectives (PEO)

PEO 01
Graduates who effectively demonstrate engineering knowledge and entrepreneurial skills by providing practical solutions.

PEO 02
Graduates who effectively demonstrate professionalism in multi-disciplinary engineering environment, leadership quality and teamwork.

PEO 03
Graduates who make contributions to knowledge and establish best engineering practice through research and development.

PEO 04
Graduates who demonstrate an ethical commitment to the community and the profession through involvement with professional organizations and society.

PEO 05
Graduates who engage in life-long learning as demonstrated through career advancement.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in Mechanical Engineering discipline.

PO 02
Ability to identify, formulate and solve engineering problems.

PO 03
Ability to design a system, component or process to meet desired needs.

PO 04
Ability to design and conduct experiments, as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
In-depth understanding of entrepreneurship, the process of innovation and the need for sustainable development.

PO 08
Understanding of professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively.

PO 11
A recognition of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Mechanical Engineering)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	**I**	**II**	**III**	**IV**	**V**	**VI**		**VII**	**VIII**
Engineering Core (98)	ENT141/3 Engineering Statics	ENT142/3 Engineering Dynamics	ENT241/3 Fluid Mechanics I	ENT247/3 Fluid Mechanics II	ENT345/4 Mechanical Components Design	ENT348/4 Mechanical System Design	EIT 302/4 Industrial Training	ENT445/2 Final Year Project I	ENT446/4 Final Year Project II
	ENT150/3 Engineering Graphic & Computer Aided Drafting	ENT143/3 Thermodynamics I	ENT243/3 Thermodynamics II	ENT245/4 Product Design Development	ENT347/3 Finite Element Methods	ENT342/3 Computational Fluid Dynamics		ENTXXX/3 Elective I	ENTXXX/3 Elective II
	ENT145/3 Materials Engineering	ENT144/2 Machining Skills	ENT242/3 Solid Mechanics I	ENT 246/3 Solid Mechanics II	ENT 388/3 Electronics	ENT346/3 Vibration Mechanics		ENT487/3 Mechanical Design Project I	ENT488/3 Mechanical Design Project II
		ENT188/3 Electrical Technology	ENT286/3 Instrumentations & Measurements	ENT244/3 Manufacturing Processes	ENT343/3 Principles of Heat Transfer	ENT385/3 Control Engineering		ENT457/3 Management, Production & Operations	
						ENT381/2 Microprocessors			
Non Engineering (22)	ENT189/3 Computer Programming								
	EUT122/2 Skills & Technology in Communication					EUT443/2 Engineering Management			EUT440/3 Engineers in Society
	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT241/3 Numerical Methods & Vector Calculus	EQT271/3 Engineering Statistics					
University Required (17)		UUW114/2 University Malay Language	UUW233/2 Islamic & Asian Civilisations	UUW223/2 University English	UUW224/2 Engineering Entrepreneurship	UUW 322/2 Thinking Skills			
		UUW235/2 Ethnic Relations			UUWXXX/2 Option				
	UUWXXX/1 Co-curriculum	UUWXXX/1 Co-curriculum	UUWXXX/1 Co-curriculum						
	18	**19**	**18**	**18**	**17**	**19**	**4**	**11**	**13**
Total Units for Graduation 137									

Elective:
Elective I: ENT461/3 Renewable Energy / ENT463/3 Elasticity / ENT465/3 Rapid Engineering / ENT462/3 Turbomachinery / ENT464/3 Fracture Mechanics / ENT466/3 Design Optimization.
Elective II: ENT431/3 Refrigeration & Air Conditioning / ENT433/3 Plasticity / ENT435/3 Robotics / ENT432/3 Energy Conversion / ENT434/3 Impact Mechanics / ENT436/3 Computer Aided Manufacturing.

Bachelor Of Engineering (Honours) (Biomedical Electronic Engineering)

Programme Objectives (PEO)

PEO 01
Graduates who effectively demonstrate engineering knowledge and entrepreneurial skills by providing practical solutions.

PEO 02
Graduates who effectively demonstrate professionalism in multi-disciplinary engineering environment, leadership quality and teamwork.

PEO 03
Graduates who make contributions to knowledge and establish best engineering practice through research and development.

PEO 04
Graduates who demonstrate an ethical commitment to the community and the profession through involvement with professional organizations and society.

PEO 05
Graduates who engage in life-long learning as demonstrated through career advancement.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in Biomedical Engineering discipline.

PO 02
Ability to identify, formulate and solve engineering problems.

PO 03
Ability to design a system, component or process to meet desired needs.

PO 04
Ability to design and conduct experiments, as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
In-depth understanding of entrepreneurship, the process of innovation and the need for sustainable development.

PO 08
Understanding of professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively.

PO 11
A recognition of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Biomedical Electronic Engineering)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	I	II	III	IV	V	VI		VII	VIII
Engineering Core (92)	ENT114/3 Circuit Theory	ENT115/3 Analogue Electronics I	ENT117/3 Engineering Mechanics	ENT218/3 Biomechanics	ENT219/3 Biomaterials	ENT221/3 Biomedical Acts, Standards & Safety	EIT 302/4 Industrial Training	ENT445/2 Final Year Project I	ENT446/4 Final Year Project II
	ECT111/3 Engineering Skills	ENT116/3 Digital Electronic Principles	ENT216/3 Analogue Electronics II	ENT222/3 Electromagnetic Field Theory	ENT220/4 Linear Control System	ENT223/3 Electrical Machine & Drives		ENTXXX/3 Elective I	ENTXXX/3 Elective II
			ENT217/3 Principles of Signasl & Systems	ENT265/4 Microcontroller & Interfaces	ENT315/4 Medical Signal Processing	ENT317/4 Medical Electronics & Bioinstrumentation		ENT427/4 Biomedical Instrumentation Design	ENT438/3 Biomedical Design Project
					ENT316/3 Principles of Communication Systems	ENT318/3 Artificial Organs		ENT413/3 Medical Imaging	
					ENT319/3 Thermofluids	ENT 320/3 Mechanics of Materials			
Non Engineering (28)	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT241/3 Numerical Methods & Vector Calculus	EQT271/3 Engineering Statistics				EUT440/3 Engineers in Society	EUT443/2 Engineering Management
	EKT120/4 Computer Programming	ENT111/4 Anatomy & Physiology	ENT210/3 Biochemistry						
	EUT122/2 Skills & Technology in Communication								
University Required (17)	UUW233/2 Islamic & Asian Civilizations	UUW410/2 University Malay Language	UUW224/2 Engineering Entrepreneurship	UUW322/2 Thinking Skills					
	UZWXXX/1 Co-Curriculum	UUW235/2 Ethnic Relation	UZWXXX/1 Co-Curriculum	UUW212/2 University English		UUWXXX/2 Option			
		UZWXXX/1 Co-Curriculum							
	18	18	18	17	17	18	4	16	14
Total Units for Graduation 137									

Elective I (Medical Computing): ENT420/4 Biological System Modeling, ENT421/4 Medical Image Processing, ENT422/4 E-Health & Telemedicine, ENT423/4 Artificial Intelligent Systems, ENT424/4 Forces, Fields & Flows in Biomedical Engineering.
Elective II (Medical Instrumentation): ENT425/4 Advanced Bioinstrumentation, ENT426/4 Computed Tomography & Applications, ENT427/4 Clinical Engineering, ENT428/4 Medical Robotics & Automation, ENT429/4 Biosensors.

Course Syllabus

ENT 111/4
Anatomy & Physiology

Course Synopsis

An introductory course to 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, and the urinary 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 able to apply in biomedical engineering problem solving.

Course Outcomes

CO1: Ability to discuss anatomical and physiological function of various systems in human body.
CO2: Ability to discuss homeostasis in human body and distinguish the homeostatic imbalance.
CO3: Ability to measure and discuss basic physiological signals and parameters.

References

1. Seely, R. R., Stephens, T.D., & Tate, P. (2005). Essentials of Anatomy and Physiology. 5th Ed. McGraw Hill.
2. Tortora, G.J., Grabowski, S.R. (2002). Principles of Anatomy and Physiology. 10th Ed. Wiley.
3. Marieb, E. (2000). Human Anatomy & Physiology. 5th Ed. Benjamin-Cummings.
4. Van Wynsberghe, D. M., Noback, C.R., & Carola, R. (1995). Human Anatomy and Physiology. 3rd Ed. Mc-Graw Hill.
5. Marieb, E.N (2009), “Essentials of Human Anatomy & Physiology”, 9th Ed., Benjamin-Cummings.

ENT 114/3
Circuit Theory

Course Synopsis

This course provide the fundamentals of electrical elements, basic laws such as Kirchorff’s law, Nodal analysis, Thevenin’s law and also circuit theorem i.e. mesh analysis, nodal analysis and superposition theorem. Calculate current, voltage and power in ac circuits using phasor approach. Study the mutual Inductance and transient response in RC, RL and RLC circuits.

Course Outcomes

CO1: Ability to distinguish between voltage and current sources and between the behaviour of resistors, capacitors and inductors in both DC and AC circuits.
CO2: Ability to analyze simple DC and AC circuits using basic circuit laws.
CO3: Ability to analyze more complex DC and AC circuits using techniques of network analysis.
CO4: Ability to design and evaluate basic circuits to meet specifications.

References

1. Robert L. Boylestad. (2007). Introductory Circuit Analysis. 11th Ed. Prentice Hall.
2. Alexander, C.K. and Sadiku, M.N.O. (2007). Fundamental of Electric Circuits. 3rd Edition, McGraw-Hill.
3. Nilssen, J.W. and Riedel, S.(2008), Electric Circuits, 8th Edition, Addison Wesley.
4. Dorf, R.C. and Svoboda, J.A.(1996), Introduction to Electric Circuits, Wiley.
5. Robert A. Pease (2008). Analogue Circuits: World Class Designs. Elsevier.

ENT 115/3
Analogue Electronics I

Course Synopsis

This course provides fundamental knowledge on analogue electronics. The student will be exposed to the basic structure of semiconductor materials, principle operation of selected electronic components and fundamental of electronic circuit design. Students will be introduced with several types of selected electronic components which are Diode, Bipolar Junction Transistor (BJT), Field Effect Transistor (FET) and Thyristors.

Course Outcomes

CO1: Ability to explain the theory of semiconductor materials and selected electronic devices.
CO2: Ability to illustrate the operation and application of selected electronic devices.
CO3: Ability to design and evaluate diode circuit and biasing of BJT and FET.

References

1. Floyd, T. (2008). Electronic Devices. 8th ed. Prentice Hall.
2. Boylestad, R.L., and Nashelsky, L. (2008). Electronic Devices and Circuit Theory. 10th ed. Prentice Hall.
3. Cathey, J.J. (2002), Schaum's outline of theory and problems of electronic devices and circuits, 2nd edition, McGraw-Hill.
4. Salivahanan, S., Kumar, N.S., Vallavaraj, A(1998)., Electronic Devices and Circuits, Tata McGraw-Hill.
5. Robert A. Pease (2008). Analogue Circuits: World Class Designs. Elsevier.

ENT 116/3
Digital Electronic Principles

Course Synopsis

In this course, the students will be exposed to the basic principle digital systems, digital circuit design and analysis. Lecture and practical will cover Algebra Boolean, Numbering system, Basic Logic Gate, Combinational Logic Circuit Design, Bi-stable Memory Devices, Sequential Circuits Design, Programmable Logic Devices, Signal Interfacing and Processing.

Course Outcomes

CO1: Able to analyze the combinational and sequential logic circuits
CO2: Be able to design and construct simple circuits and system of basic digital electronics

References

1. Floyd, T. (2009). Digital Fundamentals. 10th ed. Prentice Hall.
2. Mano, M.M. (2002). Digital Design. 3rd ed. Prentice Hall.
3. Tocci, R.J. (2001). Digital Systems: Principles and Applications. 8th ed. Prentice Hall.
4. Balaniaban, N. and Carlson, B. Digital Logic Design Principles. 1st ed. Wiley.
5. Donald D. Givone (2003). 'Digital Principles and Design', 1st Ed., Mcgraw-Hill.

ENT 117/3
Engineering Mechanics

Course Synopsis

The course provides a foundation for the students to analyze mechanical problems using simple and logical methods. The syllabus is designed to enable non-mechanical engineering students to have strong fundamental to solve mechanical problems.

Course Outcomes

CO1: Ability to study and explain fundamental laws in engineering mechanics and solve problems related to resultant force and moment.
CO2: Ability to study, explain and apply equilibrium equations to solve problems of structure with and without friction.
CO3: Ability to study, measure and analyze the relationship of kinematics and kinetics of a particle and rigid body.

References

1. Hibbler, R.C. (2010). Engineering Mechanics: Statics. 12th ed. Prentice Hall.
2. Hibbler, R.C. (2010). Engineering Mechanics: Dynamics. 12th ed. Prentice Hall.
3. Ferdinand P. Beer, E. Russell Johnston & William E.C (2007)., "Vector Mechanics for Engineers: Statics.", 8th ed., Mc Graw Hill.
4. Ferdinand P. Beer, E. Russell Johnston & William E.C.(2007), "Vector Mechanics for Engineers: Dynamics.", 8th ed., Mc Graw Hill.
5. Anthony M. Bedford and Wallace Fowler (2007). Engineering Mechanics: Statics & Dynamics, 5th Edition, Prentice Hall.

ENT 141/3
Engineering Statics

Course Synopsis

The objective of the course is to evaluate problems related to concept of mechanics in static conditions. It covers topics of equilibrium force analysis of a particle in static conditions, equilibrium force analysis for rigid body, structural analysis, friction analysis, centre gravity and centroid analysis, and moment of inertia analysis.

Course Outcomes

CO1: Ability to evaluate problems related to static equilibrium force, concepts of mechanics and vector mechanics.
CO2: Ability to evaluate problems related to moment of a force, equilibrium in rigid body and forces acting on structures.
CO3: Ability to evaluate problems related to frictions, centre of gravity, centre of mass for a system and moment of inertia of an area.

References

1. R.C. Hibbeler. (2010). *Engineering Mechanics: Statics.* 12th ed., Prentice Hall.
2. Beer and E.R. Johnson Jr. (2005). *Vector Mechanics tor Engineer: Statics*. 7th Ed. In SI Units, McGraw Hill.
3. J.L. Meriam L.G. Kraige (2003). *Engineering Mechanics: Statics*. 7th ed., John Wiley and Sons.

ENT 142/3
Engineering Dynamics
(Pre Requisite: ENT 141/3 Engineering Statics)

Course Synopsis

The objective of the course is to enable students to evaluate problems related to mechanics concepts in dynamic condition. The course covers topics of force and acceleration, work and energy, and also impulse and momentum for both kinematics of a particle and planar kinetics of a rigid body problems.

Course Outcomes

CO1: Ability to analyze problems related to rectilinear kinematics, law of motions, and also concepts mechanics and vector mechanics.
CO2: Ability to evaluate problems related to kinematics of particle, involving force and acceleration, work and energy, and also impulse and momentum.
CO3: Ability to evaluate problems related to planar kinetics or a rigid body, involving force and acceleration, work and energy and also impulse and momentum.

References

1. R. C. Hibbler (2009). *Engineering Mechanics: Dynamics*. 12th edition, Pearson / Prentice Hall.
2. Anthony Bedford and Wallace Fowler (2008). *Engineering Mechanics: Dynamics*. 5th edition in SI unit, Prentice Hall.
3. R.C Hibbeler (2006). *Engineering Mechanics: Principles of dynamics*. Pearson/Prentice.
4. Wan Abd Rahman Assyahid dan Suhaimi Ilyas (2006). *Engineering Mechanics (EPT 101)*. Penerbit KUKUM, Perlis.

ENT 143/3
Thermodynamics I

Course Synopsis

To introduce the concepts and basic knowledge of thermodynamics to the students of mechanical engineering. Emphasis will be given to the first and second laws of thermodynamics, physical properties, pure substances, enthalpy, entropy, ideal and real gas, and energy.

Course Outcomes

CO1: Ability to identify, apply the basic concepts of thermodynamics; the concept of energy transfer, the First Law of Thermodynamics and evaluate them.
CO2: Ability to calculate the properties of pure substances and solve problems related to energy evaluate for close and open systems.

CO3: Ability to identify, explain the Second Law of Thermodynamics, apply it to reversible, irreversible processes and analyze energy. Ability to evaluate the entropy of a system undergoing a process.

References

1. Y.A. Cengel and M.A. Boles (2009). *Thermodynamics: An Engineering. Approach*, 6th edition, McGraw-Hill.
2. Kurt C. Rolle (2005). *Thermodynamics and Heat Power.* University of Wisconsin-Platteville.
3. Davin Dunn (2001). *Fundamental Engineering Thermodynamics.* Illustrate edition, Longman Group, United Kingdom.

ENT 144/2
Machining Skills

Course Synopsis

The objective of this course is to introduce and provide the students with theoretical and practical skills that are required in fabricating and manufacturing mechanical parts or components. At the end of this course the students will be able appreciate various skills and technology in manufacturing processes include Manufacturing Metrology, Welding, Conventional Machining, CNC Machining and EDM Machining.

Course Outcomes

CO1: Ability to describe and choose the proper measurement tools and the safety procedures to complete a particular manufacturing process.
CO2: Ability to construct and describe the proper manufacturing process to complete a finish product.
CO3: Ability to decide and organize the use of proper machine to complete a particular manufacturing process.

References

1. S.K.Garg (2006). *Workshop Technology: Manufacturing processes*. 2nd Edition, Laxmi Publications.
2. Krar, Steve F., Gill, Arthur R., Smid, Peter (2005). *Technology Of Machine Tools*. 6th Ed., McGraw Hill.
3. Groover, M. P. (2002). *Fundamental of Modern Manufacturing*. Prentice Hall.
4. Schey, J.A. (2000). *Introduction to Manufacturing Processes*. 3rd Ed., Mc Graw-Hill.

ENT 145/3
Materials Engineering

Course Synopsis

The objective of the course is to enable the students to analyze problems related to material selection, process selection and metal structure in materials engineering. The course covers topics on atomic structure of materials, materials selection, phase diagrams, microstructure, diffusion in solids, physical properties, mechanical properties of metals, light alloys, corrosion and magnetic materials.

Course Outcomes

CO1: Ability to analyze problems related to engineering materials, materials behaviour, atomic structure, materials selection and processing of materials.
CO2: Ability to analyze problems related to metal structure, phase diagrams, diffusion in solids, physical and mechanical properties of metals.
CO3: Ability to analyze problems related to production, forming of metals, light alloys corrosion and magnetic materials.

References

1. William D Callister (2010). *Materials Science and Engineering*. 8th Edition, John Wiley & Sons.
2. Donald R. Askeland and Pradeep P. Phule (2003). *The Science and Engineering of Materials*. 4th Ed., Thomson Brooks/Cole.
3. Kenneth G. Budinski (2010). *Engineering Materials: Properties and Selection.* 9th Ed., Pearson.
4. James F Shackelford (2009). *Introduction to Materials Science for Engineers*. 7th Edition International Edition, Pearson.

ENT 150/3
Engineering Graphics
& Computer Aided Drafting

Course Synopsis

The aim of this course is to expose mechanical engineering student to basic concepts and applications of engineering graphics and computer aided drafting.

Course Outcomes

CO1: Ability to design and reproduce drafting and technical drawings using proper techniques.
CO2: Ability to design and reproduce 2-dimensional drawings to 3-dimensional drawings and vice versa.
CO3: Ability to realize basic concepts of drafting and to design engineering projects using computer aided drafting software.

References

1. Gary R. Bertoline and Eric N. Wiebe (2008). *Technical Graphics Communication*. 5th Ed., McGraw-Hill.
2. Frederick E. Giesecke, Henry Cecil Spencer, John Thomas Dygdon, Alva Mitchell, Ivan Leroy Hill and James E. Novak (2009). *Technical Drawing*. 13th Ed., Prentice Hall.
3. Timothy Sean Sykes (2002). *AutoCAD 2002 One Step at a Time*. Prentice Hall,.
4. Ralph Grabowski (2002). *Using AutoCAD 2002.* Thomson Learning.

ENT 153/4
Principles of Thermo-Fluids
and Materials

Course Synopsis

This course aims to introduce to the mechatronic engineering students the basic knowledge on the principles of mechanical sciences. It includes basic aspects related to material engineering, fluid mechanics and Thermodynamics.

Course Outcomes

CO1: Ability to describe the Mechanical properties of materials and analyse tensile, compressive, shear stresses & strains, and torsional deformation.
CO2: Ability to calculate the pressure variation in a static fluid, and to analyze the resulting hydrostatic forces on plane and curved submerged surfaces.
CO3: Ability to describe, explain and analyze an Energy equation for fluid flow problems.
CO4: Ability to identify, analyze and solve energy balance problems for closed and steady flow systems and devices.

References

1. William D Callister (2010). *Materials Science and Engineering*. 8th Edition, John Wiley & Sons.
2. Yunus A. Cengel and Robert H Hunter (2005). *Fundamentals of Thermal Fluids Sciences*. Int'l Edition, McGraw-Hill.
3. Lim Poh Seng, Tay Seng How and Koh Kok Pin (2003). *Strength of Materials for Polytechnic*, Revised Edition, Prentice Hall.
4. Robert L. Mott (2006). *Applied Fluid Mechanics*. 6th Edition, Pearson.
5. William Fox and Alan T. McDonald (1998). *Introduction to Fluid Mechanic*.

ENT 161/4
Electrical Circuits

Course synopsis

This course provide the fundamentals of electrical elements, basic laws such as Kirchorff's law, Nodal analysis, Thevenin's law and also circuit theorem i.e. mesh analysis, nodal analysis and superposition theorem. The syllabus covers a calculation of current, voltage and power in ac circuits by using phasor approach, and follows by the study of the mutual Inductance and transient response in RC, RL and RLC circuits.

Course Outcomes

CO1: Ability to solve DC problems using basic laws and circuit theorem.
CO2: Ability to solve AC problems using basic laws and circuit theorem.
CO3: Ability to design and evaluate basic circuits to meet specifications.

References

1. Alexander, C.K. and Sadiku, M.N.O.(2007) *Fundamental of Electric Circuits, 3rd Edition*, McGraw-Hill.
2. Robert L. Boylestad. (2007) *Introductory Circuit Analysis*. 11th Ed. Prentice Hall.
3. Nilssen, J.W. and Riedel, S.(2008) *Electric Circuits, 8th Edition,* Addison Wesley.

ENT 162/4
Analogue Electronics

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

CO1: Ability to perform the analysis on characteristics of semiconductor devices.
CO2: Ability to design and evaluate analogue circuits by using semiconductor devices.
CO3: Ability to solve circuitry problems in a group.

References

1. Floyd T., "Electronic Devices", 8th Edition, Pearson Prentice Hall, 2008.
2. Boylested R L and Nashelsky L., "Electronics Devices and Circuit Theory", 7th Edition, Prentice Hall, 1999.
3. Schuler C A., "Electronics- Principles and Applications", 6th Edition, Prentice Hall, 2003.
4. Aminian, A., and Kazimierczuk, M., "Electronic Devices- A Design Approach", Pearson Prentice Hall, 2004.
5. Salivahanans S., Kumar N., Vallavaraj A., "Electronic Devices and Circuits", McGraw Hill, 2007.

ENT 188/3
Electrical Technology

Course Synopsis

The objective of the course is to introduce the students with the fundamentals concept of electric circuits, electric supply system and installation, magnetic and electromagnetic, inductance, capacitance and AC circuit, three-phase system, basic principles of electrical machines, DC and AC electrical machines, transformer and electrical safety. The laboratory will be used to aid the students understanding of the concept introduced.

Course Outcomes

CO1: Ability to analyze electrical circuits to solve engineering problems.
CO2: Ability to analyze AC Circuits.
CO3: Ability to analyze the characteristics three-phase circuits and electromagnetic.
CO4: Ability to analyze the operation of Electrical Machines and their applications.

References

1. Charles K. Alexander and Matthew N. O. Sadiku (2004). *Fundamentals of Electrical Circuits.* 2nd Ed, McGraw Hill.
2. James W. Nilsson and Susan A. Reidel (2004). *Electric Circuits*. 6th Ed, Prentice Hall.
3. Wildi, T (2002). *Electrical Machines, Drives and Power Systems*. Prentice Hall.
4. Bhattacharya, S. K. (1998). *Electrical Machines.* McGraw Hill.
5. P. C. Sen (1997). *Principles of Electric Machines and Power Electronics*. 2nd Edition, Wiley.

ENT 189/3
Computer Programming

Course Synopsis

This course is designed to introduce the fundamentals of Computer Programming. It provides an introduction to the principles of procedural programming, data types, control structures, data structures and functions, data representation on the machine level. This course also introduces the basic concepts of object oriented programming. At the end of this course students should be able to write, debug and document well-structured C applications applied to Mechatronic Engineering

Course Outcomes

CO1: Ability to define the basic programming techniques.
CO2: Ability to apply suitable programming technique to solve a given problem.
CO3: Ability to develop and analyze computer programmes in C and C++ for Mechatronic Applications.

References

1. Deitel & Deitel, Suhizaz Sudin, R. Badlishah and Yasmin Yacob (2006). *C How To Programme*. Pearson-Prentice Hall.
2. Ivor Horton's (2003). *Beginning visual C++.* Wiley Publishing, Inc, Indiana.
3. Tan & D Orazio (1999). *C Programming for Engineering & Computer Science*. McGraw Hill.
4. Forouzan, B. A. & Gilberg R. F. (2001). *Computer Science: A Structured Programming Approach Using C*. Brooks/Cole.
5. Al Kelley and Ira Pohl (2000). *C by Dissection: The Essentials of C Programming*. 4th ed., Addison-Wesley.
6. Sprankle and Maureen (2006). *Problem Solving and Programming Concepts*. 7th Edition. Prentice Hall.

ENT 216/3
Analogue Electronics II
(Pre Requisite: ENT 115/3 Analogue Electronics 1)

Course Synopsis

This course provides further knowledge on analogue electronics. The student will be exposed to the concept and operation of amplifiers including cascade amplifier, power amplifier and the operational amplifier. Students will also be introduced with the operating principles of active filters, feedback circuits, oscillators and voltage regulators.

Course Outcomes

CO1: Ability to analyze the operation, application and frequency response of power amplifiers and operational amplifiers.
CO2: Ability to analyze the principles of active filters, feedback circuits, oscillators and voltage regulators in electronic applications.
CO3: Ability to design amplifiers, active filters and oscillators.

References

1. Floyd, T. (2008). Electronic Devices. 8th ed. Prentice Hall.
2. Boylestad, R.L., and Nashelsky, L. (2008). Electronic Devices and Circuit Theory. 10th ed. Prentice Hall.
3. Cathey, J.J. (2002), "Schaum's outline of theory and problems of electronic devices and circuits", 2nd edition, McGraw-Hill.
4. Salivahanan, S., Kumar, N.S., Vallavaraj, A. (1998), "Electronic Devices and Circuits", Tata McGraw-Hill.
5. Robert A. Pease (2008). Analogue Circuits: World Class Designs. Elsevier.

ENT 217/3
Principles of Signals & Systems

Course Synopsis

This course introduces the different types of signals and networks present in an engineering systems. Signal and system representations are discussed for both time (Fourier Series) and frequency domains (Fourier and Laplace transform). The concept of transfer function is introduced and other applications of the Laplace transform such as for the solution of differential equations, and circuit analyses are presented. The application of z-transform is introduced in the analysis of signals and systems. At the end of this course, the students are able to analyze different types of signals using numerous transformation techniques and evaluate its performance.

Course Outcomes

CO1: Ability to explain and analyze the application of Fourier Series in signals and Systems.
CO2: Ability to explain and analyze the application of Laplace Transform in Signals and Systems.

CO3: Ability to explain and analyze the application of z-transform in Signals and Systems.
CO4: Ability to communicate clearly and to use modern engineering tools for solving engineering problems.

References

1. B.P. Lathi. (2005). Linear System & Signals. Oxford University Press.
2. C.L. Phillips, J.M. Parr, E.A. Riskin. (2003). Signals, Systems & Transforms. 3rd Ed. Prentice Hall.
3. B.P. Lathi (1998). 'Signal Processing & Linear Systems', Oxford University Press.
4. M.J. Roberts (2003). 'Signals & Systems', McGraw Hill.
5. Charles L.Philips (2007). Signals, Systems and Transforms. 4th Edition. Prentice Hall.

ENT 218/3
Biomechanics
(Pre Requisite: ENT 117/3 Engineering Mechanics)

Course Synopsis

The course aims to introduce the fundamental of biomechanics which covers the engineering mechanics, anatomy and basic applications on the analysis of the human body as mechanical systems.

Course Outcomes

CO1: Ability to define, explain and compare the biomechanics and anatomy terminologies and their relationships
CO2: Ability to differentiate and analyze the relationship of kinematics and kinetics of a particle and rigid body.
CO3: Ability to solve engineering problems by choosing appropriate method that related to statics and dynamics.

References

1. Susan J.H. (2007). Basic Biomechanics. 5th Ed.
2. Iwan W.G. (2006). Principles of biomechanics & Motion Analysis. 3rd Ed.
3. Ellen Kreighbaum and Katharine M Barthels (1996), "Biomechanics: A qualitative approach for studying human movement", 4th Edition.
4. David A.W. (2005), "Biomechanics and Motor Control of Human Movement", 3rd Edition.
5. Joseph H., Kathleen M.K (2003), "Biomechanical Basis of Human Movements", 2nd Edition.

ENT 219/3
Biomaterials

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

CO1: Ability to describe the concept of biocompatibility, analyze and follow basic properties of materials in medical applications.
CO2: Ability to propose the suitable materials for specific biomedical applications and explain and display their effects with respect to biocompatibility.
CO3: Ability to assess tissue reactions to implanted biomaterials.
CO4: Ability to illustrate the main components of biomedical implants, describe their function and justify the important characteristics of the implanted materials.

References

1. Temenoff, J.S. and Mikos, A.G. (2008). Biomaterials: The Intersection of Biology and Material Science. Prentice Hall.
2. Callister W.D., "Fundamentals of Materials Science and Engineering: An Integrated Approach", 3rd ed., John Wiley, 2008.
3. Ratner, B.D., Hoffman, A.S., Schoen, F.J., Lemons, J.E. (2004). Biomaterials Science: An Introduction to Materials in Medicine. 2nd Ed. Academic Press.
4. Park, J.B., Bronzino, J.D. (2002). Biomaterials: Principles and Applications. CRC Press.

5. Shi, D. (2004). Biomaterials and Tissue Engineering. Springer.

ENT 220/3
Linear Control Systems

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. MATLAB software will be used for the analysis and design. At the end of the course, the students should be able to analyze, design and evaluate controlled systems.

Course Outcomes

CO1: Ability to analyze basic concepts of control theory applications (including biomedical systems).
CO2: Ability to analyze system response, and stability in time domain.
CO3: Ability to analyze system response, and stability in frequency domain.
CO4: Ability to design PID and lead-lag controllers.

References

1. Nise, N.S, (2009). Control Systems Engineering. 4th Ed. Wiley.
2. Ogata, K. (2002). Modern Control Engineering. 4th ed. Prentice Hall.
3. Gopal, M. (1995). Control Systems: Principles and Design. 2nd Ed. Tata McGraw-Hill.
4. Khandpur, R.S. (2003), "Handbook of Biomedical Instrumentation", 2nd Ed. Tata McGraw-Hill.
5. Carr, J.J., Brown, J.M.(2001), "Introduction to Biomedical Equipment Technology", 4th Ed. Prentice Hall.

ENT 221/3
Biomedical Acts, Standards & Safety

Course Synopsis

The course provides an introduction to the acts and standards used in biomedical engineering. This includes ethical issues and the power system safety of electrical appliances especially medical equipments. The course also focuses on the safety issues in the healthcare institution which particularly emphasized on medical devices and their interrelation with the hospital's environment. At the end of this course, students will appreciate on how acts and standards are established with the requirements in compliance with the acts and standards. Safety aspects and measures will be emphasized so that students will be able to control and be prepared in any situation involving human life.

Course Outcomes

CO1: Ability to employ regulatory standards in ensuring safety and reliability of medical technology.
CO2: Ability to demonstrate safety awareness in dealing with hazards from medical equipment.
CO3: Ability to manage healthcare technology and demonstrate ethical responsibility in the field of biomedical engineering.

References

1. Reese, C.D. (2003). Occupational Health and safety Management: A Practical Approach. Lewis Publishers.
2. Carr, J.J. (2000). Introduction to Biomedical Equipment Technology. 4th Ed. Prentice Hall.
3. Lusardi, M.M., Nielsen, C.C. (2000). Orthotics and Prosthetics in Rehabilitation. Butterworth-Heinneman.
4. Joseph D.B. (2006). Medical Devices and Systems, Biomedical Engineering Handbook. 3rd Ed. Taylor and Francis.
5. Daniel, A.V.(2007), "Biomedical Ethics for Engineers", Elsevier.

ENT 222/3
Electromagnetic Field Theory

Course Synopsis

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

Course Outcomes

CO1: Ability to define and explain basic theory of electromagnetism.
CO2: Ability to apply the fundamental mathematics of vector analysis and Maxwell's equations to solve and analyze electromagnetic problems.
CO3: Ability to identify and differentiate the differences of magnetic materials and relate the EM properties of materials.
CO4: Ability to analyze the characteristic and mechanism of electromagnetic wave in different situation.

References

1. William H. Hayt, Jr. and John A. Buck "Engineering Electromagnetics", 7th Ed., McGraw Hill International Ed. 2006.
2. Ulaby, F.T. (2003). Fundamental of Applied Electromagnetics. Prentice Hall.
3. Kraus, J.D., Fleisch, D.A. (1999). Electromagnetics. 5th ed. McGraw-Hill.
4. Cheng D.K. (1992). Fundamental of Engineering Electromagnetics. Prentice Hall.
5. Dragan Poljak, "Human Exposure to Electromagnetic Fields", WIT Press, 2004.

ENT 223/3
Machines & Electrical Drives

Course Synopsis

This course provides the students both theories and applications of electrical machines and drives which include different types of motor, generator and transformer. This course allows the students to identify and select a suitable electrical machines and drives for various applications.

Course Outcomes

CO1: Ability to explain the principle and operation of different types of electrical machines.
CO2: Ability to compare and analyze the performance characteristics of electrical machines.
CO3: Ability to explain and compare the different types of electrical drives.
CO4: Ability to select and design suitable electronic drives for speed control of electrical machines.

References

1. Theodore Wildi (2006). Electrical Machines, Drives, and Power Systems. 6th Edition.
2. S.J. Chapman (2005), Electric Machinery Fundamentals, 4th Edition, McGraw Hill.
3. Leonard L. Gigsby (2007), Electric Power Engineering Handbook, 2nd Edition, CRC Press.
4. J. F. Gieras (2008). Advancements in Electric Machines (Power Systems), Springer.
5. Andre Veltman (2007). Fundamentals of Electrical Drives (Power Systems), Springer.

ENT 241/3
Fluid Mechanics I

Course Synopsis

This course aims to develop the student 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, flow of fluids in pipes, and in non-circular conduits. The students shall also be introduced on momentum analysis and its application in engineering problems.

Course Outcome

CO1: Ability to identify and calculate various properties of fluids.
CO2: Ability to respond and analyze problems related to fluids statics, fluids kinematics, and conservation of mass and Bernoulli equation.
CO3: Ability to analyze momentum of flow systems, identify moments acting on a control volume and use control volume analysis to determine the forces associated with fluid flow.

References

1. Yunus A. Cengel and John M. Cimbala (2008). *Fluids Mechanics: Fundamentals and Applications*. Int'l Edition, McGraw-Hill.

2. Robert L. Mott (2006). *Applied Fluid Mechanics*. 6th Edition, Pearson.
3. M.C. Potter and D.C. Wiggert (2002). *Mechanics of Fluids*, 3rd Edition, Brooks/Cole.
4. Robert W. Fox and A.T. McDonald (1998). *Introduction to Fluid Mechanics*. 5th Edition, John Wiley and Sons.
5. JF Douglas, JM Gasiorek, JA Swaffield and LB Jack (2005). *Fluid Mechanics*. 5th Edition, Prentice Hall.

ENT 242/3
Solid Mechanics I

Course Synopsis

The objective of the course is to introduce the fundamental theories of solid mechanics. The basic of mechanics that have been learned in static and dynamic subjects will be extended and emphasized on solid materials. The course covers the law of mechanics, the concept of stress and strain, torsion and bending. The theoretical knowledge will be emphasized with practical in the lab. The tests of tensile and torsion will be performed. The testing of materials will be referred to international standards so that the students have a proper knowledge of material testing.

Course Outcome

CO1: Ability to apply the fundamental theory of solid mechanics (mechanical properties, the relation between stress and strain).
CO2: Ability to identify, calculate and analyze cases of axial loading, torsion, bending.
CO3: Ability to apply and solve the combination cases by using the stress and strain transformation.

References

1. Hibbeler, R.C. (2008). *Mechanics of Materials*. 7th ed., Prentice Hall.
2. Ferdinand P. Beer (2006). *Mechanics of Materials*. 4rd ed., McGraw-Hill.
3. Barber, J.R. (2001). *Intermediate Mechanics of Materials*. McGraw-Hill.
4. Madhuhar Vable (2002) *Mechanics of Materials*. Oxford.
5. Raymond Parnes (2001). *Solid Mechanics in Engineering*. John Willey & Sons.

ENT 243/3
Thermodynamics II
(Pre Requisite: ENT 143/3 Thermodynamics I)

Course Synopsis

To introduce the concepts and the applications of thermodynamics to the students of mechanical engineering. Emphasis will be given to the gas power cycles, vapour power cycles, refrigeration cycles, gas mixture, gas vapour mixtures and air-conditioning, chemical reactions, compressible flow and the applications in industry and in everyday life.

Course Outcome

CO1: Ability to identify, describe, and illustrate the concepts of gas and vapour power cycles and their applications. Ability to evaluate and solve the related problems.
CO2: Ability to explain refrigeration cycles, heat pumps and refrigerant selection. Ability to calculate and evaluate problems of refrigeration cycles.
CO3: Ability to describe, apply, evaluate and solve the problems of gas mixtures, gas–vapour mixture and air conditioning.
CO4: Ability to explain, interpret and determine the chemical reactions, reacting systems and the adiabatic flame temperature. Ability to explain the concepts of compressible flow and evaluate problems on stagnation, Mach. No., isentropic flow, shock wave and expansion wave.

References

1. Y.A. Cengel and M.A. Boles (2009). *Thermodynamics: An Engineering Approach*. 6th edition, McGraw-Hill.
2. Kurt C. Rolle (2005). *Thermodynamics and Heat Power*. University of Wisconsin-Platteville.

3. Davin Dunn (2001). *Fundamental Engineering Thermodynamics.* Illustrate edition, Longman Group, United Kingdom.
4. W.Z. Black and J.G. Hartley (1996). *Thermodynamics*. English/SI version, 3rd edition, Prentice-Hall.
5. M.J. Moran and H.N. Shapiro (1998). *Fundamentals of Engineering Thermodynamics*. 3rd Edition, John Wiley & Sons.
6. R. Sonntag, C. Borgnakke and G. Van Wylen (1998). *Fundamentals of Thermodynamics*. 5th Edition, John Wiley and Sons.

ENT 244/3
MANUFACTURING PROCESSES

Course Synopsis

This course is an introduction of manufacturing processes and techniques used in industry to convert raw materials into finished or semi-finished part. This includes the study on the characteristics of manufacturing processes such as forming, casting, moulding, rapid prototyping, non-conventional machining and welding, soldering and mechanical fasteners. The influence of materials and processing parameters in understanding individual processes are also highlighted

Course Outcome

CO1: Ability to describe and choose the right raw materials for selected manufacturing processes.
CO2: Ability to describe, display and analyze the manufacturing processes for a finished product.
CO3: Ability to choose, compare and evaluate the use of proper machine to complete a particular manufacturing process.

References

1. S. Kalpakjian and S.R. Schmid (2006). *Manufacturing Engineering and Technology*. 5th ed., Prentice Hall International.
2. S.K. Garg (2006). *Workshop Technology: Manufacturing processes*. 2nd Edition, Laxmi Publications.
3. Krar, Steve F., Gill, Arthur R. and Smid, Peter (2005). *Technology Of Machine Tools.* 6th Ed., McGraw Hill.
4. Groover, M.P. (2002). *Fundamental of Modern Manufacturing.* Prentice Hall.
5. Zainal Abidin Ahmad (1999). *Proses Pembuatan*. Penerbit UTM, Johor.

ENT 245/4
Product Design Development

Course Synopsis

The objective of this course is to present in a clear and detailed way a set of product development methods aimed at bringing together the marketing, design, and manufacturing functions of the enterprise. This course aims to develop an understanding of customer's needs and product marketability through the subject theme of "Customers/User Centred Design". Student will use appropriate engineering approaches and methods to analyze user needs and formulate solution to the design problems.

Course Outcome

CO1: Ability to identify design requirements from general problem descriptions.
CO2: Ability to develop systematically a design from concept to prototype.
CO3: Ability to communicate clearly design ideas and information.
CO4: Ability to evaluate critically the designs using engineering criteria and predictive usage.

References

1. K.T. Ulrich and S. D. Eppinger (2008). *Product Design and Development*, 4th Edition, McGraw-Hill.
2. Richard Budynas and J. Keith Nisbett (2008). *Shigley's Mechanical Engineering Design*. Eighth Edition, McGraw Hill.
3. Joseph E. Shigle and Charles R. Mischke (2001). *Mechanical Engineering Design*. Sixth Metric Edition.
4. Karl T. Ulrich and Steven D. Eppinger (2004). *Product Design and Development*, 3rd Edition, McGraw-Hill.
5. David G. Ullman and David Ullman (2003). *Mechanical Design Process*. 3rd Edition, McGraw Hill.

6. Robert L. Mott (1992). *Machine Elements in Mechanical Design*. 2nd Edition, Maxwell and Macmillan International.
7. Alexander H. Slocum (1992). *Precision Machine Design*, Prentice-Hall International.
8. M. F. Spotts (1992). *Design of Machine Elements.* 6th Edition, Prentice-Hall.
9. Robert C. Juvinall and Kurt M. Marshek (!991). *Fundamentals of Machine Component Design*. 2nd Edition, John Wiley & Sons.

ENT 246/3
Solid Mechanics II

Course Synopsis

The objective of the course is to enhance the understanding of the topics that have been learned in Solid Mechanics I. The topics is extended and emphasized on stress transformation occur in beam, shaft and member.
It is also covered an introduction on buckling and energy method theory.

Course Outcome

CO1: Ability to analyze shaft, beam and member subjected to various loadings and develop a stress strain transformation analysis.
CO2: Ability to recognize, calculate and solve deflection in structural analysis, calculate buckling and strain energy applied by various loadings.
CO3: Ability to calculate buckling and strain energy applied by various loadings.

References

1. Hibbeler, R.C. (2009). *Mechanics of Materials*. 12th ed., Prentice Hall.
2. Pytel. Kiusalaas (2001). *Mechanics of Materials*. 3rd ed., McGraw-Hill.
3. Barber, J.R. (2001). *Intermediate Mechanics of Materials*. McGraw-Hill.
4. Madhuhar Vable (2002). *Mechanics of Materials*. Oxford.
5. Raymond Parnes (2001). *Solid Mechanics in Engineering*. John Willey & Sons.

ENT 247/3
Fluid Mechanics II
(Pre Requisite: ENT 241/3 Fluid Mechanics I)

Course Synopsis

This course is to develop the knowledge of student on dimensional analysis and modelling. Emphasis is given to explain equations of motion, and inviscid flow. Some basic, plane potential flows with their superposition are analyzed. Compressible fluid flow and particle mechanics are also covered in this course. At last will be exposed to the concept and analyze of turbo machinery.

Course Outcome

CO1: Ability to analyze dimensional analysis, modelling, and problems related to losses in pipe flows and flow over bodies.
CO2: Ability to evaluate the consequences of compressibility in gas flow and/or the effect of area changes for one dimensional isentropic subsonic and supersonic flows.
CO3: Ability to develop analytical techniques for particle mechanics problems based on Stoke's law/ Darcy's law/Carmen-Kozeny equation in fluid systems.
CO4: Ability to analyze different type of turbomachinery.

References

1. Yunus A. Cengel and John M. Cimbala (2008). *Fluids Mechanics: Fundamentals and Applications.* Int'l Edition, McGraw-Hill.
2. Robert L. Mott (2006). *Applied Fluid Mechanics.* 6th Edition, Pearson.
3. M.C. Potter and D.C. Wiggert (2002). *Mechanics of Fluids*. 3rd Edition, Brooks/Cole.
4. Robert W. Fox and A.T. McDonald (1998). *Introduction to Fluid Mechanics.* 5th Edition, John Wiley and Sons.
5. JF Douglas, JM Gasiorek, JA Swaffield and LB Jack (2005). *Fluid Mechanics*. 5th Edition, Prentice Hall.

ENT 256/4
Machine Design

Course Synopsis

This course enables the students to comprehend and identify theoretical design as well as the machine elements that need to be considered in machine design process. This course also encourages the students to think as a machine designer. The concept and principle of machine design taught will be applied in designing machine, focusing on the outcome of innovative student thinking.

Course Outcomes

CO1: Ability to discuss, apply, and organize the concept and principle of design process.
CO2: Ability to discuss, apply, and organize machine elements and analyze position, velocity and acceleration of a point in a linkage.
CO3: Ability to analyze, and construct machine elements to develop a mechanism.
CO4: Ability to apply, analyze and sketch mechanism design (linkage synthesis).

References

1. Robert L. Norton (2008). *Design of Machinery*. 5th Ed., McGraw Hill.
2. David H. Myszka (2005). *Machine & Mechanisms: Applied Kinematic Analysis*. Prentice Hall.
3. Richard G. Budynas and J. Keith Nisbet (2008). *Shigley's Mechanical Engineering Design*. 8th Ed., McGraw Hall.
4. Robert L. Mott (2006). *Machine Elements in Mechanical Design.* 4th Ed. in SI Units, Prentice-Hall.
5. Charles E. Wilson and J. Peter Sandler (2006). *Kinematics and Dynamics of Machinery.* 3rd Ed., Pearson Prentice-Hall.

ENT 263/4
DIGITAL ELECTRONICS
(Pre Requisite: ENT 162/4 Analogue Electronics)

Course Synopsis

This course is designed to introduce the basic principle of digital systems and digital circuit design with analysis. Lecture and practical will cover the following: Algebra Boolean, Numbering system, Basic Logic Gate, Combinational Logic Circuit Design, Bi-stable Memory Devices and Sequential Circuits Design.

Course Outcomes

CO1: Ability to explain the concepts of digital electronic system.
CO2: Ability to analyze the combinational logic circuit.
CO3: Ability to analyze the sequential logic circuit.
CO4: Ability to apply the digital electronic components in Mechatronic engineering applications.

References

1. Flyod, T.L., "Digital Fundamentals", 10th. Ed., Prentice Hall 2009.
2. M.M. Mano, "Digital Design", 3rd Ed., Prentice-Hall 2002.
3. Tocci, RJ., "Digital systems: Principles and Applications", 8th Ed., Prentice Hall 2001.
4. N. Balabanian and B. Carlson, "Digital Logic Design Principles", 1st Ed., John Willey
5. W. Kleitz, "Digital Electronics: A Practical Approach", 6th Ed., USA: Prentice-Hall, 2004

ENT 268/3
Principles of Electromagnetics

Course Synopsis

This course is designed to introduce the theories and concepts of electromagnetic fields. Student will be exposed to basic postulates of electrostatic and electromagnetic fields and able to solve related problems. Finally the students will be developing the ability to apply the fundamental mathematics of vector analysis and Maxwell's equations to in electromagnetic problems.

Course Outcomes

CO1: Ability to perform analysis on electric field, electric potential and capacitance due to any distribution of electric charges.

CO2: Ability to perform analysis on magnetic field, magnetic flux density and inductance due to any current distribution.

CO3: Ability to perform analysis on Maxwell's equations and problems related to electromagnetic field.

References

1. Matthew N.O. Sadiku "Elements of Electromagnetics", 4th Ed., Oxford University Press, 2007.
2. William H. Hayt, Jr. and John A. Buck "Engineering Electromagnetics", 7th Ed., McGraw Hill International Ed. 2006.
3. David K. Cheng, "Fundamentals of Engineering Electromagnetics" Addison Wesley, 1992.
4. Fawwaz T. Ulaby, "Fundamentals of Applied Electromagnetics", 5th Ed., Pearson International Edition, 2007.
5. Joseph A. Edminister, "Schaum's Outline of Theory and Problems of Electromagnetics", 2nd Ed., McGraw Hill International Ed. 1995.
6. Kraus/Fleisch, "Electromagnetics with Applications", 5th Ed., McGraw Hill International Ed. 1999.

ENT 281/3
Signals and Systems

Course Synopsis

This course provides the basics of different types of signals, transformation techniques and communication system. In addition, the students are also exposed to the design of Linear Time Invariant system and its characteristics in this course. Various signal transformation methods on two different domains (time and frequency) such as Fourier series, Fourier transform, Z Transform and Laplace transform is also studied. At the end of this course, the students are able to analyze different types of signals using numerous transformation techniques and evaluate its performance.

Course Outcomes

CO1: Ability to comprehend the concept and identify specific type of signals and systems.

CO2: Ability to analyze the signal using time and frequency domain techniques.

CO3: Ability to develop and formulate a system using both time-domain and frequency-domain techniques.

References

1. Simon Haykin and Barry Van Veen, "Signals and Systems", Wiley, 2nd Edition, 2002.
2. John G. Proakis and Masoud Salehi, "Fundamentals of Communication System", Prentice-Hall, 2005.
3. Charles L. Phillips, John M. Parr, Eve A. Riskin; "Signals, Systems and Transforms", Prentice Hall, Fourth Edition, 2009.
4. M.J. Roberts, "Signals and Systems", International Edition, McGraw Hill, 2003.

ENT 286/3
Instrumentations and Measurements

Course Synopsis

This course provides the knowledge of measurement and instrumentation with various transducers and techniques involving physical phenomena. This includes an 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 computer for interfacing application is also covered in this course.

Course Outcomes

CO1: Ability to explain basic concepts of transducers, sensors and measurement techniques and errors in measurement.

CO2: Ability to apply interfacing concept between transducers, computer and signals obtained from measurement techniques.

CO3: Ability to design measurement system using suitable sensors and transducers.

References

1. Anthony J.W., Ahmad R.G., "Introduction to Engineering Experimentation", 3rd Ed., Prentice Hall, 2010

2. Bentley, J.P., “Principles of Measurement Systems”, 4th Edition, Prentice Hall, 2005.
3. Johnson, C., “Process Control Instrumentation Technology”, 8th Edition, Prentice Hall, 2006.
4. Doebelin, E.O., “Measurement System: Application and Design”, Mc Graw Hill, 2004.
5. Sinclair, I., “Sensors and Transducers”, 3rd Edition, Newnes, 2001.

ENT 288/3
Microprocessors

Course Synopsis

The aim of this course is to study the microprocessor architecture and relate that knowledge to the design of microprocessor based systems. This includes evaluation of a simple application on a microprocessor-based system. This also includes the knowledge of assembly language programming, I/O interfacing, arithmetic operations, data transfer, timers, serial port programming, interrupts, LCD and keyboard interfacing and data converters. The students must able to design and develop simple real-world applications based on PIC 18 microcontroller system.

Course Outcomes

CO1: Ability to describe and explain the theory and basic architecture of microprocessors.

CO2: Ability to write programmes using assembly language and illustrate the PIC18 microcontroller built-in functions.

CO3: Ability to choose the I/O devices and develop a simple microcontroller-based application.

References

1. Muhammad Ali Mazidi, Rolin D. Mckinlay & Danny Causey PIC Microcontroller and Embedded Systems: Using Assembly and C for PIC18, Pearson Prentice Hall 2008.
2. Barry B. Brey Applying PIC18 Microcontrollers: Architecture, Programming, and Interfacing using C and Assembly, Pearson Prentice Hall 2008.
3. Huang Han-Way PIC Microcontroller: An Introduction to Software and Hardware Interfacing, Thomson & Delmar Learning, 2005.
4. John B. Peatman Design with PIC Microcontrollers, Prentice Hall, 1998.
5. Martin Bates “Interfacing PIC Microcontrollers: Embedded Design by Interactive Simulation”, Newnes 2006.

ENT 289/3
Drives and Power Electronics

Course Synopsis

This course is intended to introduce to the Mechatronic students both theories and applications of: 1) Electromechanical drives, which consists of DC and AC machines, stepper and servo motor, 2) fundamental elements of power electronics and electronic drive control, consisting switching converters and pulse-width-modulation (PWM) techniques and variable speed operation of induction motor and 3) Actuator, which consists of Linear and rotary driven actuator, characteristics of mechanical actuator, selection of actuator. This course also allows the students to identify and select drives and actuators which are suitable for applications.

Course Outcomes

CO1: Ability to choose based on the characteristics for various types of a drive system.

CO2: Ability to analyze and evaluate the performance of different types of a drive system.

CO3: Ability to design and evaluate the drive system and actuators for an optimum performance in various applications.

References

1. Theodore Wildi. Electrical Machines, Drives, and Power Systems. Sixth Edition, 2006.
2. Anthony Esposito. Fluid Power with applications. Sixth Edition, 2003.
3. Charles E. Wilson and J. Peter Sadler. Kinematics and Dynamics of Machinery. Third Edition in SI Units, 2006.

4. Ned Mohan, Electric Drives: An Interactive Approach, MNPERE, 2004.
5. W. Bolton, "Mechatronics: Electronic Control Systems in Mechanical & Electrical Engineering", 3rd Ed., 2003.

ENT 315/4
Medical Signal Processing
(Pre Requisite: ENT 217/3 Principles of Signal and System)

Course Synopsis

This course is an introduction to classification of digital signals and systems and also explains the application of different types of transform domains in the analysis of discrete signals and systems. The course covers the application of discrete Fourier transform (DFT) and fast Fourier transform (FFT) to analyze the digital signals. This course also covers the design of finite impulse response (FIR) filters and infinite impulse response (IIR) filters for analyzing biomedical signals. Finally, this course discusses the application of digital signal processing and digital signal processors. MATLAB software is used in the laboratory sessions.

Course Outcomes

CO1: Ability to explain the basic concept of DSP and acquisition signal process.
CO2: Ability to explain on the filter used and its design.
CO3: Ability to discuss on image processing method.
CO4: Ability to discuss the tools used for DSP.

References

1. Proakis J.G. and Manolakis D.G., (2007), "Digital Signal Processing: Principles, Algorithms and Applications" 4th edition, Prentice Hall
2. Lyons R.G., (2004), "Understanding Digital Signal Processing", 2nd ed, Prentice Hall.
3. Mitra S.K., (2006), "Digital Signal Processing", McGraw-Hill.
4. Charles L.Byrne (2005). Signal Processing: A Mathematical Approach, Wellesley.
5. Steven Smith (2003). Digital Signal Processing: A Practical Guide for Engineers and Scientists, Elsevier.

ENT 316/3
Principles of Communication Systems

Course Synopsis

This course is designed to introduce the principles of communication system and its applications in communication, broadcasting and other modern equipments. At the end of the course, the students are expected to provide clear understanding in fundamental communication system, relate the principles to various applications in engineering field and propose a conceptual model of a communication setup.

Course Outcomes

CO1: Ability to analyze mathematical function of communication system model.
CO2: Ability to evaluate performance of elements in communication device.
CO3: Ability to propose a conceptual setup of a communication system based on specific requirement.

References

1. Louis E. Frenzel (2008), "Principles of Electronic Communication Systems", 3rd Ed., McGraw-Hill, 2008.
2. N. Benvenuto, R. Corvaja, T. Erseghe, N. Laurenti (2007), Communication Systems – Fundamentals and Design Methods, Willey.
3. Wayne Tomasi (2004), "Electronic Communication System, Fundamental Through Advanced",5th Ed., Pearson Prentice Hall.
4. William L. Schweber (2002), "Electronic Communication Systems: A Complete Course", 4th Edition, Prentice Hall.
5. Mullet (2003),"Basic Telecommunications: The Physical Layer", Thomson Learning.

ENT 317/4
Medical Electronics & Bioinstrumentation

Course Synopsis

This course provides an intensive introduction to medical electronics and bioinstrumentation. It will covers 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 basic sensors and design basic electronic circuits for medical applications.

Course Outcomes

CO1: Ability to define, discuss, apply, distinguish and assemble basic sensors and transducers in a medical instrumentation system.
CO2: Ability to apply, analyze, design, evaluate and assemble instrumentation amplifiers and analogue filter circuits in medical instrumentation.
CO3: Ability to discuss, explain, apply and analyze medical devices involved in the measurement of cardiovascular and respiratory system.
CO4: Ability to discuss, explain, apply and analyze fundamental concepts in cardiac therapeutic devices and basic medical imaging modalities.

References

1. Webster, J.G. (2010). Medical Instrumentation: Application and Design. 3rd Ed. Wiley.
2. Webster, J.G. (2003). Bioinstrumentation. Wiley.
3. Perez, R. (2002). Design of Medical Electronic Devices. Academic Press.
4. Carr, J.J. (2000). Introduction to Biomedical Equipment Technology. 4th Ed. Prentice Hall.
5. Khandpur, R.S (2007).'Handbook of Biomedical Instrumentation', 2nd Edition, Tata McGraw-Hill.

ENT 318/3
Artificial Organs

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

CO1: Ability to describe concepts, fundamental principle and problems regarding artificial organs.
CO2: Ability to analyze mathematical concepts of human physiology, biotransport and artificial organs.
CO3: Ability to illustrate modelling and simulation of human physiological system and artificial organs.

References

1. Marieb E.N. (2006), "Essentials of Human Anatomy and Physiology", 8th Edition, Pearson Benjamin Cummings.
2. Lee Waite, (2006), "Biofluid Mechanics in Cardiovascular System", McGraw Hill.
3. Truskey G.A., Fan Yuan, Katz D.F., (2004) "Transport Phenomena in Biological System", Prentice Hall.
4. Dayan P., Abbott L.F., (2001) "Theoretical Neuroscience", MIT Press.
5. Ritter A.B., Reisman S., Michniak B.B., (2005), "Biomedical Engineering Principles", CRC Press.

ENT 319/3
Thermofluids

Course Synopsis

The objective of the course is to expose the students to the fundamental principles of fluid mechanic, thermodynamic, heat transfer, and also fundamental application of fluid mechanics in Biomedical Engineering. In Fluid Mechanics attention will be given to the fundamental principles of fluid mechanics and definition, fluid statics, fluid dynamics, and flow over bodies. In Thermodynamics focus is on the fundamental principles of thermodynamics and definition, the Zeroth law, the first law and the 2nd law. In Heat Transfer, different modes through conduction, convection and radiation to be covered.

Course Outcomes

CO1: Ability to define, explain and analyze the fundamental principles of thermofluids.
CO2: Ability to define, explain and analyze the fundamental principles of thermodynamics.
CO3: Ability to define, explain and analyze the fundamental principles of heat transfer.

References

1. Massoud, M. (2005). Engineering Thermofluids: Thermodynamics, Fluid Mechanics, and Heat Transfer. 1st Ed. Springer.
2. Cengel Y.A, Boles M.A. (2001). Thermodynamics: an engineering approach. 4th Ed. McGraw Hill.
3. Marquand, C. (2000). Thermofluids: an integrated approach to thermodynamics and fluids mechanics principles. John Willey.
4. Y.A Cengel and R.H Turner. (2008). Fundamental of Thermal Fluid Sciences. 3rd Edition, Mc Graw Hill.
5. Lee Waite (2006), “Biofluid Mechanics in Cardiovascular System”, Mc Graw Hill.

ENT 331/3
Management Production and Control of Quality

Course Synopsis

This course introduces productivity management such as competitiveness, ratios, work study, learning rates, and linear programming. It also introduces definitions of quality, its dimensions and views, concepts and techniques of total quality control such as statistical process control, process capability, acceptance sampling, and the relationships between productivity and quality. Where applicable, appropriate operations management software will be introduced.

Course Outcomes

CO1: To understand the productivity concepts from different aspects of management,
CO2: To understand the Six Sigma management tools.
CO3: To be able to understand the statistical methods used in quality control and improvement,
CO4: To understand the methods on how labour can improve their productivity and the measurements used to measure the labour productivity.

References

1. Evans, J.R & Lindsay, W.M. (2007). The Management and Control of Quality. 7th Edition. Thompson Learning.
2. Foster, (2006). Managing Quality. 2nd ed. Prentice Hall.
3. Kolarik, W.J. (2005). Creating Quality Concepts, Systems, Strategies, and Tools. McGraw Hill.
4. Besterfield, Dale H. Quality control 7th Edition. Upper Saddle River, New Jersey: Pearson Prentice-Hall, Inc.: 2006
5. C. M. Creveling,, J. L. Slutsky, D. Antis, Jr. Design for Six Sigma in Technology and Product Development, Prentice Hall, 2003

ENT 342/3
Computational Fluid Dynamics

Course Synopsis

This course offers comprehensive contents about computational fluid dynamics. It introduces to finite difference and finite volume methods in the analysis of linear and nonlinear problems. This course discusses inviscid incompressible and compressible fluid flow governed by Euler equations and also incompressible and compressible viscous flows governed by boundary layer and Navier-Stokes equations and explain the concept of simple turbulence modelling.

Course Outcome

CO1: Ability to formulate the mathematic equations to fluid mechanics problem.
CO2: Ability to analyze the CFD results using different types of elements.
CO3: Ability to apply the CFD technique to some applications concerning fluid flow and heat transfer problems.

References

1. Pradip Niyogi, S.K. Chakrabartty and M.K. Laha (2005). *Introduction to Computational Fluid Dynamics*. Pearson.
2. Versteeg, Versteeg, Malalasekra and Malalasekra (2007). *An introduction to Computational Fluid Dynamics: The Finite Volume Method*. 2nd Ed., Pearson.
3. Oleg Zikanov (2010). *Essential Computational Fluid Dynamics*. John Wiley.
4. H.K. Versteeg and W. Malalasekera (1996). *An introduction to Computational Fluid Dynamics: The Finite Volume Method*. 2nd Ed., Longman Scientific & Technical.
5. John D. Anderson, Jr. (1995). *Computational Fluid Dynamics: The Basics with Applications*. McGraw-Hill International editions.
6. Jiyuan Tu, Guan Heng Yeoh and Chaoqun Liu (2008). *Computational fluid dynamics: a practical approach*. Amsterdam: Butterworth-Heinemann.

ENT 343/3
Principles of Heat Transfer

Course Synopsis

This course offers comprehensive contents about energy transferred by interactions of a system with its surrounding which is heat and work. Extended from thermodynamics analysis through study of the modes of heat transfer: conduction, convection and radiation, and through development of relations to calculate heat transfer rate. This course also introduces performance parameters for assessing the efficacy of a heat exchanger and develops methodologies for designing a heat exchanger or for predicting the performance of an existing exchanger operating under prescribed conditions. Mass transfer being introduced in order to extend the knowledge of energy transferred.

Course Outcome

CO1: Ability to formulate heat transfer basic principles i.e. conduction, convection and radiation i.e. Fourier equations, Newton’s low of cooling and Black body radiation. Emphasis will be given in ability to estimate heat conduction in steady state and apply the transient heat conduction, and also to evaluate convection problem in fluid flow both in internal and external force.
CO2: Ability to evaluate heat transfer in heat exchangers.
CO3: Ability to evaluate the problems of mass heat transfer, estimate the mass-transfer coefficient and solve the problem for its application in evaporation process.

References

1. Cengel, Y.A. (2008). *Heat Transfer: A Practical Approach*. 3th ed. In SI Units, McGraw-Hill.
2. Holman, J. P. (2010). *Heat Transfer*. 10th Edition, Mc Graw Hill.
3. Frank P. Incropera and David P. Dewitt (2007). *Introduction to Heat Transfer*. 5th Edition, John Wiley & Sons.
4. Arpaci, Selamet and Kao (2000). *Introduction to Heat Transfer*. Prentice Hall.
5. Mohammad Zainal Mohd Yusof (1991). *Pemindahan Haba Kejuruteraan*. Edisi Kedua, 2nd Edition, Penerbit Universiti Teknologi Malaysia.

ENT 345/4
Mechanical Components Design

Course Synopsis

The objective of the course is to introduce the concepts and principles of mechanical design. The course begins with understanding the design fundamental and followed by the component selection, stress analysis, failure theories, designing mechanical elements. Mechanical elements are screw and fasteners, mechanical springs, bearings, gear, clutches, brakes and flexible mechanical elements. The knowledge of mechanical design will be implemented in a mini project as laboratory assignment - A design of a mechanical machine by utilizing CAD software, Mdesign and Solidworks.

Course Outcome

CO1: Ability to explain, applies the design principles, display the designed model and analyze the failure criterion in mechanical components.
CO2: Ability to explain material properties, select appropriate material and analyze mechanical components using stress and deformation analysis.
CO3: Ability to analyze, propose and display mechanical components for selected mechanical systems.

References

1. Richard Budynas and J. Keith Nisbett (2008). *Shigley's Mechanical Engineering Design*. Eighth Edition, McGraw Hill.
2. Karl T. Ulrich and Steven D. Eppinger (2004). *Product Design and Development*. 3rd Edition, McGraw-Hill.
3. David G. Ullman and David Ullman (2003). *Mechanical Design Process.* 3rd Edition, McGraw Hill.
4. Robert L. Mott (1992). *Machine Elements in Mechanical Design*. 2nd Edition, Maxwell and Macmillan International.
5. Alexander H. Slocum (1992). *Precision Machine Design*. Prentice-Hall International.
6. M. F. Spotts (1991). *Design of Machine Elements*. 6th Edition, Prentice-Hall.
7. Robert C. Juvinall and Kurt M. Marshek (1991). *Fundamentals of Machine Component Design*. 2nd Edition, John Wiley & Sons.

ENT 346/3
Vibration Mechanics

Course Synopsis

The objective of the course is to introduce the students with the skills and knowledge in vibrations disciplines. The syllabus covers 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 well prepared towards industrial application elements such as vibration control, vibration measurement and signal analysis methods.

Course Outcome

CO1: Ability to describe basic concept of vibrations and its applications, analyze simple-harmonic motion, measure free and force vibration for single degree of freedom.
CO2: Ability to analyze and measure the response of various systems (two degree and multi degrees of freedom) to various inputs (free and force excitation).
CO3: Ability to develop a model and assess vibration system parameter and estimate effectiveness of vibration isolation.
CO4: Ability to develop the operating measurement and analyze the vibration signals.

References

1. Singiresu S. Rao (2000). *Mechanical Vibration*. Fourth Edition, Prentice Hall.
2. W. Thomson (2004). *Theory of Vibration With Application*. Prentice Hall.
3. W. J. Palm III (2005). *Mechanical Vibration*, John Wiley & Sons.

ENT 347/3
Finite Element Methods

Course Synopsis

The objective of this course is to introduce finite element methods for approximate numerical solutions to engineering problems. The course concentrates on solution of structural problems, but also provides the basis for expanding to other engineering filed problem. The formulation and solution of the finite element system equations for 1, 2 and 3 dimensional elements will be discussed including on how to assemble the finite element equations and applying boundary conditions. Analyses will be conducted using computer programming and commercial FEA software.

Course Outcome

CO1: Ability to understand the fundamental of finite element analysis concepts
CO2: Ability to derive global stiffness matrices for plane frame elements.
CO3: Ability to develop computer programme to solve beam and frame problems by using finite element analysis.
CO4: Ability to model and analyze structural problem by using commercial FEM software.

References

1. Tirupathi R. Chandrupatla and Ashok D. Belegundu (2009). *Introduction to Finite Elements in Engineering*. Third edition, Prentice Hall.
2. David V. Hutton (2004). *Fundamental of Finite Element Analysis*. 1st Edition, McGraw-Hill.
3. S. S. Bhavikati (2005). *Finite Element Analysis*. New Age International Publisher.
4. I. M. Smith and D.V. Griffiths (2004). *Programming the Finite Element Method*. 4th Edition, John Wiley & Sons Ltd.
5. Kenneth H. Huebner, Donald L. Dewhirst, Douglas E. Smith and Ted G. Byrom (2001). *The Finite Element Method for Engineers*. 4th edition, John Wiley & Sons.

ENT 348/4
Mechanical System Design

Course Synopsis

This course is intended as an advanced knowledge of mechanical design for undergraduate level. Bringing together analytical and graphical techniques from previous courses to accomplish the design of a complete mechanism, machine or mechanical system. The course will emphasize on the analytical design techniques used to evaluate machine elements and machinery in mechanical. This course will utilize various Computer Aided Design (CAD) software as tools in analyzing and solving mechanical design problems.

Course Outcome

CO1: Ability to define kinematics of mechanisms, sketch and analyze mechanical elements of a system based on kinematics analysis.
CO2: Ability to describe and evaluate dynamics machinery at mechanical system, and sketch linkage and free-body diagrams.
CO3: Ability to describe and evaluate a balancing of machinery and engine dynamics and sketch in static and dynamic balancing of mechanical system.

References

1. R.L. Norton (2008). *Design of Machinery*. McGraw Hill.
2. Dan B. Marghitu (2005). *Kinematic Chains and Machine Components Design*. Academic Press.
3. R. L. Mott (2006). *Machine Elements in Mechanical Design*. Pearson Prentice Hall.
4. John J. Uicker, Jr., Gordon R. Pennock and Joseph E. Shigley (2003). *Theory of machines and mechanisms*. Oxford University Press, USA.
5. Myszka (2005). *Machines & Mechanisms*. Prentice Hall.
6. C.E. Wilson and J.P. Sadler (2003). *Kinematics and Dynamics of Machinery.* SI Edition, Pearson Prentice-Hall Publishers.

ENT 363/4
Machine Vision Systems

Course Synopsis

This course is designed to introduce the basic concepts of machine vision and provide an understanding of the basic concepts of vision and image acquisition and processing. The course also helps the students to develop the ability of designing machine vision systems for Industrial Applications.

Course Outcomes

CO1: Ability to perform analysis on image acquisition and processing concepts.
CO2: Ability to perform analysis on image feature extraction techniques.
CO3: Ability to design simple machine vision modules.

References

1. Ramesh Jain, Rangachar Kasturi and Brain G Schunck (1995). *Machine Vision.* International edition, McGraw-Hill.
2. Horn, Berthold K. P (1986). *Robot Vision*. Cambridge, MA: MIT Press/McGraw-Hill.
3. Robert M. Haralick and Linda G. Shapiro (1993). *Computer and Robot Vision*. Addison Wesley Publishing Company Inc. U.S.A.
4. David Forsyth and Jean Ponce (2003). *Computer Vision: A modern approach*. Prentice Hall.
5. Milan Sonka, Vaclav Hlavac and Roger Boyle (1999). Image Processing Analysis and Machine Vision. Brooks/Cole Publishing Company. U.S.A.
6. S.N. Sivanandham and M.Paulraj.' Introduction to Artificial Neural Networks'. Vikas Publications, India, 2003

ENT 372/4
Robotics

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 Dell design and Various industrial Applications.

Course Outcomes

CO1: Ability to describe the importance of various types of robots and relate them in various industrial applications.
CO2: Ability to construct and analyze the coordinate representation, transformations and path planning.
CO3: Ability to construct and analyze robot control systems for various industrial applications.
CO4: Ability to design a robot work-cell for specific industrial task and measure its validity.

References

1. Saeed B Niku (2001). *Introduction to Robotics*. Prentice Hall.
2. M. P. Groover (1999). *Industrial Robotics*. McGraw Hill.
3. K.H. Low (2003). *Robotics: Principles and System Modelling*. Prentice Hall.
4. Man Zhihong (2005). *Robotics*. Prentice Hall.
5. R. D. Klaffer, T. A. Chmielewski and M. Negin (2006). *Robotic Engineering: An Integrated Approach*. Prentice-Hall, India.

ENT 373/4
Embedded System Design and Applications
(Pre Requisite: ENT 288/3 Microprocessors)

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 and programming techniques in C language and developing an embedded system application.

Course Outcomes

CO1: Ability to write a structured programme in C language for embedded system application.
CO2: Ability to choose and apply input output devices to microcontroller.
CO3: Ability to evaluate and develop a self-contained embedded system application.

References

1. Muhammad Ali Mazidi, Rolin D. Mckinlay and Danny Causey (2008). *PIC Microcontroller and Embedded Systems: Using Assembly and C for PIC18*. Pearson Prentice Hall.

2. Barry B. Brey (2008). *Applying PIC18 Microcontrollers: Architecture, Programming, and Interfacing using C and Assembly*. Pearson Prentice Hall.
3. Richard H. Barnett, Sarah Cox and Larry O'Cull (2004). *Embedded C Programming and the Microchip PIC*. Thomson & Delmar Learning.
4. Tim Wilmshurst (2007). *Designing Embedded Systems with PIC Microcontrollers: Principles and Applications*. Newnes.
5. Martin Bates (2006). *Interfacing PIC Microcontrollers: Embedded Design by Interactive, Simulation*. Newnes.

ENT 374/3
Power Systems Engineering
(Pre Requisite: ENT 161/4 Electrical Circuits)

Course Synopsis

This course aims to provide basic concepts of power systems which include transmission line, transformer, power flow, fault analysis and system protection.

Course Outcomes

CO1: Ability to discuss the functional concepts of various sections of a power system network.

CO2: Ability to illustrate the functions of single phase, three phase transmission lines and transformers in power flow.

CO3: Ability to analyze fault conditions using symmetrical components.

CO4: Ability to design system protection schemes in a power flow network.

References

1. Glover, Sarma and Overbye (2007). *Power Systems Analysis and Design*. Fourth Edition, Thomson.
2. Steven W.Blume (2007). Electric Power System Basics-for the Non electrical Professional, Wiley Interscience.
3. Mukund R. Patel, (2006); Wind and Solar Power Systems, 2nd Edition, Taylor & Francis. NY
4. Gillbert M. Masters, (2004); Renewable and Efficient Electrical Power Systems, John Wiley, NJ.
5. M. N. Bandyopadhyay, (2006); Electrical Power Systems, Wiley Interscience, New Delhi.

ENT 381/2
Microprocessor

Course Synopsis

The aim of this course is to study the Motorola 68HC11 microprocessor architecture and relate that knowledge to the design of microprocessor based systems. This includes evaluation of a simple application on a microprocessor-based system. The study of 68HC11 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

CO1: Ability to describe and explain the theory and basic architecture of microprocessor.

CO2: Ability to write and programme a microprocessor system using assembly language .

CO3: Ability to analyze and apply the microcontroller with I/O devices.

CO4: Ability to evaluate a simple application on a microprocessor-based system.

References

1. Muhammad Ali Mazidi, Rolin D. Mckinlay & Danny Causey, PIC Microcontroller and Embedded Systems: Using Assembly and C for PIC18, Pearson Prentice Hall 2008.
2. Barry B. Brey, Applying PIC18 Microcontrollers: Architecture, Programming, and Interfacing using C and Assembly, Pearson Prentice Hall 2008.
3. R.S. Gaonkar, Microprocessor Architecture, Programming, and Applications with the 8085, 5th Edition, Prentice Hall, 2002.

ENT 383/3
Network & Communication Engineering

Course Synopsis

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

Course Outcomes

CO1: Ability to explain the principle of network and communication systems

CO2: Ability to obtain mathematical model of modulation.

CO3: Ability to apply principle of various types of network and communication systems.

CO4: Ability to select equipments for the industrial network and communication technology.

References

1. George Coulouris, Jean Dollimore, Tim Kindberg, " Distributed Systems: Concepts & Design", 4th Ed., Pearson Education Limited, 2005
2. Richard Zurawski, editor "The Industrial Communication Technology Handbook", CRC Press, 2005.
3. Andrew S. Tanenbaum, Maarten van Steen, "Distributed System: Principles and Paradigms", Prentice-Hall, 2002.
4. Behrouz A. Forouzan, "Data Communications and Networking", 4th Ed., Mc-Graw Hill, 2007.
5. William Stallings, "Data and Computer Communications", 7th Ed., Prentice-Hall, 2004.

ENT 385/3
Control Engineering

Course Synopsis

This is an introduction course to control systems engineering. Students will be exposed to the mathematical modelling for mechanical, electrical as well as electro-mechanical systems using transfer functions, signal-flow graphs and Mason's rule. They will conduct system performance analysis in time and frequency domain. System stability will also be studied along with the root locus analysis. Finally the students will be introduced to system compensation design using PID and lead-lag controllers. The laboratory sessions will be conducted to enable the students to test the theory.

Course Outcome

CO1: The ability to obtain the mathematical model for electrical and mechanical systems.

CO2: Ability to perform system response analysis and stability in time domain.

CO3: Ability to perform system response analysis and stability in frequency domain.

CO4: Ability to evaluate P,PI, PD, PID, lead, lag controllers based on the analysis of the system's response in time and frequency domain.

References

1. Nise, N.S., "Control Systems Engineering", 6th Ed., Wiley, 2011.
2. Kuo B.C. "Automatic Control System" 8th Edition, Prentice Hall, 1995.
3. Ogata, K., "Modern Control Engineering", 4th Ed. Prentice Hall, 2002.
4. Gopal, M., "Control Systems: Principles and Design", 2nd Ed. Tata McGraw-Hill, 2002.

ENT 386/3
Modern Control Engineering
(Pre Requisite: ENT 385/3 Control Engineering)

Course Synopsis

This course aims to convey the knowledge of classical control systems, advanced classical control method, state space representation of continuous-time system, continuous-time response and performance, specifications, state space analysis and design, advanced state space control system, projects based on problems drawn from mechatronics and manufacturing.

Course Outcomes

CO1: Ability to analyze the concepts of state-space design, non-linear system and digital control.

CO2: Ability to apply the concept of controllability and observability.

CO3: Ability to analyze the non linear system.
CO4: Ability to design the digital control.

References

1. Norman S. Nise, "Control System Engineering",4th Edition, Wiley, 2004.
2. Katsuhiko Ogata; "Modern Control Engineering", 4th Edition, Prentice-Hall, 2002.
3. Benjamin C. Kuo; "Automatic Control Systems", 8th Edition, John Wiley, 2003.
4. Richard C. Dorf, Robert H. Bishop; "Modern control System", 9th Edition, Prentice Hall, 2001
5. Richard Dorf and R.H. Bishop "Modern Control Systems", Addison-Wesley, 1998.

ENT 388/3
Electronics

Course Synopsis

This course is designed to introduce the basic concepts of electronics and its applications which cover both analogue and digital devices. This course helps the student to apply the theory to develop and test electronic equipments.

Course Outcome

CO1: Ability to describe and analyze analogue electronics circuits.
CO2: Ability to describe and analyze the digital electronics circuits.
CO3: Ability to select and apply suitable electronic components in mechanical engineering applications.

References

1. Floyd T. (2005). *Electronic Devices*. 7th Edition, Pearson Prentice Hall.
2. Storey, N. (2006). *Electronics: A System Approach*. 3rd Ed., Prentice Hall.
3. Schuler, C. (2008). *Electronics: Principles & Applications*. 7th Ed., Mc Graw Hill.
4. Tocci, R.J., WIdmer, N.S. and Moss, G.L. (2007). *Digital Systems: Principles and Applications*. 9th Ed., Prentice Hall.
5. Diffenderfer, R. (2005). *Electronics Devices: Systems and Applications*. Thomson Delmar Learning.
6. Tocci, R.J. and Ambrosio, F. J. (2003). *Microprocessors and Microcomputers: Hardware and Software*. 6th Ed., Prentice Hall.
7. Hambley, A.R. (2000). *Electronics*. 2nd Ed., Prentice Hall.

ENT 413/3
Medical Imaging

Course Synopsis

In this course the students are introduced to the basic principle of medical imaging modalities. This will provide them the understanding of various types of diagnostic radiology such as general X-Ray, Mammography, Computed Tomography (CT) and Magnetic Resonance Imaging (MRI).

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

CO1: Ability to explain the concept of medical imaging modalities used in clinical application.
CO2: Ability to distinguish and explain the sources of energy in medical imaging modalities.
CO3: Ability to discuss and predict tissue reactions to radiation and propose the solution to reduce the radiation by applying Radiation Protection concept.
CO4: Ability to select the most suitable modalities for successful diagnostic.

References

1. Walter Huda (2003), "Review of Radiologic Physics", Lippincott Williams & Wilkins.
2. Suetens, P. (2002). Fundamental of Medical Imaging. Cambridge University Press.
3. Bushberg, J.T. (2006). The essential physics of medical imaging. 3rd ed. William & Wilkins
4. Prince, J.L. (2006), Medical Imaging Signals and System, Prentice Hall.
5. Glenn F. Knoll (2000)."Radiation Detection and Measurement", John Wiley and Sons.

ENT 427/4
Biomedical
Instrumentation Design

Course Synopsis

An advanced course to medical electronics & bioinstrumentation, the students will be exposed to the knowledge of designing bioelectrical amplifier and filters, application of microcontrollers in a data acquisition system, and platforms for telemedicine applications. Their theoretical knowledge will be tested in designing instrumentation for biomedical applications.

Course Outcomes

CO1: Ability to design an instrumentation circuit to acquire biomedical signals
CO2: Ability to develop a PC-based data acquisition device which is capable of acquiring biomedical signals.
CO3: Ability to demonstrate the project needs, design contsraints and requirement for the selected project in Biomedical Electronic Engineering field.

References

1. Webster, J.G. 'Medical Instrumentation: Application and Design', 4th Ed., Wiley, 2010.
2. Khandpur, R.S. 'Handbook of Biomedical Instrumentation', 2nd Edition, Tata McGraw-Hill, 2007.
3. Webster, J.G. 'Bioinstrumentation', Wiley, 2003.
4. Cromwell, L. 'Biomedical Instrumentation and Measurements', 2nd Ed. Prentice-Hall, 2002.
5. Perez, R. 'Design of Medical Electronic Devices', Academic Press, 2002.
6. Carr, J.J. 'Introduction to Biomedical Equipment Technology', 4th Ed. Prentice Hall, 2000.

ENT 438/3
Biomedical Design Project

Course Synopsis

This course will focus on the design of a biomedical instrumentation for medical applications. Students will utilised their theoretical knowledge in various aspects of bioinstrumentation to solve a biomedical related problem by identifying problem needs, and developing potential designs as well as construct and testing prototypes. Students will be introduced to the principle of engineering design process at the beginning of the course, followed by selection of the project theme. This course provides the opportunity for the students to apply and develop their design, executing project management and polished their interpersonal and communication skill.

Course Outcomes

CO1: Apply technical knowledge and problem-solving skills to serve community, society and profession.
CO2: Ability to design and evaluate the specific sub-system in the design device and system.
CO3: Ability to conduct economic evaluation of the selected project in Biomedical Engineering field.

References

1. Biomedical Engineering & Design Handbook, Volumes I and II
2. Handbook of Biomedical Instrumentation, Khandpur
3. Bioinstrumentation, J.G. Webster
4. Medical Instrumentation, Application and Design, J.G Webster
5. Engineering Design Methods: Strategies for Product Design by Nigel Cross
6. Engineering Design Principles by Ken Hurst
7. Biomedical Instrumentation Systems, S. Chatterjee
8. Biomedical Instrumentation and Measurements, Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer

ENT 445/2
Final Year Project I

Course Synopsis

In this course, students will be applying the knowledge they have learned throughout this programme by implementing them in a research project which is carried out for two semesters. In the first semester, focus is given on the preparation of work schedule, identifying the objectives, and writing the research methodology.

Students are expected to begin project work according to the planned schedule.

Course Outcome

CO1: Ability to evaluate engineering issue(s)/problem(s) in proposed Final Year Project.
CO2: Ability to propose methodology for proposed Final Year Project.
CO3: Ability to perform audio visual presentations.

Reference

None

ENT 446/4
Final Year Project II

Course Synopsis

In this course, students will be applying the knowledge they have learned throughout this programme by implementing them in a research project which is carried out for two semesters. In the second semester, focus is given on the project work (experiments, simulation, etc), analysis of results and final report writing. Students are expected to complete project work according to the planned schedule.

Course Outcome

CO1: Ability to evaluate engineering deliverable via system / prototype / algorithm / software / simulation / experimental analysis.
CO2: Ability to demonstrate project management skills (such as problem solving & interest, creativity, independence and entrepreneurship) in order to achieve project objectives.
CO3: Ability to present the findings of project using audio visual presentations.

Reference

None

ENT 457/3
Management, Production & Operations

Course Synopsis

This course offers comprehensive contents about production and operation management in manufacturing and services. Production and operation management is the process of managing people and resources in order to create a product or a service. This course also introduces students to project management, forecasting theory, goods and services design, process strategy and capacity planning, location and layout strategies, supply chain management, inventory management theory, aggregate planning theory, Material Requirements Planning (MRP) and scheduling theory.

Course Outcome

CO1: Ability to analyze operations management in operations, productivity, project management and forecasting.
CO2: Ability to design operations in goods and services, process control, capacity planning, location and layout strategies.
CO3: Ability to manage operations in supply-chain management, inventory management, aggregate planning, material requirements planning, operations scheduling, maintenance and reliability.

References

1. Jay Heizer and Barry Render (2010). Operations Management. 10th Edition, Person.
2. Steven Nahmias (2009). *Production and Operations Analysis*. McGraw Hill.
3. Russell and Taylor (2009). *Operations Management: Along The Supply Chain*. 6th Edition, John Wiley & Sons.
4. Stephen Chapman (2004). *Fundamentals of Production Planning and Control*. Prentice Hall.
5. R. Dan Reid and Nada R. Sanders (2005). *Operation Management: An Integrated Approach*. 2nd Edition, John Wiley & Sons.
6. Faridah Maarof, Maslin Masrom and Mohd Yunus Majid (1998). *Penyelidikan Operasi: Penggunaan dan Algoritma*. Penerbit Universiti Teknologi Malaysia, Johor.

ENT 471/4
Automation
(Pre Requisite: ENT 289/3 Drive and Power Electronics)

Course Synopsis

This course aims to convey the knowledge of automation technologies. It combines the automation technology principles and its relationship with assembly process and system, the element of sensor, actuator and drive technology as an input/output component in automation technology. It also covers automation technology and technique in terms of hardware and software control, the automation technology issues in design, engineering analysis, planning, tooling and manufacturing.

Course Outcomes

CO1: Ability to perform analyzes on automation in a production system.
CO2: Ability to perform analyzes and evaluate on elements of an automation system.
CO3: Ability to design and evaluate the automation system for an optimum performance in various applications.

References

1. Mikell P. Groover (2001), "Automation, Production Systems, and Computer-Integrated Manufacturing" 2nd Edition, Prentice Hall.
2. Jon Stenerson (2003), "Industrial Automation and Process Control" 1st Edition, Prentice Hall
3. Frank D. Petruzella (1999), "Programmable Logic Controllers" 2nd Edition, Glencoe/McGraw-Hill
4. Ridley, J.E (1999), "Introduction to Programmable Logic Controller"

ENT475/3
Mechatronic Systems Design I

Course Synopsis

This course focuses on the methodologies, processes and elements for the design an integrated mechatronic system. It covers the philosophy mechatronic system design and evaluates all related design tools for a mechatronics system. It reviews all elements of a mechatronic system and introduces the first part of the mechatronic system design project.

Course Outcomes

CO1: Ability to design, develop and evaluate measurement, instrumentation and actuation systems.
CO2: Ability to design and evaluate a mechatronic system using a microcontroller.
CO3: Ability to identify customer need and conduct evaluation based on economic, ethical and sustainable factors for the mechatronic system.

References

1. Bolton, W., Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, 3rd edition, Addison Wesley Longman: Essex England, 2003.
2. D. G. Alciatore and M. B. Histand, Introduction to Mechatronics and Measurement Systems. 3rd edition, McGrawHill.
3. D. Shetty and R. A. Kolk, Mechatronics System Design, PWS Publishing Co., Boston, MA, 1997.
4. Godfrey C. Onwubolu, "Mechatronics: Principles and Applications", Butterworth-Heinemann 2005.
5. R. Isermann, Mechatronic Systems: Fundamentals, Springer-Verlag: Great Britain, 2003

ENT476/3
Mechatronic Systems Design II

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

CO1: Ability to evaluate the design concept and requirement for a mechatronic system.
CO2: Ability to apply relevant design concept, requirement and tools for the design of a mechatronic system.
CO3: Ability to design and evaluate specific subsystems and processes in a mechatronic system.
CO4: Ability to conduct economic evaluation, ethical and sustainable analysis for the mechatronic system.

References

1. Bolton, W., Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, 3rd edition, Addison Wesley Longman: Essex England, 2003.
2. D. G. Alciatore and M. B. Histand, Introduction to Mechatronics and Measurement Systems. 3rd edition, McGrawHill.
3. D. Shetty and R. A. Kolk, Mechatronics System Design, PWS Publishing Co., Boston, MA, 1997.
4. Godfrey C. Onwubolu, "Mechatronics: Principles and Applications",Butterworth-Heinemann 2005.
5. R. Isermann, Mechatronic Systems: Fundamentals, Springer-Verlag: Great Britain, 2003

Elective Courses

ENT 420/4
Biological System Modeling

Course Synopsis

The course aims to develop quantitative engineering models describing biological systems at the cellular and tissue scale. Students will be introduced to the process of developing engineering models of biological systems, and to use simulation software for the solution of the mathematical equations describing the system behaviour.

Course Outcomes

CO1: Ability to calculate the linear and non-linear system using ordinary differential equation (ODE).
CO2: Ability to analyze the knowledge about mathematical equation into biological system.
CO3: Ability to construct and analyze the mathematical modelling of biological system.

References

1. Alon, U. (2007). An Introduction to Systems Biology. CRC Press.
2. Klipp, E. (2005). Systems Biology in Practice. Wiley.
3. Allen, L.J.S. (2007). An Introduction to Mathematical Modelling. Prentice-Hall.
4. Edelstein-Kesher, L. (2005). Mathematical Models in Biology. SIAM.
5. Murray, J.D. (2002). Mathematical Biology. Springer.

ENT 426/4
Computed Tomography and Applications

Course Synopsis

This is an advanced course to biomedical instrumentation. Students will be exposed to the knowledge of tomography systems, principles and applications. Several types of tomography systems, its theoretical concept and algorithm will be discussed. This course is related to that some clinical applications and safety aspects.

Course Outcomes

CO1: Ability to discuss, explain, analyze and judge the concept of tomography and its suitable applications.
CO2: Ability to explain, discuss and analyze the suitable reconstruction algorithm of a tomography system.
CO3: Ability to discuss, explain and analyze the measurements of projection data of a tomography system.
CO4: Ability to discuss, explain and compare the algebraic reconstruction algorithms for suitable tomography applications.

References

1. W. A. Kalender (2006), Computed Tomography; Fundamentals, System Technology, Image Quality and Applications, Wiley.
2. A. C. Kak and Malcolm Slaney (2001), Principles of Computerized Tomographic Imaging, Society of Industrial and Applied Mathematics.
3. S. C. Bushon (2000) Computed Tomography, McGraw Hill.
4. C. B. Grossman (*1991), "Magnetic Resonance Imaging and Computed Tomography of the Head and Spine", Williams & Wilkins.
5. T. Grumme, W. Kluge, K. Kretzschmar and A. Roesler (1998), "Cerebral and Spinal Computed Tomography", 3rd ed. Blackwell Science.

ENT431/3
Refrigeration and Air Conditioning

Course Synopsis

The objective of this course is to introduce a comprehensive and wide-ranging theoretical principles and practical aspects of refrigeration and air conditioning systems. The basic of thermodynamics, heat transfer and fluid mechanics that have been learned will be extended and emphasized on this course. Student will be exposed to refrigeration machines, refrigerant compressors, expansion devices and psychrometry of air-conditioning processes.

Course Outcomes

CO1: Ability to identify, describe refrigeration machines, vapour compression system, and solve problems on multipressure systems.

CO2: Ability to identify, analyze and evaluate refrigerant compressors, condensers, expansion devices and evaporators.

CO3: Ability to explain and interpret the psychrometry of air conditioning processes. Ability to analyze and evaluate cooling loads.

References

1. C.P. Arora (2001). *Refrigeration and Air conditioning*. Second Edition Mc Graw Hill.
2. Jeffus Larry (2004). *Refrigeration and Air conditioning*. 4th edition. Pearson/Prentice Hall.
3. Ahmadul Ameen (2006). *Refrigeration and Air Conditioning.* Prentice Hall.
4. G. F. Hundy (2008). *Refrigeration and Air Conditioning*. Elsevier.
5. William C. Whitman (2009). *Refrigeration and Air conditioning technology*. 4th edition. Cengage Learning.

ENT432/3
Energy Conversion

Course Synopsis

This course offers comprehensive contents about conversion of energies which excluded from renewable energy. This course covers fossil fuel, reciprocating internal combustion engine, Wankel rotary engine, nuclear power plant and battery. This course also discuss about the contemporary issues relate to environment and pollution.

Course Outcomes

CO1: Ability to evaluate energy conversion systems based on thermo-fluid fundamental knowledge.

CO2: Ability to explain contemporaneous issues in energy systems.

CO3: Ability to judge the impact of the usage of energy to environment and pollution issues.

References

1. Goswami, D.Y. Kreith, F (2007). *Energy Conversion*. CRC Press.
2. Valone, T.F. (2005). *Practical Conversion of Zero-Point Energy*. 3rd Edition, Integrity Research Institute.
3. Leyzerovich, A. (2005). *Wet-Steam Turbines for Nuclear Power Plants.* PennWell Corp.
4. Kiameh, P. (2002). *Power Generation Handbook: Selection, Application, Operation, Maintenance*. McGraw-Hill Professional.
5. Kenneth C. Weston (1992). *Energy Conversion*. PWS Pub. Co.

ENT433/3
Plasticity

Course Synopsis

This course is intended to serve theory plasticity in metal materials. This course is introducing the hardening plasticity, orthotropic plasticity and plasticity instability. The Application of finite elements and production processes are introduced in theory of plasticity.

Course Outcomes

CO1: Ability to apply theory of plasticity to uniform and non-uniform stress states.
CO2: Ability to analyze theory of plasticity in slip line field and in collapse of beam or structure.
CO3: Ability to select the test is related to theory plasticity and estimate plasticity occurs on materials.
CO4: Ability to estimate inelasticity buckling struts and plates, and estimate stress waves in bars.
CO5: Ability to predict theory of plasticity in production processes and apply to finite elements in theory plasticity.

References

1. D.W.A. Rees (2006). *Basic engineering plasticity: and introduction with engineering and manufacturing applications*. Elsevier Ltd.
2. Wai Fah-Chen and D. Jian Han (2007). *Plasticity for structural engineers*.

ENT434/3
Impact Mechanics

Course Synopsis

This course offers comprehensive contents about reaction forces that develop during a collision and the dynamic response of structures to these reaction forces. This course develops several different methodologies for analyzing collisions between structures. This is include rigid body theory for structures that are stiff .The analytical methods combine mechanics of contact between elastic-plastic or viscoplastic bodies with dynamics of structural response.

Course Outcomes

CO1: Ability to analyze reaction forces in collinear impact.

CO2: Ability to evaluate reaction forces in impact for 2D and 3D collision.
CO3: Ability to evaluate reaction forces in impact for rigid body.

References

1. W.J Stronge (2007). *Impact Mechanics.* Cambridge University Press.
2. Norman Jones (2001). *Structural Impact.* Cambridge University Press.
3. Anthony C. Fischer (2007). *Introduction to Contact Mechanics*. Springer.

ENT435/3
Robotics

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 Dell design and Various industrial Applications.

Course Outcomes

CO1: Ability to describe the importance of various types of robots and relate them in various industrial applications.
CO2: Ability to construct and analyze the coordinate representation, transformations and path planning.
CO3: Ability to construct and analyze robot control systems for various industrial applications.
CO4: Ability to design a robot work-cell for specific industrial task and measure its validity.

References

1. Saeed B Niku (2010). *Introduction to Robotics*. John Wiley and Sons.
2. M. P. Groover (1999). *Industrial Robotics*. Mc Graw Hill.
3. K.H. Low (2003). *Robotics: Principles and System Modelling*. Prentice Hall.
4. Man Zhihong (2005). *Robotics*. Prentice Hall.

ENT436/3
Computer Aided Manufacturing

Course Synopsis

This course is fundamental knowledge of Computer Aided Design and Computer Aided Manufacturing. In this course the concept of Numerical Control Programming is introduced for milling and lathe. The proper knowledge of Computer Aided Manufacturing will be emphasized on the numerical control programming and geometric modelling techniques also are describing using solid modelling standard.

Course Outcomes

CO1: Ability to define Computer Aided Design and describe types of computer Aided Design system and numerical control programming.
CO2: Ability to describe geometric modelling techniques and numerical control.
CO3: Ability to select function of part of CNC machine and demonstrate CNC machine using numerical control programming.

References

1. Ibrahim Zeid (2007). *Mastering CAD/CAM*, Special Indian Edition 2007, Tata McGraw-Hill Publishing Company Ltd., New Delhi.
2. Mikell P. Groover (2002). *Automation, Production Systems, and Computer-Integrated Manufacturing*. 2nd Edition, Reprint 2002, Pearson Education Asia.
3. YoramKoren (1983). *Computer control of manufacturing systems*. International Edition, McGraw Hill Book Co.

ENT461/3
Renewable Energy

Course Synopsis

The objective of this course is to introduce the concepts of Renewable Energy to students, emphasising on the fundamentals principles, and as well as applications of some renewable energy (Biomass, Wind, Solar, and Hydrogen) and the other energy resources available today for sustainable development.

Course Outcomes

CO1: Ability to interpret and evaluate the basic concepts and principles of renewable energy technologies and energy resources available today for sustainable development.
CO2: Ability to analyze and evaluate the conversion of Biomass, Wind, Solar and Hydrogen energies to mechanical, thermal and electrical power.
CO3: Ability to discuss and evaluate energy and power in the Geothermal, Tidal, Micro Hydro and other renewable energy.
CO4: Ability to describe and evaluate the relationships of renewable energies in the field, and their environmental impact.

References

1. Gevorkian, Peter (2009). *Sustainable Energy Systems Engineering*. The McGraw Hill companies, New York.
2. GN Tiwari and MK Ghosal (2008). *Renewable Energy Resources*. Alpha Science International Ltd. Harrow, UK.
3. Tester, Drake, Driscoll, Golay and Peters (2000). *Sustainable Energy*. The MIT Press, Cambridge, Massachusetts London, England.
4. Dewulf, Van Langenhove (2006). *Renewable Based Technology*. John Wiley & Sons Ltd.
5. Z. Lubosny (2003). *Wind Turbine Operation in Electrical Power Systems*. Springer Verlag Berlin Heidelberg.

ENT462/3
Turbomachinery

Course Synopsis

This course introduces the operating principles of different types of pumps, compressors and conventional prime movers used in power generation. Analysis and design characteristic consideration in turbomachinery is also emphasized.

Course Outcomes

CO1: Ability to explain the operating principles of different pumps, analyze their performance, select proper pump for specific application and design such a pump.

CO2: Ability to discuss the operating principles of hydraulic turbines, analyze and predict their performance and select proper turbine.
CO3: Ability to explain the operating principles of thermal turbines (steam/gas turbines), compare their usage, vary parameters to evaluate their performance.
CO4: Ability to explain the operating principles of different compressors and analyze their performance.

References

1. W.W. Peng (2008). *Fundamentals of Turbomachinery*. John Wiley & Sons.
2. Y.A. Cengel and J.M. Cimbala (2006). *Fluid Mechanics-Fundamentals and Applications*, McGraw Hill.
3. S.L. Dixon (1998). *Fluid mechanics and Thermodynamics of Turbomachinery*. 5th Ed., Pergamon, Oxford.
4. B.R. Munson, D.F. Young, and T.H. Okiishi (2006). *Fundamentals of Fluid Mechanics*. 5th Ed., John Wiley & Sons.
5. H. Cohen, GFC Rogers, and HIH Saravanamuttoo (1996). *Gas Turbine Theory*. 4th Ed., Longman.
6. C.T. Crowe, D.F. Elger, and J.A. Roberson (2005). *Engineering Fluid Mechanics*. 8th Ed., John Wiley & Sons.
7. J.F. Douglas, J.M. Gasiorek, J.A. Swaffield, and L.B. Jack (2005). *Fluid Mechanics*. 5th Ed., Pearson.

ENT463/3
Elasticty

Course Synopsis

The theory of elasticity is concerned with modelling the deformations of and stresses in continuous media characterized by linear relationships between stress and strain. Applied elasticity is about developing and applying geometry-based idealizations of real physical situations and structures. Comparison with solutions obtained by using elementary strength of materials in solving engineering problems will be emphasized. Practical problems will be solved and advantages of using particular methods will be illustrated.

Course Outcomes

CO1: Ability to apply the fundamental of elasticity to engineering problems, and use appropriate mathematical tools to solve mechanics problems.
CO2: Ability to select the governing equations for 3-D and 2-D solid mechanics, and estimate the critical load that a component can withstand using different failure criteria.
CO3: Ability to analyze a problem and choose any computational tools to model and analyze structural components.

References

1. Martin H. Sadd (2009). *Elasticity: theory, applications and numerics*. 2nd edition, Academic Press, London.
2. Anthony Armenakas (2006). *Advanced Mechanics of materials and applied elasticity*. Boca Raton Fla. Taylor & Francus.
3. Albrecht Bertram (2005). *Elasticity and plasticity of a large deformations: an introduction*. Springer, New York.
4. A. I Lurie, translated by A. Belyaev (2005). *Theory of Elasticity*. Springer, Berlin.
5. Arthur P. Boresi and Ken P. Chong (2000). *Elasticity and plasticity of large deformations: an introduction*. 2nd edition, John Wiley and Sons, New York.

ENT464/3
Fracture Mechanics

Course Synopsis

This course contains the theory of principles and application of fracture mechanics. The fracture mechanics have a wide range of engineering design applications, including the analysis of brittle fracture of low-toughness structural materials and many non-metallic, and quantitative prediction of fatigue crack growth in a wide range of engineering materials. It will emphasize on the mathematical principles of linear elastic fracture mechanics and their application to engineering design. Student will conduct laboratory work with experiments using servo hydraulic fatigue testing machines and scanning electron microscopy.

Course Outcomes

CO1: Ability to describe the principles of fracture mechanics in engineering materials and examine the related problem under dynamic load.

CO2: Ability to identify the specimen configuration to use experiment in fracture toughness testing of metals/non-metals and predict fatigue strength and fatigue life using Stress versus Number of cycles curves.

CO3: Ability to estimate fatigue crack growth in metals on the fracture surface, and evaluate fatigue crack growth experiment using CT specimen.

CO4: Ability to identify the effect of varies environment on the surface fracture and estimate corrosion fatigue in environment.

CO5: Ability to identify cleavage fracture, intergranular fracture and ductile fracture in the fractography, and calculate cohesive strength of solids.

References

1. T. L. Anderson (2005). *Fracture Mechanic Fundamentals and Applications*. 37th Edition, Taylor & Francis Groul.
2. E. E. Gdoutos (2005). *Fracture Mechanics and Introduction*. 2nd Edition, Springer.
3. R, J, Sanford (2003). *Principle of Fracture Mechanics*.1st Edition, Prentice Hall.
4. G, E, Dieter (1986). *Mechanical Metallurgy*. 3rd Edition, McGraw-Hill.

ENT465/3
Rapid Engineering

Course Synopsis

This is an introductory course on several rapid engineering techniques. It combines engineering prototype design theory, reverse engineering, solid freeform technology, rapid prototyping (RP) including liquid, powder and solid based process, and rapid tooling in manufacturing and the various applications of rapid engineering.

Course Outcomes

CO1: Ability to organize the development of product prototyping design to construct the rapid prototype model.

CO2: Ability to select and describe the rapid prototyping processes for a finished product.

CO3: Ability to select the proper rapid prototyping tools and techniques in terms of hardware and software technologies to construct a finished product.

References

1. Frank W. Liou (2007). *Rapid Prototyping and Engineering Applications: A Toolbox for Prototype Development*. Vol. 210, CRC Press, Dekker Mechanical Engineering Series.
2. Kenneth Cooper (2001). *Rapid Prototyping Technology: Selection and Application*. Vol. 133, CRC Press, Dekker Mechanical Engineering Series.
3. D.T. Pham and S.S. Dimov (2001). *Rapid Manufacturing: The technologies and applications of Rapid Prototyping and Rapid Tooling*. Springer, London.
4. C. K. Chua, K. F. Leong and C. S. Lim (2003). *Rapid Prototyping: Principle and Applications*. 2nd Edition, World Scientific Publishing.

ENT466/3
Design Optimization

Course Synopsis

This course introduces the traditional non-linear optimization methods that can be used to solve a wide range of problems across all engineering disciplines. By the end of the semester the student will have gained a basic knowledge of numerical optimization algorithms and will have sufficient understanding of the strengths and weakness of these algorithms to apply them appropriately in engineering design. Students will write simple code as well as use off-the-shelf routines to gain experience and appreciation.

Course Outcomes

CO1: Ability to apply basic theoretical of optimization in practical engineering design situations.
CO2: Ability to apply mathematical constructs and theoretical tools to solve linear and non-linear design problems.
CO3: Ability to formulate the optimization problem from the constraint associated with design.

References

1. Vanderplaats, Garret N. *Numerical Optimization Techniques for Engineering Design: With Applications*. McGraw-Hill.
2. Arora, Jasbir S. *Introduction to Optimum Design*, McGraw-Hill.
3. Reklaitis, G.V., A. Ravindran, and D.M. Ragsdell, *Engineering Optimization-Methods and Applications*. John Wiley.

ENT474/3
Intelligent Mechatronic Systems

Course Synopsis

This course introduces important concepts of Artificial Intelligence (AI) and their applications in mechatronic systems. The concepts include fuzzy logic, neural network, neuro-fuzzy, genetic algorithm and pattern recognition. The mechatronic systems encompass Industrial Automation, Industrial Robotics and Control of process systems.

Course Outcomes

CO1: Ability to organize Artificial Intelligence components in mechatronics systems.
CO2: Ability to display the concepts of pattern recognition and classification.
CO3: Ability to analyze intelligent control with optimal parameter search for complex industrial systems.
CO4: Ability to analyze simple expert system for specific requirements.

References

1. Sivanandam S. N., Paulraj M., “Introduction to Artificial Neural Networks”, Second Edition, 2005, Vikas Publications.
2. Russell S.J., Norvig P., Canny J.F., “Artificial Intelligence: A Modern Approach”, Prentice Hall, 2003
3. Rajasekaran. S., Pai G.A.V., “Neural Networks, Fuzzy Logic and Genetic Algorithms”, 7th Edition, Prentice Hall India, 2007 By Mukaidono M., Kikuchi H., “Fuzzy Logic for Beginners”, World Scientific, 2001.
4. Bolton, W., Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, 3rd edition, Addison Wesley Longman: Essex England, 2003.
5. D. Shetty and R. A. Kolk, Mechatronics System Design, PWS Publishing Co., Boston, MA, 1997

ENT488/3
Mobile Robotics

Course Synopsis

This course introduces the students 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

CO1: Ability to apply various locomotion systems in mobile robotic applications.
CO2: Ability to analyze the force-torque requirements of the mobile robots and select the most suitable actuator.
CO3: Ability to solve the kinematics problems for mobile robots.

CO4: Ability to apply suitable sensors and control systems for the wheeled mobile robot mechanisms.
CO5: Ability to analyze various autonomous guidance systems in mobile robotics application.

References

1. Thomas Braunl, ”Embedded Robotics – Mobile robot design and applications with embedded systems”, Springer, NY, 2006.
2. H. R. Everett, ”Sensors for mobile robots – Theory and Application”, A.K Peters Ltd, Mass, USA, 1995.

3. M. P. Groover, ”Automation, Production systems and Computer Integrated Manufacturing”, Prentice Hall, NJ, 1990.
4. Phillp John McKerrow, “Introduction to Robotics”, Addison Wesley, NY, 1998
5. Man Zhihong, ‘ Robotics”, Pearson Prentice Hall, Singapore, 2005.

ENT 491/3
Robotic Control

Course Synopsis

The objective of this course is to impart knowledge in the application and design aspect of mechatronic system. The course topics include the applications of sensors and transducers, signal conditioning, pneumatic, hydraulic, mechanical and electrical actuators, input and output interfacing, communication systems, programmable logic controllers, microprocessors and fault analysis.

Course Outcomes

CO1: Ability to design, develop and construct industrial measurement and instrumentation systems.
CO2: Ability to design and develop industrial actuation systems.
CO3: Ability to evaluate, design and construct analog and digital control system using PLC and Microcontroller.
CO4: Ability to design, construct and evaluate simple mechatronic systems that combine electrical/ electronic and mechanical components.

References

1. Bolton, W., *Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering, 3rd edition,* Addison Wesley Longman: Essex England, 2003.
2. D. G. Alciatore and M. B. Histand, *Introduction to Mechatronics and Measurement Systems.* 3rd edition, McGrawHill.
3. D. Shetty and R. A. Kolk, *Mechatronics System Design*, PWS Publishing Co., Boston, MA, 1997.
4. Godfrey C. Onwubolu, “Mechatronics: Principles and Applications”, Butterworth-Heinemann 2005.
5. R. Isermann, *Mechatronic Systems: Fundamentals*, Springer-Verlag: Great Britain, 2003.

ENT 493/3
Advanced Control Systems
(Pre Requisite: ENT 386/3 Modern Control Engineering)

Course Synopsis

The aim of this course is to introduce state-space design, non-linear system and digital control. Students also will be exposed to other control methods, like robust control, predictive control and optimal control.

Course Outcomes

CO1: Ability to analyze the concepts of state-space design, non-linear system and digital control.
CO2: Ability to derive state-space description from continuous-time and discrete-time systems.
CO3: Ability to design sate-feedback and digital controller.
CO4: Ability to evaluate Robust Control, Optimal Control methods.

References

1. J R Leigh, “Control Theory”, 2nd ed. IEE, 2004
2. Charles L. Philips, H. Troy Nagle, “Digital Control Systems Analysis and Design”, 3rd ed. Prentice Hall, 1995
3. Gene F. Franklin, J. David Powell, Micheal Workman, “Digital Control of Dynamic Systems”, 3rd ed. Addison-Wesley,1998.
4. M. Gopal, “Digital Control and State Variable Methods”, McGraw-Hill, 1997.
5. Kevin Warwick,” An Introduction to Control Systems”, 2nd ed. World Scientific, 1996

ENT 497/3
Artificial Intelligence in Engineering

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 exposed to fuzzy systems, artificial neural networks and evolutionary computation. At the end of this course students should know a few major techniques in AI and ability to build simple intelligent systems applied to Mechatronic Engineering.

Course Outcomes

CO1: Ability to perform analysis and examine the right AI techniques for simple applications.
CO2: Ability to perform analysis on different types of AI techniques.
CO3: Ability to design and evaluate AI techniques for Mechatronics Applications.

References

1. Negnevitsky M., (2004). *Artificial Intelligence: A guide to Intelligent System, 2nd Edition.* Addison Wesley.
2. Sivanandam S N., Paulraj M., (2005). *Introduction to Artificial Neural Networks, Second Edition.* Vikas Publications.
3. Russell S.J., Norvig P., Canny J.F., (2003). *Artificial Intelligence: A Modern Approach.* Prentice Hall.
4. Rajasekaran. S., Pai G.A.V., (2007), *Neural Networks, Fuzzy Logic and Genetic Algorithms, 7th Edition.* Prentice Hall India.
5. Mukaidono M., Kikuchi H., (2001). *Fuzzy Logic for Beginners*. World Scientific.

ENT499/3
Digital Signal Processing & Applications
(Pre Requisite: ENT 281/3 Signals and Systems)

Course Synopsis

This course is designed to introduce the concepts of digital signal processing and to help the students to explore the theory and applications of digital signal processing. The course also helps the students to develop the ability of analyze and manipulate digital signals.

Course Outcomes

CO1: Ability to do the analisys of analogue and digital signals in time domain.
CO2: Ability to do analysis of analogue and digital signals in frequency domain.
CO3: Ability to design digital filter in signal processing.
CO4: Ability to use signal processing tools in a specific signal processing application

References

1. S.K. Mitra , 'Digital Signal Processing: A Computer Based Approach', Tata McGraw Hill , 2006.
2. E.C. Ifeachor and B.W. Jervis, 'Digital Signal Processing: A Practical Approach' Prentice Hall, Second Edition 2002.
3. Richard G. Lyons, 'Understanding Digital Signal Processing', Prentice Hall, Second Edition, 2004.
4. J. G. Proakis and D. G. Manolakis, 'Digital Signal Processing: Principles, Algorithms, and Applications', 1989.
5. Stephen W. Smith, 'The Scientist and Engineer's Guide to Digital Signal Processing', California Technical Publishing, 2nd Edition, 2003.
6. John G. Proakis , 'Digital Signal Processing', PEARSON Fourth Edition, 2007.

Career Opportunities

Graduates in these areas will have the ability to engage in the design, research and development, consultancy, education, manufacturing, construction, maintenance, sales and management in many industries such as manufacturing, processing, automotive, aviation and shipping, mining and services, communications and building services and medical industries. Among of the firms that had offered employment opportunities to the graduates of these areas are as follows:

- Vehicle making and installation firms
- Home making appliances firms
- Electronic products firms
- Plant food processors
- Oil and gas companies
- High-tech firms
- Consultant firms
- Engineering & product development firms
- Automation system firms
- Bio-medical engineering firms
- Software development firms
- Research & development agencies
- Hospitals
- Companies, maintenance and repair firms of medical equipment
- Companies, marketing and sale firms of medical equipment
- Manufacturing industry of medical instrumentation


IEYI THAILAND 2012

School of Electrical System Engineering

Programme Offered

- Diploma in Electrical Engineering
- Bachelor of Electrical System Engineering
- Bachelor of Industrial Electronic Engineering
- Bachelor of Electrical in Energy Systems Engineering
- Master of Science (Electrical System Engineering)
- Master of Science (Electrical Power Engineering)- Mixed Mode
- Doctor of Philosophy (PhD)

Address

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Introduction

School of Electrical System Engineering offers four programmes, Bachelor of Electrical System Engineering, Bachelor of Industrial Electronic Engineering, Bachelor of Electrical Energy Systems Engineering and Bachelor of Technology in Industrial Power Engineering.

The School of Electrical System Engineering has well equipped teaching areas and laboratories. The laboratory infrastructure is highly developed, with a large number of networked PCs and power engineering workstations. These include Electronic Laboratory, Digital Electronic Laboratory, Computer Programming Laboratory, Electrical Technology Laboratory, Instrumentation Laboratory, Power System Laboratory, Electrical Machine Laboratory, Power Electronic Laboratory and Electromagnetic and Machine Design Laboratory.

Electrical System Engineering (RK23)
The Electrical System Engineering programme leading to the degree of Bachelor of Engineering (Hons)(Electrical System Engineering) has a strong focus on the preparation of engineers who can serve the needs of the electric power industry. This programme provides emphasis on the major fields of power engineering, which includes electrical machines, power systems and high voltage engineering. These are offered as compulsory course so as to cope with the rapid change of technology in power engineering.

Fundamental subjects on electrical circuit and power engineering are taught in the first two years of study. A broad background in mathematics and computing, electric circuits and systems, analogue electronic circuits and components, digital systems, instrumentations, communications, electromagnetics and control, necessary to underpin the more advanced courses given in the subsequent years. Students undergo practical training after at the semester break of third year to gain practical knowledge from electrical power industries. Final year student project enhance practical skills and the use of innovative and creative ideas.

Industrial Electronic Engineering (RK45)
The School of Electrical Systems Engineering also offers Industrial Electronic Engineering program leading to the degree of Bachelor of Engineering (Hons) (Industrial Electronic Engineering). This program focuses on power electronic systems for industrial use with special emphasis on industrial electronic control, electrical machine and drive.

The programme consists of common courses for the first two years providing a broad background in mathematics and computing, electric circuits and systems, analogue electronic circuits and components, digital systems, instrumentations, communications, electromagnetics and control, necessary to underpin the more advanced courses given in the subsequent years. In the third and fourth year, the students will major in electrical system and power electronic system in which will provide the opportunity for in depth technical study combined with a range of courses aiming to enhance the students understanding of industrial electronic application. Students undergo practical training after at the semester break of third year to gain practical knowledge from electrical power industries.

Electrical Energy Systems Engineering (RK96)
Bachelor of Engineering (Hons)(Electrical Energy Systems Engineering) programme focuses on technological aspects and management of ion including renewable energyandalternative energy sources. One the main objective of the programme is to promote the use of renewable energy for electricity generation in Malaysia.

This program consists of common courses until third years of studies which providing a broad background in mathematics and computing, electric circuits and systems, analogue electronic circuits and components, digital systems, instrumentations, communications, electromagnetic, control, electrical system (generation, transmission&distribution) and power electronic. Students undergo practical training after at the semester break of third year to gain practical knowledge from electrical power industries.

In fourth year, students will be focused in their major studies which are in electrical energy system and renewable energy system subjects. This will provide the opportunity for in depth study combined with a range of courses aiming to enhance the students understanding of renewable energy applied in electrical power. In general, electrical energy system engineering programme has a broad scope, particularly in thesectorsof power generation and energy renewal.

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Bachelor Of Engineering (Honours) (Electrical System Engineering)

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PEO 01
Graduates who are leaders in the field of electrical engineering or chosen field as demonstrated via career advancement.

PEO 02
Graduates who are members of and contribute to professional society.

PEO 03
Graduates who engage in life-long learning or continuous education opportunities.

PEO 04
Graduates who contribute towards research and development.

PEO 05
Graduates who are entrepreneurial engineers.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in electrical engineering discipline to the solution of complex engineering.

PO 02
Ability to identify, formulate and solve electrical engineering problems.

PO 03
Ability to design solutions for complex engineering problems and systems, component or processes to meet desired needs.

PO 04
Ability to conduct investigation into complex problems as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for complex engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to understand entrepreneurship, the process of innovation and the need for environmental and sustainable development.

PO 08
Ability to understand the professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large.

PO 11
A recognition of the need for, and an ability to engage in life-long learning.

PO12
Demonstrate understanding of project management and finance principles.

Curriculum Structure 2013/2014

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YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	**I**	**II**	**III**	**IV**	**V**	**VI**		**VII**	**VIII**
Engineering Core (96)	EET106/3 Engineering Science	EET110/3 Basic Computer Programming	EET206/3 Electric Circuit II	EET208/3 Electrical Power Technology	EET301/4 Power System Engineering	EET308/3 Power System Analysis	EIT302/4 Industrial Training	EET445/2 Final Year Project I	EET446/4 Final Year Project II
	EET108/3 Electric Circuit I	EET107/3 Digital Electronics I	EET202/3 Digital Electronics II	EET203/4 Microcontroller Systems Design	EET302/3 Control Systems Engineering	EET307/4 Power Electronics I		EET412/3 Electrical Machine Design	EET416/3 Electrical Drives
		EET109/3 Electronic Devices	EET205/4 Analog Electronics	EET207/3 Signals and Systems	EET306/4 Electrical Machines	EET304/3 Communication System Engineering		EET411/3 Power System Operation & Control	EET417/3 High Voltage Engineering
			EET204/3 Instrumentation and Measurements		EET303/3 Electromagnetic Theory	EET333/3 Engineering Team Project		EET414/3 Substation Design	
								EETXXX/3 Elective I	EETXXX/3 Elective II
Non Engineering (24)	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT203/3 Engineering Mathematics III	EQT271/3 Engineering Statistics	EUT440/3 Engineers in Society	EET311/2 Engineering Economics			EUT443/2 Engineering Management
		EUT122/2 Skills And Technology in Communication							
		ECT111/3 Engineering Skills							
University Required (17)	UUW233/2 Islamic Civilization and Asia Civilization			UUW212/2 University English Language		UUW322/2 Thinking Skills		UUWXXX/2 Option	
	UUW410/2 University Malay Language		UZWXXX/1 Co-curriculum	UUW224/2 Engineering Entrepreneurship					
	UUW235/2 Ethnic Relation								
	UUWXXX/1 Uniform Body	UUWXXX/1 Uniform Body							
137	16	18	17	17	17	17	4	16	15
Total Units for Graduation 137									

Elective I: EET427/3 Industrial Electronic Control or EET426/3 Power Electronics II or EET431/3 Electrical Energy System or EET432/3 Electrical Energy Utilization.
Elective II: EET418/3 Power Quality or EET422/3 EMC & Compliance Engineering or EET433/3 Renewable Energy System.

School of Electrical System Engineering

Bachelor Of Engineering (Honours) (Industrial Electronic Engineering)

Programme Objectives (PEO)

PEO 01
Graduates who are leaders in the field of electrical engineering or chosen field as demonstrated via career advancement.

PEO 02
Graduates who are members of and contribute to professional society.

PEO 03
Graduates who engage in life-long learning or continuous education opportunities.

PEO 04
Graduates who contribute towards research and development.

PEO 05
Graduates who are entrepreneurial engineers.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in electrical engineering discipline to the solution of complex engineering.

PO 02
Ability to identify, formulate and solve electrical engineering problems.

PO 03
Ability to design solutions for complex engineering problems and systems, component or processes to meet desired needs.

PO 04
Ability to conduct investigation into complex problems as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for complex engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to understand entrepreneurship, the process of innovation and the need for environmental and sustainable development.

PO 08
Ability to understand the professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large.

PO 11
A recognition of the need for, and an ability to engage in life-long learning.

PO12
Demonstrate understanding of project management and finance principles.

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Industrial Electronic Engineering)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	I	II	III	IV	V	VI		VII	VIII
Engineering Core (96)	EET106/3 Engineering Science	EET110/3 Basic Computer Programming	EET206/3 Electric Circuit II	EET208/3 Electrical Power Technology	EET301/4 Power System Engineering	EET308/3 Power System Analysis	EIT302/4 Industrial Training	EET445/2 Final Year Project I	EET446/4 Final Year Project II
	EET108/3 Electric Circuit I	EET107/3 Digital Electronics I	EET202/3 Digital Electronics II	EET203/4 Microcontroller Systems Design	EET302/3 Control Systems Engineering	EET307/4 Power Electronics I		EET427/3 Industrial Electronic Control	EET428/3 Power Electronics Drives
		EET109/3 Electronic Devices	EET205/4 Analog Electronics	EET207/3 Signals and Systems	EET306/4 Electrical Machines	EET304/3 Communication System Engineering		EET426/3 Power Electronics II	EET422/3 EMC & Compliance Engineering
			EET204/3 Instrumentation and Measurements		EET303/3 Electromagnetic Theory	EET333/3 Engineering Team Project		EET424/3 Power Electronics For Energy System	
								EETXXX/3 Elective I	EETXXX/3 Elective II
Non Engineering (24)	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT203/3 Engineering Mathematics III	EQT271/3 Engineering Statistics	EUT440/3 Engineers in Society	EET311/2 Engineering Economics			EUT443/2 Engineering Management
		EUT122/2 Skills And Technology in Communication							
		ECT111/3 Engineering Skills							
University Required (17)	UUW233/2 Islamic Civilization and Asia Civilization			UUW212/2 University English Language		UUW322/2 Thinking Skills		UUWXXX/2 Option	
	UUW410/2 University Malay Language		UZWXXX/1 Co-curriculum	UUW224/2 Engineering Entrepreneurship					
	UUW235/2 Ethnic Relation								
	UUWXXX/1 Uniform Body	UUWXXX/1 Uniform Body							
137	16	18	17	17	17	17	4	16	15

Total Units for Graduation 137

Elective: EET412/3 Electrical Machine Design or EET414/3 Substation Design or EET432/3 Electrical Energy Utilization or EET431/3 Electrical Energy System
Elective II: EET418/3 Power Quality or EET417/3 High Voltage Engineering or EET433/3 Renewable Energy System

Bachelor Of Engineering (Honours) (Eelectrical Energy System Engineering)

Programme Objectives (PEO)

PEO 01
Graduates who are leaders in the field of electrical engineering or chosen field as demonstrated via career advancement.

PEO 02
Graduates who are members of and contribute to professional society.

PEO 03
Graduates who engage in life-long learning or continuous education opportunities.

PEO 04
Graduates who contribute towards research and development.

PEO 05
Graduates who are entrepreneurial engineers.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in electrical engineering discipline to the solution of complex engineering.

PO 02
Ability to identify, formulate and solve electrical engineering problems.

PO 03
Ability to design solutions for complex engineering problems and systems, component or processes to meet desired needs.

PO 04
Ability to conduct investigation into complex problems as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for complex engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to understand entrepreneurship, the process of innovation and the need for environmental and sustainable development.

PO 08
Ability to understand the professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large.

PO 11
A recognition of the need for, and an ability to engage in life-long learning.

PO12
Demonstrate understanding of project management and finance principles.

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Eelectrical Energy System Engineering)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	I	II	III	IV	V	VI		VII	VIII
Engineering Core (96)	EET106/3 Engineering Science	EET110/3 Basic Computer Programming	EET206/3 Electric Circuit II	EET208/3 Electrical Power Technology	EET301/4 Power System Engineering	EET308/3 Power System Analysis	EIT302/4 Industrial Training	EET445/2 Final Year Project I	EET446/4 Final Year Project II
	EET108/3 Electric Circuit I	EET107/3 Digital Electronics I	EET202/3 Digital Electronics II	EET203/4 Microcontroller Systems Design	EET302/3 Control Systems Engineering	EET307/4 Power Electronics I		EET431/3 Electrical Energy System	EET428/3 Power Electronics Drives
		EET109/3 Electronic Devices	EET205/4 Analog Electronics	EET207/3 Signals and Systems	EET306/4 Electrical Machines	EET304/3 Communication System Engineering		EET432/3 Electrical Energy Utilization	EET433/3 Renewable Energy System
			EET204/3 Instrumentation and Measurements		EET303/3 Electromagnetic Theory	EET333/3 Engineering Team Project		EET424/3 Power Electronics For Energy System	
								EETXXX/3 Elective I	EETXXX/3 Elective II
Non Engineering (24)	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT203/3 Engineering Mathematics III	EQT271/3 Engineering Statistics	EUT440/3 Engineers in Society	EET311/2 Engineering Economics			EUT443/2 Engineering Management
		EUT122/2 Skills And Technology in Communication							
		ECT111/3 Engineering Skills							
University Required (17)	UUW233/2 Islamic Civilization and Asia Civilization			UUW212/2 University English Language		UUW322/2 Thinking Skills		UUWXXX/2 Option	
	UUW410/2 University Malay Language		UZWXXX/1 Co-curriculum	UUW224/2 Engineering Entrepreneurship					
	UUW235/2 Ethnic Relation								
	UUWXXX/1 Uniform Body	UUWXXX/1 Uniform Body							
137	16	18	17	17	17	17	4	16	15
Total Units for Graduation 137									

Elective I: EET427/3 Industrial Electronic Control or EET426/3 Power Electronics II or EET411/3 Power System Operation and Control or EET414/3 Substation Design

Elective II: EET418/3 Power Quality or EET417/3 High Voltage Engineering or EET422/3 EMC & Compliance Engineering

Course Syllabus

EET103/4
Electrical Technology

Course Synopsis

This course is offered to non-electrical engineering background students. This course is intended to provide students with clear understanding of the DC and AC circuits, basic principles of 3-phase AC circuits, electro-magnetism and magnetic circuits. They will also gain an understanding of the basic operating principles and performance analysis of three most commonly used electric machines, namely, transformers, dc machines, and induction motors.

Course Outcomes

CO1: Ability to analyze the DC and AC circuits by using Ohm's Law, Kirchhoff's Current Law, Kirchhoff's Voltage Law, Source Transformation and Thevenin's theorem.

CO2: Ability to calculate and analyze parameters of three phase AC system for Wye and Delta connection.

CO3: Ability to explain and apply the basic concept of magnetism and electromagnetism in DC and AC machines.

References

1. Richard J. Fowler. (2008). Electricity Principles and Applications. 7th Edition. McGraw Hill.
2. Boylestad, Robert L. (2007). Introductory Circuit Analysis. 11th Edition. Prentice Hall..
3. Hughes. (2005). Electrical and Electronic Technology. 9th Edition. Prentice Hall.
4. Charles K. Alexander & Matthew N.O. Sadiku. Fundamentals of Electric Circuits. International Third Editions, McGraw-Hill.
5. Nilsson, J.W. & Riedel. (2005). S.A., Electric Circuits. 7th Edition. Pearson Prentice Hall.

EET106/3
Engineering Science

Course Synopsis

This course aims to introduce to the Electrical Engineering students the knowledge on the principles of material engineering and thermal fluid. It includes aspects related to material engineering, thermodynamics and fluid mechanics.

Course Outcomes

CO1: Ability to describe and analyze the Mechanical, Electrical and Magnetic properties of materials.

CO2: Ability to understand, apply and analyze concepts and principles of Fluid Statics, Bernoulli and Energy Equations.

CO3: Ability to understand, apply and analyze concepts and principles of First Law and Second Law of Thermodynamics.

References

1. Y.A. Cengal and M.A. Boles. (2008). Thermodynamics: An Introduction Approach', 6th Ed., McGraw-Hill.
2. William D. Callister, Jr. (2007). Materials Science and Engineering: An Introduction. 7th ed.
3. Robert L. Mott. (2006). Applied Fluid Mechanics. 6th ed. Pearson.
4. Yunus A. Cengel, Robert H. Turner. (2005). Fundamentals of Thermal-Fluid Sciences. Int ed. McGraw-Hill.
5. Lim Poh Seng, Tay Seng How, Koh Kok Pin. (2003). Strength of Materials for Polytechnic. Revised ed. Prentice Hall.

EET107/3
Digital Electronics I

Course Synopsis

The aim of this course is to introduce students to the basic knowledge in the digital electronics. This course focuses 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

CO1: Ability to apply the basic principles of numbering system and Algebraic Switching in digital electronics.

CO2: Ability to design and optimizes logic circuit using Boolean functions and Karnaugh maps.
CO3: Ability to design and evaluate digital system applications using combinational and sequential logic design techniques.

References

1. Floyd. TL. (2009). Digital Fundamentals. 10th Ed. Prentice Hall.
2. Rafikha Aliana, Norina Idris, Phak Len Eh Kan, Mohammad Nazri. (2007). Digital Electronics Design. 1st Ed. Prentice Hall.
3. Ronald J. Tocci. (2007). Digital Systems – Principles and Applications. 10th Ed. Prentice Hall.
4. Godse, Atul P. Godse, Deepali A. Godse, Gurpreet Singh Ghai. (2007). Digital Electronics. Technical Publications Pune.
5. Nigel, P.C. (1999). A First Course in Digital Electronic. 1st Ed. Prentice Hall.

EET108/3
Electric Circuit I

Course Synopsis

Basically this introductory circuit course can be divided into two parts. Part I, consisting of chapter 1 through 4, is devoted to DC circuits. It covers fundamental laws and theorems, circuit analytical techniques, passive and active elements. Part 2, consisting of chapter 5 through 7, deals with AC circuits. It introduces phasors, sinusoidal steady state analysis, using previous analytical techniques under sinusoidal steady state excitation, RLC circuits, AC power calculations and power factor correction and rms values.

Course Outcomes

CO1: Ability to derive importantequations and analyze DC circuits
CO2: Ability to analyze the first and second order circuits containing passive elements, DC sources and switches using differential equations.
CO3: Ability to calculate and analyze circuits parameters containing sinusoidal steady-state sources using complex impedances and phasor representations.

References

1. Nilssen, J.W. and Riedel, S.(2008) Electric Circuits, 8th Edition, Addison Wesley.
2. Robert L. Boylestad. (2007) Introductory Circuit Analysis. 11th Ed. Prentice Hall.
3. Alexander, C.K. and Sadiku, M.N.O. (2007) Fundamental of Electric Circuits, 3rd Edition, McGraw-Hill.
4. Dorf, R.C. and Svoboda, J.A., (1996) Introduction to Electric Circuits, Wiley.
5. David E. Johnson, (1997), Electric Circuit Analysis, Prentice Hall.

EET109/3
Electronic Devices

Course Synopsis

EET 109 will expose the students with basic electronic 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 rectifiers, Full wave rectifiers, Power Supply Filter and Regulators, Clipper and Clamper Diode circuits and Voltage Multipliers. The students also will 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 which are Junction Field-Effect Transistor (JFET) and the Metal Oxide Semiconductor Field-Effect Transistor (MOSFET) will be introduced in this course as well.

Course Outcomes

CO1: Ability to explain and differentiate the fundamental concepts of electronic devices.
CO2: Ability to analyze the basic operations of electronic devices such as diode, BJT and various types of FET.
CO3: Ability to design and evaluate the basic biasing circuits.

References

1. Neamen Donald A. (2010). Microelectronics Circuit Analysis and Design. 4th Ed. McGraw Hill. Int. Ed.

2. Robert L. Boleystad.. (2009). Electronic Devices and Circuit Theory. 10th Ed. Prentice Hall
3. T. Robert Paynter. (2009). Introductory Electronic Devices and Circuits. 10th Ed. Prentice Hall
4. Thomas L. Floyd. (2008). Electronic Devices: Conventional Current Version. 8th Ed. Prentice Hall
5. Puspa Inayat Khalid, Rubita Sudirman, Siti Hawa Ruslan. (2001). Modul Pengajaran Elektronik 1. Edisi ke3

EET110/3
Computer Programming

Course Synopsis

One of the aspects of a good engineer is to have the capability of integrating the hardware and the software, thus an electrical 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 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

CO1: Ability to differentiate programming concepts and principles.

CO2: Ability to solve engineering related problems using computer programming techniques

CO3: Ability to design and evaluate computer programs by using programming techniques and tools.

References

1. Cheng, H. (2010). C for Engineers and Scientists. McGraw Hill.
2. Deitel and Deitel, Sudin, S., Ahmad, R.B. and Yacob, Y., (2006). C How To Program. Pearson-Prentice Hall.
3. Sprankle, Maureen. (2006). Problem Solving and Programing Concepts. 7th Edition. Prentice Hall.
4. Hanly, J.R. and Koffman, E.B. (2001). C Program Design for Engineers. 2nd Ed. Addison-Wesley.
5. Al Kelley, Ira Pohl. (2000). C by Dissection: The Essentials of C Programming. 4th ed. Addison-Wesley.

EET202/3
Digital Electronics II

Course Synopsis

This course exposes the students to the combinational logic system design, sequential system, memory and programmable logic devices, register transfer and datapath, sequential and control as well as computer organization.

Course Outcomes

CO1: Ability to construct digital logic circuit using Register Transfer Language

CO2: Ability to analyze and convert ASM chart to logical circuit and vice versa

CO3: Ability to design a basic computer system

References

1. Floyd. TL. (2009). Digital Fundamentals. 10th ed. Prentice Hall.
2. Rafikha Aliana, Norina Idris, Phak Len Eh Kan, Mohammad Nazri. (2007). Digital Electronics Design. 1st ed. Prentice Hall
3. Ronald J. Tocci. (2007). Digital Systems – Principles and Applications. 10th ed. Prentice Hall.
4. Godse, Atul P. Godse, Deepali A. Godse, Gurpreet Singh Ghai. (2007). Digital Electronics. Technical Publications Pune.
5. Nigel, P.C. (1999). A First Course in Digital Electronics. 1st ed. Prentice Hall.

EET203/4
Microcontroller Systems Design

Course Synopsis

The aims of this course is to study the PIC microcontroller architecture, its programming language and basic interfacing with input and output devices. These knowledge are gathered and applied to design a simple microcontroller based system.

Course Outcomes

CO1: Ability to illustrate and explain the basic microcontroller architecture.
CO2: Ability to analyze and write a microcontroller programming language in C program.
CO3: Ability to interface the input and output devices with microcontroller.
CO4: Ability to design and evaluate a simple microcontroller based system and present in group.

References

1. S. Katzen. (2010). The Essential PIC18® Microcontroller (Computer Communications and Networks). Springer
2. M.A Mazidi, R.D Mckinlay, and D Causey. (2008). PIC Microcontroller and Embedded Systems: Using Assembly and C for PIC18. Prentice Hall
3. B.B. Brey. (2008). Applying PIC18 Microcontroller: Architecture, Programming and Interfacing using C and Assembly. Prentice Hall
4. M. Bates. (2006). Interfacing PIC Microcontrollers: Embedded Design by Interactive Simulation. Newness
5. H.W. Huang. (2005). PIC Microcontroller: An Introduction to Software and Hardware Interfacing. Thomson & Delmar Learning

EET204/3
Instrumentation and Measurement

Course Synopsis

The course is aimed at providing an overview of modern instrumentation and measurement techniques. It is divided into four main topics namely the fundamentals of electronic instrumentation and measurement systems; the working principles and application of sensors and transducers; principles and application of signal conditioning circuits including bridges, amplifiers and filters; and finally display, data acquisition and interfacing techniques.

Course Outcomes

CO1: Ability to define, describe and analyze the elements of a complete electronic instrumentation and measurement system
CO2: Ability to explain and apply the working principles of various sensors and signal conditioning/processing techniques in instrumentation and measurements
CO3: Ability to describe and analyze display systems, data acquisition systems and computer interfacing techniques in instrumentation and measurements

References

1. Wai Kai Chen. (2006). Passive, Active & Digital Filters. US, CRC Press.
2. Walt Jung. (2005). Op Amp Applications Handbook. UK, Elsevier.
3. Rajendra Prasad.(2004). Electrical Measurement and Measuring Instrument. Khanna Publishers, India.
4. H.S Kalsi.(2003). Electronics Instrumentation. Tata McGraw Hill.
5. J. Park & S. Mackay. (2003). Practical Data Acquisition for Instrumentation and Control Systems. 1st Edition, Great Britain, Elsevier.

EET205/4
Analog Electronics

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. The basic principles of oscillator are also discussed. Furthermore, the students will also learn in depth about active filters and voltage regulators.

Course Outcomes

CO1: Ability to analyze small-signal and frequency performance of basic amplifier configurations (BJT and FET) and categorize different types of power amplifiers.
CO2: Ability to design the basic circuit of amplifier.

CO3: Ability to differentiate the feedback amplifier and design an oscillator.
CO4: Ability to explainthe operation and analyze various types of filters.
CO5: Ability to describe the operation, and design simple linear and non-linear voltage regulator circuits.

References

1. Boylestad, R.L. (2009). Nashelsky, L., ‘Electronic Devices and Circuit Theory. 10th Ed. Prentice Hall.
2. Adel S. Sedra, Kenneth C. Smith. (2009). Microelectronic Circuits. 6th Ed. Oxford University Press.
3. Floyd, T. (2008). Electronic Devices. 8th Ed. Pearson Education, Inc.
4. Donald A. Neamen. (2007). Microelectronics Circuit Analysis and Design. 3rd Ed. McGraw-Hill.
5. Bogart, T.F. (2004). Electronic Devices and Circuits. 6th Ed. Prentice Hall.

EET206/3
Electric Circuit II

Course Synopsis

This course offers the students an exposure to the theories and concepts of the following as well as developing the skills to analyse linear electric circuits:

i) Mutual Inductance
ii) Two port network
iii) Laplace transform
iv) Frequency response of AC circuits
v) Fourier series
vi) Fourier transform

Course Outcomes

CO1: Ability to explain and analyze special types of circuit such as mutual inductance and two port networks.
CO2: Ability to analyze electric circuits using Laplace Transform, Fourier Series and Fourier Transform for the circuit comprising passive elements.
CO3: Ability to analyze electric circuits using Laplace Transform, Fourier Series and Fourier Transform for the circuit comprising passive elements.

References

1. Dorf, R.C., Svodoba, J.A. (2010). Introduction to electric circuits. 8th Ed. John Wiley
2. Sadiku, M. N. O, Alexander, C. K. (2009). Fundamentals of Electric Circuits. Singapore. 4th Ed. McGraw-Hill
3. Nilsson, J. W. and Riedel, S.A. (2008). Electric Circuits. 8th Ed. Prentice Hall. New Jersey
4. Irwin, J.D., Nelms, R.M. (2008). Basic Engineering Circuit Analysis. 9th Ed.. John Wiley
5. Hyat W.H., Durbin, S.M., Kimmerly, J.E. (2007). Engineering Circuit Analysis. 7th Ed. McGraw Hill

EET207/3
Signals and Systems

Course Synopsis

This course aims to introduce students about basic of signals and systems and learn how certain input to a system will produce the required output. Students will be exposed to signal spectrum concept and the method being utilized to analyze signal and its relations.

Course Outcomes

CO1: Ability to identify type and analyze waveform of the signals and its characteristics in engineering systems.
CO2: Ability to analyze signals and determine the process of the systems.
CO3: Ability to calculate and evaluate the system response using variable methods.

References

1. Charles L. Philips, John M. Parr, Eve A. Riskin. (2008). Signals, Systems and Transforms. 4th Ed. Prentice Hall International Edition
2. P. Rao. (2008). Signals and Systems. Tata Mc Graw Hill
3. Simon Haykin, Barry Van Veen. (2005). Signals and Systems. 2nd Ed. Wiley
4. Fred J. Taylor. (1994). Principles of Signals and Systems. McGraw Hill International
5. Ashok Ambardar. (1999). Analog and Digital Signal Processing. 2nd Ed.

EET208/3
Electrical Power Technology

Course synopsis

In Electrical Power Technology courses, student will be exposed to the concept of three-phase system, electromagnetism and magnetic circuit. The next part includes principles and operation of single-phase and three-phase transformer. At the end of these practical lab sessions they are asked to prepare lab report on the experiments they have carried out and submit for assessment.

Course Outcomes

CO1: Ability to evaluate parameters of three phase system
CO2: Ability to solve electromagnetism problem and analyze its application in magnetic circuit
CO3: Ability to analyze the principles and performance of single-phase and three-phase transformer

References

1. Edward Hughes, Ian McKenzie Smith, John Hiley, Keith Brown. (2008). 'Electrical and Electronic Technology', 10th Ed., Prentice Hall.
2. Theraja B.L. (2007). 'A Text Book of Electrical Technology', Volume II (AC & DC Machines), S.Chand & Company Ltd.
3. Boylestad, Robert L. (2007). 'Introductory Circuit Analysis', 11th Edition, Prentice Hall.
4. John Bird. (2007). 'Electric Circuit Theory and Technology', Newnes.
5. Chapman, Stephen J. (2005). 'Electric Machinery Fundamentals', 4th Ed., New York: McGraw-Hill.

EET301/4
Power System Engineering

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 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 system, fault and protection system.

Course Outcomes

CO1: Ability to classifytypes and operation of power system generations in groups.
CO2: Ability to solvesingle-line diagram problems using the per-unit system.
CO3: Ability to calculate and analyze the transmission line parameters and models in power system
CO4: Ability to explain and calculate load characteristics and distribution system components in power system.
CO5: Ability to explain and evaluate symmetrical fault and protection system in power system.

References

1. Duncan Glover, Mulukutla S. Sarma, Thomas J. Overbye. 2011. Power System Analysis and Design, SI Version. 5th ed. CENGAGE Learning
2. Hadi Saadat. (2004). Int. ed. Power System Analysis.Boston: McGraw Hill
3. B.M. Weedy& B.J. Cory (2012), Electric Power System, John Wiley & Sons, 5th ed.
4. Chapman, Stephen J. (2002). Electric Machinery and Power System Fundamentals. Boston: McGraw Hill.
5. El-Hawary, M. E. (2000). Electrical Energy Systems. Boca Raton: CRC Press.

EET302/3
Control Systems Engineering

Course synopsis

This is an introduction course to control systems engineering. Students will be exposed to the mathematical modeling for electrical, electro-mechanical as well as 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.

Course Outcomes

CO1: Ability to produce mathematical model from physical systems (electrical/mechanical/block diagram) by employing suitable techniques such as Mason's law, Laplace transform and etc.
CO2: Ability to analyze system's response to test inputs in time or frequency domain.
CO3: Ability to analyzecontrol system problems by utilizingcontrol system graphical tools such as root locus or bode plot.
CO4: Ability to design appropriate controller/s throughsystem compensation in performing control system analysis.

References

1. Norman S. Nise. (2011). Control System Engineering. 6th ed. John Wiley & Sons.
2. Richard C. Dorf & Robert H. Bishop. (2011). Modern Control Systems. 12th Edition. Prentice Hall.
3. Kuo B. C. Automatic Control System. 9th Edition. John Wiley & Sons.
4. Ogata K. (2009). Modern Control Engineering. 5th Ed. Prentice Hall.
5. Franklin G. F., Powell J. D. and Emani-Naeni A. (2009). Feedback Controlof Dynamic Systems System. 9th Edition. Prentice Hall.

EET303/3
Electromagnetic Theory

Course Synopsis

Purpose of this course is to learn the basic theory and analysis of electromagnetic. Student will be exposed to the basic concepts and effects of electrostatics and magnetostatics. Theory and application of transmission line will be introduced in this course.

Course Outcomes

CO1: Ability to explain the concept of vector analysis in electromagnetic theory
CO2: Ability to explain and analyze the concept of electrostatic
CO3: Ability to explain and analyze the concept of magnetostatic
CO4: Ability to applythe concept of electromagnetic in transmission line analysis

References

1. Matthew N.O. Sadiku. (2008). Element of Electromagnetics. 3rd Ed. Amazon
2. U.A. Bakshi and A.V.Bakshi. (2007) Electromagnetic Fields. 1st Ed. Technical Publications Pune.
3. William H.Hayt, John A Buck. (2006). Engineering Electromagnetics. 6th Ed. McGraw Hill. International ed.
4. Stuart M Wentworth. (2005). Fundamentals of Electromagnetics with Engineering Applications. John Wiley
5. Fawwaz T Ulaby. (2004). Fundamentals of Applied Electromagnetics. Pearson. Prentice Hall.

EET304/3
Communication System Engineering

Course Synopsis

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

Course Outcomes

CO1: Ability to explain basic principles of communication systems and the essential of communication system in real world.
CO2: Ability to define and differentiate the different types of modulation.
CO3: Ability to define, calculate and analyze noise in communication system.
CO4: Ability to prepare a report in relevant topics using various resources.

References

1. Jeffrey S. Beasley, Gary M. Miller. (2008). Modern Electronic Communication. Pearson/Prentice Hall
2. William D. Stanley, John M. Jeffords. (2006). Electronic Communications : Principles and Systems.Thomson Delmar Learning
3. Paul Young. (2004). Electronics Communications Techniques. 5th Ed. Prentice Hall
4. Wayne Tomasi. (2004). Electronics Communication Systems. 5th Ed. Prentice Hall
5. Mullet. (2003). Basic Telecommunications: The Physical Layer. Thomson Learning

EET306/4
Electrical Machines

Course Synopsis

Primarily this Electrical Machines course can be divided into three parts. Part 1, begins by reviewing the basic concept of electromechanical conversion and its application to electrical machines. 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 purpose machines.

Course Outcomes

CO1: Ability to define and explain the principle of electro-mechanical energy conversion and its application to electrical machines
CO2: Ability to determine and analyze parameters for AC and DC Machines
CO3: Ability to apply related software tools in understanding principle of electrical machines

References

1. Stephen J. Chapman, (2010). Electric Machinery Fundamentals. 5th ed., McGraw-Hill.
2. Bhattacharya S.K. (2008). Electrical Machines. 3rd ed. Tata McGraw-Hill.
3. Theraja B.L. (2007). A Text Book of Electrical Technology. Volume II (AC & DC Machines), S. Chand & Company Ltd.
4. Charles A. Gross, (2007). Electric Machines. CRS Press.
5. Wildi, T., (2005). Electrical Machine, Drives and Power System. 6th. ed, Prentice-Hall.

EET307/4
Power Electronics I

Course Synopsis

EET307 introduces Power Electronics as a Multidisciplinary & Interdisciplinary Applications Orientated Technology emphasizing the main criterion of energy efficiency. AC-DC, AC-AC and DC-DC converter performance, including waveform analysis, is developed from theory – simulation - laboratory. EET307 introduces an awareness of Electromagnetic Compatibility (EMC) Legislation & the effects of Power Electronic Systems on Power Quality. Design aspects include understanding manufacturer’s data, co-relating data to select power semiconductors and passive components, thermal management and EMC compliance.

Course Outcomes

CO1: Ability to analyse operation, applications area and the need for design efficiency of power electronic systems.
CO2: Ability to calculate and analyse parameters for power rectifier, SCR, Triac and power transistors.
CO3: Ability to analyse and evaluate AC-DC converter, AC-AC converter and DC-DC converter.
CO4: Ability to explain and calculate the design requirements of power quality related EMC compliance and thermal management of power electronic converters.

References

1. Pressman, Billings & Morey. (2009). Switching Power Supply Design. 3rd Ed., McGraw Hill.
2. S Maniktala. (2006). Switching Power Supplies A to Z. Elsevier Newnes.
3. Muhammad H. Rashid.(2004). Power Electronics: Circuits, Devices & Applications. 3rd Ed., Pearson: Prentice-Hall.

4. Mohan, Undeland, Robbins. (2003). Power Electronics: Converters, Applications & Design. 3rd Ed., John Wiley.
5. Erickson R.W., Maksimovic D. (2001). Fundamentals of Power Electronics. 2nd Ed. Springer.

EET308/4
Power System Analysis

Course Synopsis

This course is divided into four parts. Part I, consisting of topic introduction to power system, the main problem in power system, single-line diagram, representation of power system, bus admittance and impedance matrix. Part II, consisting of topic power flow solution by means of Gauss-Seidel, Newton-Raphson, Decoupled and Fast-Decoupled method.Part III, consisting of topic symmetrical fault, symmetrical component and unsymmetrical fault. Part IV, consisting of topic power system stability with equal area and step by step method. The students are introduced to MiPower software in the laboratory session.

Course Outcomes

CO1: Ability to calculate, analyze power flow with Gauss-Seidel, Newton-Raphson, Decoupled and Fast-Decoupled methods.
CO2: Ability to calculate, and analyze fault current in Symmetrical and Unsymmetrical Fault.
CO3: Ability to calculate and analyze stability system by using Equal-Area method, and Step-by-Step method

References

1. Saadat, H. (2004). Power System Analysis. 2nd Ed. McGraw-Hill
2. Professor Tom Overbye. (2004). Power System Analysis. Department of Electrical and Computer Engineering University of Wisconsin
3. D.P. Nagrath, I.J. Kothari. (2003). Modern Power System Analysis. 3rd Ed. Tata McGraw-Hill
4. Bergen, A.R., Vittal, V. (2000). Power System Analysis. Prentice Hall
5. John. J. Grainger, William D. Stevenson, Jr. (1994). Power System Analysis. McGraw-Hill

EET311/2
Engineering Economics

Course Synopsis

This course introduces the economic principles and analytical tools needed to think intelligently about economic problems. The course begins by focusing on microeconomics, in which students will examine the concept and principles of individual consumer and firm behaviour. In the second part of the course deals with the thought process, concepts, methods and knowledge bases used by engineers to cost engineering projects and to evaluate the merit of making a particular investment, and to chose the best of a series of alternative investments to achieve a desired objective.

Course Outcomes

CO1: Ability to discover the fundamental ideas that economics has to offer as well as the power and relevance of micro economics to engineering profession.
CO2: Ability to analyze economics analysis that address the economic problem of how to allocate scarce resources among unlimited wants.
CO3: Ability to analyze the practical needs of the engineer towards making informed financial decisions in an engineering project.
CO4: Ability to evaluate the concept the concept of Time Value of Money.

References

1. William A. McEachern (2005). McEachern's Economics: A Contemporary Introduction. 7th Edition.
2. Chan S. Park. (2002). Contemporary Engineering Economics. 3rd Edition. Prentice Hall. New Jersey.
3. Pindyck Rubinfield. (2008). Micro Economics. 6th Edition. Prentice Hall, New Jersey.
4. Blank Tarquin (2005). Engineering Economy. 6th Edition. McGraw-Hill

EET333/3
Engineering Team Project

Course Synopsis

This course introduces the small-scaled research project that inclined towards engineering designing is necessary for each third year student. The student will be given an engineering problem (or encourage to identify on their own) and gain expertise by problem solving, investigation, research writing and effective presentation of the research outcome in the form of report and seminar.

Course Outcomes

CO1: Ability to combine engineering knowledge and solve engineering design problem in team work
CO2: Ability to design a proper process to produce creative and innovative solution.
CO3: Ability to demonstrate effective communication, report writing, presentation and entrepreneur skill.

References

Related journals, proceedings and papers in electrical and electronic engineering 2007 onward.

EET411/3
Power System Operation & Control

Course Synopsis

This course aims to provide further understanding of the fundamentals of power system operation and control. It mainly focuses on various aspects of electrical power generation such as energy source and transfer, power plant operation and characteristics, economical and optimal power generation, power system control and optimal power flow, unit commitment, interconnected power system and HVDC system.

Course Outcomes

CO1: Ability to describe, calculate and analyze energy generation, power system behavior and economics of generating costs.
CO2: Ability to calculate and analyze the optimal dispatch with transmission losses, unit commitment in thermal power plant and design power system control.
CO3: Ability to calculate and analyze interconnection system, operation of generators in parallel with large power system and Tie-line interchange between interconnected utilities.
CO4: Ability to describebasic principle of security studies, sensitivity factors and sensitivity methods.
CO5: Ability todescribe, calculate and analyze the basic principles of the HVDC System.

References

1. Saadat, H.(1999). Power System Analysis. Singapore. McGraw-Hill.
2. J.J Grainger, W.D. Stevenson. (1994). Power System Analysis. McGraw-Hill
3. Wood A.J. Wolleenberger, B.D.(1996). Power System Operation, Generation and Control. 2nd Edition. John Wiley and Sons.
4. Miller, R.H., Malinowski, J.H.(1994). Power System Operation. Singapore: McGraw-Hill.
5. B.M. Weedy& B.J. Cory. Electric Power System. John Wiley & Sons. 4th Edition.

EET412/3
Electrical Machine Design

Course Synopsis

Basically this Electrical Machine Design course consist introduction about magnetic material, magnetic circuit, heating and cooling of electrical Machine and study about transformer design and continue with general test of the characteristic of Transformer, and the end of this topic is analysis the performance of transformer . The courses continue with study about design of rotating electrical machine and general test of the characteristic, and analysis the performance of rotating electrical machine. The end of this subject topic the student also will study about simulation of electromagnetic using FEM. To increases the understanding of electrical machine design sample case also available in this subject. The student also being exposed to practical intensive lab throughout the course.

Course Outcomes

CO1: Ability to analyze magnetic material that used to design electrical machine and magnetic circuit of electrical machine
CO2: Ability to analyze the performance, design winding and core of transformer
CO3: Ability to analyze the performance, design winding and core of rotating electrical machine

References

1. Juha Pyrhonen, Tapani Jokinen, Valeria Hrabovcova. (2008). Design of rotating electrical machines. John Wiley & Sons.
2. S.V.Kulkarni, S.A. Khaparde. (2004). Transformer Engineering Design and Practical. Marcel Dekker Inc.
3. Philip Beckley. (2002). Electrical Steels for rotating machine. The institution of Electrical Engineers. ISBN 0 85296 980 5.
4. Indrajit Dasgupta. (2002). Design of Transformer. Tata McGraw-Hill Publishing Com. Lmt.
5. Jimmie J. Cathey. (2001). Electric Machines, Analysis and Design applying Matlab. McGraw-Hill Publishing Com. Lmt.

EET414/3
Substation Design

Course Synopsis

This course, to introduce aspects of the fundamentals and considerations of substation design, configuration and design of busbar and safety requirement. This course describe the functions of various substation main equipments, substation auxliary included protection design against internal and external fault. The students also learn how to measure soil resistivity and resistance grounding, substation grounding design, furthermore calculation of the ground grid substation. Latter in this course, students will learn and practice how to test and to do maintenance of the substation equipment parts.

Course Outcomes

CO1: Ability to classify type of substation and explain fundamentals and considerations of substation design
CO2: Ability to describe operation, maintenance, selection and functionsof substation equipments part and ability to design simple busbar
CO3: Ability to measure resistivity and grounding resistance and ability to design and analysisground grid substation and safety requirement
CO4: Ability to identify and calculateparameters in protection system of substation equipments caused by internal and external faults.
CO5: Ability to calculate capacity and service area substation and explaintesting and commissioning method of substation equipments.

References

1. John McDonald. (2007). Electrical Power Substations Engineering. 2nd Ed. CRC Press.
2. Rao, S. (2003). Electrical Substation Engineering & Practice. Khana Publishers, New Delhi.
3. Colin Bayliss. (2002). Transmission and Distribution electrical engineering. Newness, Great Britain.
4. Garzon Ruben D. (2002). High Voltage Circuit Breaker. Marcel Decker Inc, USA.
5. H. Lee Willis. (2000). Power Distribution Planing. Dekker/CRC Press.

EET416/3
Electrical Drives

Course Synopsis

This course provides the student an exposure application of Power Electronics for electric motor drives. It emphasize on fundamental concepts of power electronic drives, electrical machines types and related applications. The aspects of load characteristic and matching drives to load also discussed.

Course Outcomes

CO1: Ability to differentiate and explain type of motor loads and drive requirements
CO2: Ability to justify and analyse power electronic drives parameters based on load characteristics.
CO3: Ability to explain and calculate converters parameters for power electronic drives.
CO4: Ability to design and recommend appropriate power electronic drives parameters in electrical machines application.

References

1. Wildi Theodore. (2006). Electrical Machines, Drives, and Power Systems. Pearson-Prentice Hall. New Jersey.
2. Muhammad H. Rashid. (2004). Power Electronics: Circuits, Devices and Application. Second Edition. Prentice Hall International Inc. New Jersey.
3. Gopal K. Dubey. (2001). Fundamentals of Electrical Drives. 2nd Ed. Alpha Science. Kanpur.
4. El-Sharkawi A. Mohamed. (2000). Fundamentals of Electric Drives. A division of Thomson Learning. USA.
5. Vedam Subrahmanyam. (1994). Electric Drives: Concepts and Applications. Tata McGraw-Hill.

EET417/3
High Voltage Engineering

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, 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

CO1: Ability to analyze the various breakdown mechanism and applications of vacuum, liquid, solid and composite dielectrics
CO2: Ability to design and evaluate generations and measurements of high voltage AC, DC and impulse generator
CO3: Ability to analyze the over-voltage phenomena, insulation coordination in power system, types of high voltage testing for electrical apparatus and non-destructive testing of materials

References

1. M.S. Naidu & V. Kamaraju. (2009) 'High Voltage Engineering', 4th ed., Tata McGrawHill.
2. C.L. Wadhwa. (2007). 'High Voltage Engineering'. New Age International.
3. Subir Ray. (2004). 'An Introduction to High Voltage Engineering', Prentice-Hall of India.
4. E. Kuffel, W.S. Zaengl, J. Kuffel. (2000). 'High Voltage Engineering: Fundamentals', 2nd ed., Newness.
5. M.E. Khalifa. (2000). 'High Voltage Enfineering: Theory and Practice'. 2nd ed. Marcel Dekker Inc.

EET418/3
Power Quality

Course Synopsis

This course covers topics power quality in power system. The student is exposed to some problem in power system such as voltage sags, transient and harmonics. This courses will also covering mitigation or preventive method in power quality issue.

Course Outcomes

CO1: Ability to explain power quality disturbances and typical problems associated with power quality disturbances.
CO2: Ability to solve problems on harmonic distortion on electrical power systems.
CO3: Ability to design basic filters to reduce harmonic distortion.
CO4 : Ability to explain the typical equipment that either causes or is susceptible to electrical power quality disturbances.

EET422/3
Electromagnetic Compatibility (EMC) and Compliance Engineering

Course Synopsis

Electromagnetic Compatibility (EMC) is an essential part of good product design to ensure compliance with International Regulations and Directives. EET422 (Electromagnetic Compatibility (EMC) and Compliance Engineering) provides an awareness of the directives that manufacturers need to consider for compliant products. EET422 introduces the fundamentals of EMC concepts, circuit design methods, PCB and system layout techniques and the tools available to design compliant products. EET 422 includes EMC test and measurement methods and knowledge of commercial EMC test equipment to enhance diagnostic skills and provide EMC solutions.

Course Outcomes

CO1: Ability to demonstrate the importance of EMC directives, EMC related directives and routes to compliance.

CO2: Ability to discuss and examine an understanding of EMC basics, including interference sources, effects and solutions, common mode and differential mode interference.

CO3: Ability to differentiate EMI solution methods including filters, shielding and grounding, and able to create analytic solutions to compliance requirements.

CO4: Ability to classify EMI sources and propose solutions on practical applications including Power Electronic, analogue and digital systems.

CO5: Ability to explain and discuss EMI compliance testing procedure and able to distinguish essential test equipments including voltage sources, LISN and analyzers.

References

1. M. I. Montrose: E. M. Nakauchi. (2004). Testing for EMC Compliance: Approaches and Techniques. IEEE.
2. T. Williams. (2001). EMC for Product Designers. 3rd Ed. Newnes.
3. T. Williams K. Armstrong. (2000). EMC for Systems and Installations. Newnes.
4. D. Lohbeck, 'CE Marking. (1998). Newnes.
5. Laszlo Tihanyi. (1995). Electromagnetic Compatibility in Power Electronics. Elsevier Science.

EET424/3
Power Electronics for Energy System

Course Synopsis

This course gives a detail exposure to the students on the application of power electronics for energy system. In part 1, an introduction of power quality problems that caused by the use of power electronics. Part 2 concentrate on power electronic inverter and waveform shaping techniques used in a typical energy system. Subsequently, in part 3, an introduction of uninterruptile power supplies (UPS) as one of the mitigation devices to solve power quality problems. Part 4 focus on sustainable energy system; i.e. solar energy system and energy management.

Course Outcomes

CO1: Ability explain power quality problems and differentiate their mitigation devices

CO2: Ability to analyze and evaluate inverter topologies and their performances through theoretical and simulation

CO3: Ability to analyze and evaluate the significance of sustainable energy

References

1. Ewald F. Fuchs, Mohammad A. S. Masoum. (2008). Power quality in power systems and electrical machines. Academic Press/ Elsevier.
2. M. H. Rashid. (2007). Power Electronics Handbook: Devices, Circuits, and Applications - Engineering Series Academic Press Series in Engineering. Academic Press.
3. G. N. Tiwari and M K Ghosal. (2005). Renewable Energy Resources. Alpha Science.
4. M. H. Rashid. (2004). Power Electronics: Circuit, Devices and Applications. Prentice Hall.

5. Barry W. Kennedy. (2000). Power Quality Primer. McGraw-Hill.

EET426/3
Power Electronics II

Course Synopsis

Efficient Power Management Systems are essential for the proper operation of all modern electronic systems. EET423 provides an in depth study of Switched Mode Power Supplies (SMPS) and includes topology variations, operational modes and control strategies, performance analysis including the effects of parasitic elements and waveform analysis. Design aspects include understanding manufacturer's data, co-relating data to select power semiconductors and passive components, thermal management and EMC compliance.

Course Outcomes

CO1: Ability to explain and classify the Topologies, parameters of related components and thermal management in SMPS.

CO2: Ability to interpret and analyze the rectification techniques, SMPS waveforms, SMPS control strategies and modes control.

CO3: Ability to use related software tools to simulate SMPS Topologies and to determine and analyze device performance.

References

1. Pressman, Billings & Morey. (2009). Switching Power Supply Design. 3rd Ed. McGraw Hill
2. S. Maniktala. (2006). Switching Power Supplies A to Z. Elsevier Newnes.
3. Muhammad H. Rashid. (2004). Power Electronics: Circuits, Devices &Applications',.3rd Ed. Pearson: Prentice-Hall.
4. Mohan, Undeland, Robbins. (2003). Power Electronics: Converters, Applications & Design. 3rd Ed. John Wiley
5. Erickson R.W., Maksimovic D. (2001). Fundamentals of Power Electronics. 2nd Ed. Springer.

EET427/3
Industrial Electronics Control

Course Synopsis

This course will have a wide explosure about industrial electronics control to the students. The course will be coverege of components, circuits, instruments, equipments and control technique used in industrial automatic systems. At beginning of this couse the topics will be covered are basic principle of industrial electronics control and interfacing devices. The interfacing devices will give wide explosure to the student regarding of operational amplifiers, signal processors, opto-electronic interface devices, transducers, detection sensors, actuator, digital to analog converter and analog to digital converter. The next part of this course will coverage the design of controller, proportional controll, proportional integral control, proportional integral derivative control, presure control and temperature control. The servo and stepper motor control design that used in a variety of industrial automation application are also covered in this course. Typical applications of these motors are rotary table control, pen positioning and precise position controll will be studied in this course. The student will be expose to programmable logic controler (PLC), PLC components, PLC programming and operational procedure. The PLC capable to perform more complex motion and process control applications.

Course Outcomes

CO1: Ability to explain And calculate Operational amplifiers, opto-electronic, signal processor, interfacing devices, transducers, detection sensors and actuator in industrial electronic control applications.

CO2: Ability to explain and calculate digital and analog controller, temperature control, flow control and its relation to industrial electronic control applications.

CO3: Ability to explain, analyze and design motor controller for industrial electronic control applications.

CO4: Ability to explain and design ladder diagram that will perform a specified operation using PLC programming in applications of industrial electronic control.

References

1. Kissell Thomas. (2008). Industrial Electronics: Applications for Programmable Controllers, Instrumentation and Process Control, And Electrical Machines And Motor Controls. Prentice-hall Of India Pvt Ltd
2. Terry Bartelt. (2006). Industrial Control Electronics; Devices, Systems and Application. 3rd Ed. Thomson Delmar Learning.
3. Frank Petruzella. (2005). Programmable Logic Controllers. 3rd Ed. Amazon.
4. Jacob, M,. (1995). Industrial Control Electronics. Prentice Hall. Singapore.
5. Webb, J. Greshock, K. (1993). Industrial Control Electronics. 2nd Ed. Prentice Hall

EET428/3
Power Electronics Drives

Course Synopsis

This course provides the student an exposure application of Power Electronics for electric motor drives. It emphasize on fundamental concepts of power electronic drives, electrical machines types and related applications. The aspects of load characteristic and matching drives to load also discussed.

Course Outcomes

CO1: Ability to differentiate and explain type of motor loads and drive requirements.
CO2: Ability to justify and analyze power electronic drives parameters based on load characteristics.
CO3: Ability to explain and calculateconverters parameters for power electronic drives.
CO4: Ability to design and recommendappropriate power electronic drives parameters in electrical machines application.

References

1. Wildi Theodore. (2006). Electrical Machines, Drives, and Power Systems. Pearson-Prentice Hall. New Jersey
2. Muhammad H. Rashid. (2004). Power Electronics: Circuits, Devices and Application. Second Edition. Prentice Hall International Inc. New Jersey
3. Gopal K.Dubey. (2001). Fundamentals of Electrical Drives. 2nd Ed. Alpha Science, . Kanpur
4. El-Sharkawi A. Mohamed. (2000). Fundamentals of Electric Drives', A division of Thomson Learning. USA
5. Vedam Subrahmanyam. (1994). Electric Drives: Concepts and Applications. Tata McGraw-Hill

EET431/3
Electrical Energy System

Course Synopsis

To introduce students to the energy sources technology and develop understanding of a number of different types of energy sources whose outputs are suitable for conversion into electrical power generation.

References

1. El-Hawary, M. E. (2007). Electrical Energy Systems. 2nd Ed. Taylor & Francis.
2. George G. Karady and Keith E. Holbert. (2005). Electrical Energy Conversion and Transport-An Interactive Computer-Based Approach. John Wiley.
3. Gilbert M. Masters. (2005). Renewable and Efficient Electric Power Systems. John Wiley & Sons.
4. G. N. Tiwari and M. K Ghosal. (2005). Renewable energy resources: basic principles and applications. Alpha Science International.
5. Stanislaw Sieniutycz and Alexis de Vos. (2000). Thermodynamics of Energy Conversion and Transport. Springer.

EET432/3
Electrical Energy Utilization

Course Synopsis

To introduce students to the energy efficiency and conservation in order to reduce energy costs and promote economic and environmental sustainability.

References

1. Joel N. Swisher, Gilberto de Martino Jannuzi, and Robert Y. Redlinger. Tools and methods for Integrated Resource Planning: Improving Energy efficiency and protecting the Environment. UNEP Collaborating Centre on Energy and Environment.
2. Wayne C. Turner and Steve Doty. (2009). Energy Management Handbook. 7th Ed. Fairmont Press Inc.
3. Frank Kreith and D. Yogi Goswami. (2008). Energy Management and Conservation Handbook. CRC Press.
4. Gilbert M. Masters. (2004). Renewable and Efficient Electric Power Systems. John Wiley and Sons.
5. Bary W. Kennedy. (2000). Power Quality Primer. McGraw Hill.

EET433/3
Renewable Energy System

Course Synopsis

This course consists of design basic system for integration of renewable generation into electricity and calculates the potential energy for different renewable technologies. This course also introduce students with the relevant conversion, storage, network interfacing and economic assessment techniques for renewable energy systems.

References

1. B. K. Hodge. (2009). Alternative Energy Systems. John Wiley & Sons.
2. John Twidell and Anthony D. Weir. (2006). Renewable Energy Resources. Taylor & Francis.
3. G. N. Tiwari and M. K Ghosal. (2005). Renewable energy resources: basic principles and applications. Alpha Science International.
4. Godfrey Boyle. (2004). Renewable Energy: Power for a Sustainable Future. Oxford University Press. Oxford.
5. Gilbert M. Masters. (2004). Renewable and Efficient Electric Power Systems. John Wiley & Sons.

EET445/2
Final Year Project I

Course Synopsis

Small-scaled research project that inclined towards designing is necessary for each final-year student. The student will be given an engineering problem (or encourage to identify on their own) and gain expertise by problem solving, investigation, research writing and effective presentation of the research outcome in the form of thesis and seminar. The area of research is mainly on Power Electronics, High Voltage, Electrical Power System & Machine Design.

EET446/4
Final Year Project II

Course Synopsis

Small-scaled research project that inclined towards designing is necessary for each final-year student. The student will be given an engineering problem (or encourage to identify on their own) and gain expertise by problem solving, investigation, research writing and effective presentation of the research outcome in the form of thesis and seminar. The area of research is mainly on Power Electronics, High Voltage, Electrical Power System & Machine Design.

Career Opportunities

Electrical System Engineering, Industrial Electronicsand Electrical Energy Systems graduates will have wide range of career prospects. Electrical engineers are always at demand to the industrial/private sectors, government sectors or entities and agencies that are related to the electrical system design.

Areas that need of electrical engineers are:

- Electrical/Electronics product manufacturers
- Tenaga Nasional Berhad (TNB)
- Independent Power Plant (IPP)
- Telekom Malaysia Berhad
- Angkatan Tentera Malaysia
- Jabatan Kerja Raya
- Consultants or contractors
- Education and training (universities, polytechnics and colleges)

School of Manufacturing Engineering

Programmes Offered

- Diploma in Engineering (Manufacturing)
- Bachelor of Engineering (Hons.) (Manufacturing Engineering)
- Bachelor of Engineering (Hons.) (Product Design Engineering)
- Bachelor of Mechanical Engineering Technology (Honours) (Machining)
- Bachelor of Mechanical Engineering Technology (Honours) (Product Development)
- Master of Science (Manufacturing Engineering)
- Master of Science (Product Design Engineering)
- Master of Science (Manufacturing System) Mixed Mode
- Doctor of Philosophy (Manufacturing Engineering)

Address

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Introduction

Initially, the School of Manufacturing, also known as PPKP was established with the name of the School of Manufacturing System Engineering or in short form of PPKSP on March 1, 2003. The school's new name was then proposed to School of Manufacturing and it has been approved officially by the Ministry of Higher Education dated October 30, 2004. Among the major justification for the changing the name of the school was due to the manufacturing engineering field is larger than the manufacturing systems engineering, or in other words, engineering manufacturing system is one aspect in the field of manufacturing engineering itself.

At its inception, the School of Manufacturing commenced its operation in the location of the School Complex, located at Kubang Gajah, Arau. Starting in 2004, School of Manufacturing was moved to a new location located at the Jejawi Enginnering Complex along with six other schools. Then, once again this school was moved to new location in Seberang Ramai, Kuala Perlis on 1 November 2007. Among the main factors for the second move was to accommodate the needs of the rooms for the increasing number of the academic staff, and also to facilitate communication between the non-academic staff, academic staff and students as the majority of students are placed in residential colleges around Kuala Perlis.

In line with the development of a more rapidly growing industry and a key contributor to economic growth in Malaysia, the School of Manufacturing so far has offered two programs of study at Bachelor level, namely Bachelor of Engineering (Manufacturing) and Bachelor of Engineering (Product Design).

In general, the structure of the manufacturing engineering curriculum is designed to create a balance between technical specialization and industrial management. The entire core courses are offered in order to expose students to the important aspects of the manufacturing industry particularly to the methods for the production and an exposure to manufacturing technology. Manufacturing technologies focus on the selection of appropriate technology in the manufacturing process, taking into account several important factors such as the use of appropriate machines and the optimum process in accordance with the set standard.

Apart from that, the structure of product design engineering curriculum has been designed to create a balance between functionality and aesthetic aspects of design. The entire core courses are offered to expose students to the industry, especially the production of the design product is coordinated with the leading branded products in the world as well as an exposure the students to the manufacturing technology. Designs require the skills to create and produce consumer products by using the technology available in industrial design. An application of aesthetic values is also important to allow the product to be marketed globally.

For the Bachelor program, the number of credits needed to be completed prior the graduation requirement is 135 units of credit, where 120 unit credits include core courses, while the remaining 15 credit units of courses include the University requirements. In addition, final year students also need to carry out projects which are related to education programs, in line with current industry requirements.

No less important, students are also required to carry out industrial training during the semester break before entering the fourth year of study. Students will be issued to undergo industrial training in the industries associated with the program of study offered. The main objective of these industrial training courses is required to complete the prospective graduates with the necessary technical knowledge in the real world of work in selected industries, when students were eligible for graduation.

In addition, the School of Manufacturing also offers a Diploma in Engineering (Manufacturing), Bachelor of Science (Manufacturing), Bachelor of Science (Product Design) and Doctor of Philosophy (Manufacturing). In principle, the school was founded with the goal of making the public to produce engineers who are not only skilled in specialized areas such as technical design and manufacturing, but also equipped with soft skills, entrepreneurship, languages, technology and information technology.

Staff Directory

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Deputy Dean (Student Development and Alumni Affairs)
Dr. Rosmaini Ahmad
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Chairperson of Degree Programme (Manufacturing Engineering)
En. Zailani Zainal Abidin
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Chairperson of Degree Programme (Product Design Engineering)
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Bachelor Of Engineering (Honours) (Manufacturing Engineering)

Programme Objectives (PEO)

PEO 01
Graduates who are leaders in the field of Manufacturing Engineering or chosen field as demonstrated via career advancement.

PEO 02
Graduates who are members of and contribute to professional society.

PEO 03
Graduates who engage in life-long learning or continuous education opportunities.

PEO 04
Graduates who contribute towards research and development.

PEO 05
Graduates who are entrepreneurial engineers.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in Manufacturing Engineering discipline to solve the complex engineering problems.

PO 02
Ability to identify, formulate and solve complex engineering problems.

PO 03
Ability to design solutions for complex engineering problems and systems, components or processes to meet desired needs.

PO 04
Ability to conduct investigation into complex problems as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for complex engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to understand entrepreneurship, the process of innovation and the need for environment and sustainable development.

PO 08
Ability to understand the professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large.

PO 11
A recognition of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles.

Curriculum Structure 2013/2014

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YEAR	FIRST		SECOND			THIRD			FOUTH	
SEMESTER	I	II	III	IV		V	VI		VII	VIII
Engineering Core (97)	EPT103/3 Materials	EPT161/3 Electrical Technology	EPT241/3 Solid Mechanics I	EPT228/3 Fluid Mechanics I		EPT335/3 Applied Thermodynamics	EPT315/3 Machine Components Design	EIT300/6 Industrial Training	EPT445/2 Final Year Project	EPT446/4 Final Year Project
	EPT152/2 Engineering Drawing	EPT114/3 Statics	EPT212/3 Dynamics	EPT235/3 Thermodynamics		EPT341/3 Solid Mechanics II	EPT324/2 Heat Transfer		EPT463/3 Automatic Control	EPT415/3 Vibration
	EPT162/2 Computer Programming	EPT181/2 CAD/CAM	EPT261/3 Electronics	EPT281/3 Industrial Engineering		EPT383/3 Automation and Robotics	EPT364/3 Mechatrinics		EPT427/3 Pneumatics & Hydraulics System Design	EPT495/2 Operational Research
		EPT182/3 Manufacturing Process I	EPT282/3 Manufacturing Process II			EPT385/3 Metrology and Quality Control	EPT329/3 Fluid Mechanics II		EPT448/3 Product Design Integrated Project	EPT4XX/3 Elective
		EPT183/2 Engineering Workshop				EPT384/3 Advanced Manufacturing Technology	EPT395/3 Engineering Product Design III			
						EPT371/2 Finite Element Analysis				
Non Engineering (23)	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT203/3 Engineering Mathematics III	EQT271/3 Engineering Statistics					EUT443/2 Engineering Management	EUT440/3 Engineers in Society
		UUT122/2 Skills and Technology in Communication								
University Required (17)	UUW233/2 Islamic & Asian Civilisations & UUW114/2 University Malay Language & UUW235/2 Ethnic Relations & UUWXXX/3 Co-Curriculum Subjects		UUW212/2 University English	EUW224/2 Engineering Entrepreneurship & UUWXXX/2 Option Subjects			EUW322/2 Thinking Skills			
137	19	18	17	16		17	16	4	13	15
Total Units for Graduation 137										

School of Manufacturing Engineering

Bachelor Of Engineering (Honours) (Product Design Engineering)

Programme Objectives (PEO)

PEO 01
Graduates who are leaders in the field of Product Design Engineering or chosen field as demonstrated via career advancement.

PEO 02
Graduates who are members of and contribute to professional society.

PEO 03
Graduates who engage in life-long learning or continuous education opportunities.

PEO 04
Graduates who contribute towards research and development.

PEO 05
Graduates who are entrepreneurial engineers.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in Product Design Engineering discipline to solve the complex engineering problems.

PO 02
Ability to identify, formulate and solve complex engineering problems.

PO 03
Ability to design solutions for complex engineering problems and systems, components or processes to meet desired needs.

PO 04
Ability to conduct investigation into complex problems as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for complex engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to understand entrepreneurship, the process of innovation and the need for environment and sustainable development.

PO 08
Ability to understand the professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large.

PO 11
A recognition of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles.

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Product Design Engineering)

YEAR	FIRST		SECOND		THIRD			FOUTH	
SEMESTER	**I**	**II**	**III**	**IV**	**V**	**VI**		**VII**	**VIII**
Engineering Core (97)	EPT103/3 Materials	EPT161/3 Electrical Technology	EPT241/3 Solid Mechanics I	EPT228/3 Fluid Mechanics I	EPT335/3 Applied Thermodynamics	EPT312/3 Vibration and Mechanics of Machines	EIT300/6 Industrial Training	EPT445/2 Final Year Project	EPT446/4 Final Year Project
	EPT152/2 Engineering Drawing	EPT114/3 Statics	EPT212/3 Dynamics	EPT235/3 Thermodynamics	EPT341/3 Solid Mechanics II	EPT315/3 Machine Components Design		EPT412/3 Mechanical System Design	EPT481/3 Tools and Die Design
	EPT191/2 Workshop & Studio Practice	EPT184/3 Manufacturing Technology	EPT261/3 Electronics	EPT262/2 Measurement & Instrumentation System	EPT314/3/3 Machine Mechanism	EPT386/3 Design for Manufacture		EPT447/3 Manufacturing Integrated Project	EPT495/2 Operational Research
		EPT192/3 Product Innovation	EPT283/2 Computer Aided Design	EPT293/3 Engineering Product Design I	EPT393/3 Engineering Product Design II	EPT361/4 Instrumentation and Control		EPT484/2 Lean Manufacturing	EPT4XX/3 Elective
					EPT394/3 Product Ergonomic & Safety	EPT324/2 Heat Transfer		EPT485/2 Production Planning and Control	
					EPT371/2 Finite Element Analysis				
Non Engineering (23)	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT203/3 Engineering Mathematics III	EQT271/3 Engineering Statistics					
	EPT162/2 Computer Programming	UUT122/2 Skills and Technology in Communication						EUT443/2 Engineering Management	EUT440/3 Engineers in Society
University Required (17)	UUW233/2 Islamic & Asian Civilisations & UUW114/2 University Malay Language & UUW235/2 Ethnic Relations	UUWXXX/3 Co-Curriculum Subjects	UUW212/2 University English	UUW224/2 Engineering Entrepreneurship & UUWXXX/2 Option Subjects		EUW322/2 Thinking Skills			
137	18	20	16	18	17	16	4	13	15
Total Units for Graduation 137									

Course Syllabus

EPT 103/3
Materials

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 advance materials.

References

1. William F. Smith, Javad Hashemi, 2006, Foundation of Materials Science and Engineering, Fourth edition, McGraw Hill.
2. William D. Callister, Introduction to Materials, John-Wiley & Sons.
3. Budinski, K.G, 2006, Engineering Materials Properties and Selection, 8th edition, Prentice Hall.
4. Shackeford, J.F, 2005, Introduction to Materials Science for Engineers,6th edition, Prentice Hall.
5. Mars G. Fontana, 1986, Corrosion Engineering, Third edition, McGraw Hill.

EPT 152/2
Engineering Drawing

Course Synopsis

This course introduces fundamental of engineering drawing, engineering graphic as language, basic drafting skill, applied geometry, shape description, basic dimensioning, tolerance, detail and assembly drawing based on BS308 part 1 and part 2.

References

1. Jensen C., Helsel J D., Short D R., 2007, Engineering Drawing & Design. 7th ed. Mc-Graw Hill.
2. Jensen C., Helsel J D., 1996. Fundamentals of Engineering Drawing. 4th ed. Mc-Graw Hill.
3. Kirkpatrick J M., 2003. Basic Drafting Using Pencil Sketches and AutoCAD. Prentice Hall.
4. Luzzader W. J., Duff J. M., 1993. Fundamentals of Engineering Drawing With an Introduction to Interactive Computer Graphics for Design and Production. 11th ed. Prentice Hall International.
5. Goetsch D L., Chalk W.S., Nelson J.A. Rickman R.L., 2005. Technical Drawing. 5th ed. Thomson Delmar Learning.

EPT 181/2
CAD/CAM

Course Synopsis

This course introduces the principles and application of CAD/CAM systems. It enables students to understand the theory, concept, and application of CAD/CAM as used in the industry. Students will use CAD software to illustrate parts, and CAM software to convert CAD files into numerical control (NC) codes.

References

1. P.N. Rao. *CAD/CAM Principles and Applications*. 2nd Edition.McGraw Hill. (2004)
2. Ibrahim Zeid. *Mastering CAD/ CAM*. 1st Edition. McGraw Hill International Edition. (2004)
3. Farid M. Amirouche. *Principles of Computer Aided Design and Manufacturing*. 2nd Edition. Prentice Hall. (2003)
4. Chris McMahon, Jimmie Browne. *CADCAM: From Principles to Practice*. Addison Wesley Publication. (1993)
5. Chris McMahon, Jimmie Browne.. *CADCAM : Principles, Practice and Manufacturing Management*. 2nd Edition. Prentice Hall. (1999)

EPT 182/3
Manufacturing Process I

Course Synopsis

This course introduces students to the knowledge, understanding and synthesis of the basic processes in manufacturing such as metal-casting processes, forming & shaping processes, and joining processes. In the beginning of the course, the fundamental of materials will be given, before they learn the processes in manufacturing. Students will undergo practical sessions in the workshop/lab to help in a better understanding of the subject matter.

References

1. Groover M.P., 2004. *Fundamentals of Morden Manufacturing: Materials, Processes and Systems*. Prentice Hall.

2. Kalpakjian S., 2001. *Manufacturing Engineering an Technology*, 5th Ed. Addision Wesley.
3. Schey J.A. 2000. *Introduction to Manufacturing Process*. 3rd Ed. MC Graw Hill.
4. Bruce R.G. et al. 2003. *Modern Materials & Manufacturing Process*. 3rd Ed. Prentice Hall.
5. Serope Kalpakjian, Steven R. Schmid. *Manufacturing Processes For Engineering Materials,* Fifth Edition, Pearson Education, 2009

EPT 183/2
Engineering Workshop

Course Synopsis

In the first part of this course, safeties aspects in the workshop will be covered, followed by fundamental measurement techniques, and use of measuring equipment such as vernier calliper, micrometer, etc., Then, various basic cutting processes, e.g. filing, chiselling, sawing, etc. will be covered. Students will be introduced to fabrication, sheet metal forming, and welding, which consists of introduction to basic knowledge of various cutting methods and hand tools, such as file, hacksaw, chisel, etc. The practices or lab sessions consist of explanations on safety practices in the workshop, fitting work, sheet metal forming, and welding processes.

The second part of the course introduces the fundamentals of measurement techniques followed by milling, lathe and grinding operations which consist of introduction to basic knowledge of various cutting tools, parts of machines and their functions, machine operations, and numerous calculations involving the operations. Students will practice conventional machining process used in the industry to transform raw material to finished products. Practical work will help student's gain effective understanding.

References

1. Steve F. Krar, Arthur R.Gill, Peter Smid. *Technology of Machine Tools*. 6th ed. McGraw Hill, 2007.
2. S. Kalpakjian, S.R. Schmid (2001). *Manufacturing Engineering and Technology*. 4th ed. Prentice Hall International.
3. Mikell P. Groover (2007), *Fundamentals of Modern Manufacturing.* 3rd ed. John Wiley & Sons, Inc.
4. E. Paul DeGarmo, J T. Black, Ronald A. Kohser (1997). *Materials and Processes in Manufacturing*. 8th ed., John Wiley & Sons, Inc.
5. *Manufacturing Engineering And Technology*, Fifth Edition, Serope Kalpakjian, Steven R. Schmid, Prentice Hall, 2005

EPT 191/2
Workshop and Studio Practice

Course Synopsis

This course will expose the student in practicality and developing skills regarding design processes and model/ prototype fabrication. Hence, topics will be focusing to product sketching techniques and model/prototype fabrication. Through the assignment given, the knowledge and skills that need by a product designer will be developing. Furthermore, this course will expose the student by studio/ workshop sessions through product design assignments which emphasis on creative thinking and the production of visual in the context of design. The student will be expose trough design assignment about the concepts and methods in designing; elements of good quality product; included concepts sketching and presentation drawing; model making; understanding of engineering drawing and design documentation.

References

1. Serope Kalpakjian, Steven R. Schmid 2006. Manufacturing Engineering and Technology - 5th Edition in SI Units, Prentice-Hall.
2. John A. Schey, 2000. Introduction to Manufacturing Processes,3rd Edition, McGraw-Hill.
3. Risatti, Howord and Trapp, Kenneth R 2007. A Theory of Craft: Function and Aesthetic Expression, Kindle Edition.
4. Arie Walllert, erma Hermens, Maria F.J. Historical Painting Techniques, Materials, and Studio Practice Practice: Preprints of a Symposium, University of Leiden, the Netherlands, 26-29 June 1995 Peek Getty Publications.
5. Groover M.P., 2004. Fundamentals of Morden Manufacturing: Materials, Processes and Systems. Prentice Hall.

EPT 162/2
Computer Programming

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, User Friendly Interface and their application on solving engineering problems. C programming language is utilized in this course.

References

1. H. H. Tan and T. B. D'Orazio, 1999. C Programming for Engineering & Computer Science, McGraw-Hill.
2. Behrouz A. Forouzan and Richard F, Gilberg, 2001. Computer Science A Structured Programming Approach Using C, Second Edition, Brooks/Cole.
3. Jeri R. Hanly and Elliot B. Koffman, 2002. Problem Solving & Program Design in C, 3rd Edition, Addison Wesley.
4. Elice E. Fischer, David W. Eggert and Stephen M. Ross, 2001. Applied C: An Introduction and More, McGraw-Hill.
5. Harry H. Cheng, 2010. C for Engineers and Scientists: An Interpretive Approach, McGraw Hill.

EPT 161/3
Electrical Technology

Course Synopsis

This course is intended to provide students with clear understanding the concepts and principles of the DC and 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 chapter, the students will understand the principles of DC Machines and three phase induction motors and do some basic calculation of losses and efficiency of DC Machines.

References

1. Edward Hughes, Electrical and Electronic Technology. 8th Edition, Prentice Hall, 2002.
2. Stephen J. Chapman, "*Electric Machinery Fundamentals*", 4th Edition, McGraw Hill, 2005.
3. Charles K. Alexander & Matthew Sadiku, "*Fundamentals of Electric Circuits*", International Edu., McGraw Hill, 2001.
4. V.K. Mehta, Principles of Electrical Engineering and Electronics.S.Chand 1996.
5. Eugene C. Lister and Robert J. Ruch, Electric Circuits and Machines. 7th Edition, McGraw-Hill 2000.

EPT114/3
Statics

Course Synopsis

This course introduces introduction to mechanics, force vector, equilibrium of particle, force system resultants, equilibrium of rigid body, structural analysis, friction, centroids and center of gravity.

References

1. R.C. Hibbeler, 2004. Engineering Mechanics Statics SI Third Edition, Pearson Prentice-Hall, Inc.
2. R.C. Hibbeler and Peter Schiavone, 2004. Engineering Mechanics Statics – Statics Study Pack SI Third Edition, Pearson Prentice-Hall, Inc.
3. J. L. Meriam and L. Glenn Kraige, 2003. Engineering Mechanics, Statics Fifth Edition, John Wiley & Sons, Inc.
4. Ferdinand P. Beer, E. Rusell JohnsonJr and William E. Clausen, 2004. Vector Mechanics for Engineers Statics Seventh Edition. Mc-Graw Hill.
5. W. Riley, L. Sturges, D. Morris, 2007. Mechanics of Materials, John Wiley & Sons, Inc.

EPT 184/3
Manufacturing Technology

Course Synopsis

This course introduces students to industrial manufacturing technology used for converting raw materials into finished products. Various processes, machinery, and operations will be examined with emphasis placed on understanding engineering materials and processing parameters that influence design considerations, product quality and production costs.

References

1. Serope Kalpakjian, Steven R. Schmid 2006. Manufacturing Engineering and Technology - 5th Edition in SI Units, Prentice-Hall, Inc.
2. DeGarmo, Black and Kohser, 2006. Materials and Processes in Manufacturing. 9th Edition. Wiley, ISBN: 0-471-36679-X.

3. John A. Schey, 2000. Introduction to Manufacturing Processes, 3rd Edition, McGraw-Hill, Inc.
4. Schey, J.A. Introduction to Manufacturing Processes, 3rd Ed., Mc Graw Hill, 2000.
5. Bruce R.G. et al. 2003. *Modern Materials & Manufacturing Process.* 3rd Ed. Prentice Hall.

EPT 192/3
Product Innovation

Course Synopsis

This course starts with basic ideas about inventing which define what invention and innovation constitute. It then describes the differences between invention and non-invention criterion, areas, and invention types. In conjunction with technology, the innovation itself cannot be separated from some fundamental principles of technology such as energies and their forms, storage of energy and some general concepts that have been used over and over again in originating, developing and applying many devices and systems such as the area principles. This course also focuses on the invention process to produce novel design concepts and reverse engineering processes applied so as to improve current design concepts. As the course go on, topics on intellectual properties such as patents, trade mark, trade secret and copyright are discussed. These are important legislative documents to protect novel ideas. In addition, strategies on how to generate profits from the invention and innovation activities are covered. Presentation techniques and ethics are also studied using graphic software and materials such as panels and mock-up.

References

1. G. Kivenson, 1982, The Art and Science of Inventing, 2nd edition, Van Nostrand Reinhold.
2. M. Baxter, 1995, Product Design: Practical Methods for The Systematic Development of New Products, CRC Press.
3. P. Trott, 2002, Innovation Management and New Product Development, 2nd edition, Prentice Hall.
4. Wego Wang, 2010, Reverse Engineering: Technology of Reinvention, CRC Press.
5. M.Crawford, 2003,New Products Management, McGraw-Hill.
6. G.E. Dieter, 2000, Engineering Design, 3rd edition, McGraw Hill.
7. R.J. Eggert, 2005, Engineering Design, Prentice Hall.

EPT 241/3
Solid Mechanics I

Course Synopsis

This course covers deformation and internal forces that exist in a solid body when subjected to external loads. The concepts of stress, strain, and constitutive behaviors are discussed. Students are taught to solve problems of loading on solid bodies under axial, torsion, bending and buckling loading conditions. The concepts of principal stresses and strains are used to solve problems involving multi-directional loadings. Students use Mohr's Circle to solve the problems.

References

1. Hibbeler, R.C. 2005. *Mechanics of Materials*, 5th ed., Prentice Hall.
2. Raymond, Parnes. 2001. *Solid Mechanics in Engineering*, John Willey & Sons.
3. Madhukar, Vable. 2002. *Mechanics of Materials*, Oxford University Press.
4. Barber, J.R . 2001. *Intermediate Mechanics of Materials*, McGraw-Hill.
5. Pytel, Kiusalaas. 2001. *Mechanics of Materials*, 3rd ed., McGraw-Hill.

EPT 212/3
Dynamics

Course Synopsis

In this course, students use the concepts of mechanics in dynamic conditions. The 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, student learn the dynamics of a particle first, followed by topics in rigid-body dynamics in two and then three dimensions. Emphasis will be given on the kinematics and kinetics of a particle, planar kinematics and kinetics of a rigid body, three dimension kinematics and kinetics of a rigid body.

References

1. Beer, F. P. & Johnston E. R. 2003. *Engineering Mechanics- Dynamics*. 4th ed. John Wiley & Son.
2. Hibbler R. C., 2007. *Engineering Mechanics- Dynamics*, Prentice Hall.

3. Bedford A. & Fowler W., 2005. *Engineering Mechanics- Dynamics*, Addison Wesley Longman.
4. Meriam J.L. , Kraige L.G., 2007. *Engineering Mechanics, Dynamics*,
5. John Wiley.

6. Ginsberg. J., 2007. *Engineering Dynamics.* 3rd Ed. New York: Cambridge University Press.

EPT 261/3
Electronics

Course Synopsis

In this course, students learn about electronic devices which include analog and digital devices. In analog devices, the topics include introduction to semiconductor, PN junction, diodes, zener diodes, bipolar junction transistor (BJT) and operational amplifier. In digital devices, the topics include introduction to binary number system, Boolean Algebra, logic gates and logic circuits, Boolean function, combinational logic circuits, sequential logic circuit and counters. Students will be exposed to the basics of electronics, operation concept, and analysis methods including the usage of electronic devices in the industry.

References

1. Floyd, T.L., *Electronic Devices.* 7th ed. Prentice Hall, Inc, 2002.
2. Floyd, T.L., *Digital Fundamentals*, 8th ed. Prentice Hall, Inc, 2002.
3. Tocci, R.J. and, Widmer, N.S., *Digital Systems: Principles and Applications.* 8thed. Prentice Hall, 2001.
4. Knight, S.A.(1996). *Electronics for Engineers*. BH Newness.
5. Floyd, T.L. (1995). *Electronics Fundamentals, Circuits, Devices & Applications.* Prentice Hall.

EPT 281/3
Industrial Engineering

Course Synopsis

This course covers processes of design of industrial engineering systems, improvement and the installation of an integrated system of people, materials, equipment, information, energy and economics. It involves knowledge of mathematical and economical sciences with the principles and methods of engineering analysis. The main objective is to solve industrial engineering problems in order to increase labour and manufacturing productivity of industrial systems. Tools which make the most effecient solutions will be focused in this course. Other topics include structure of industrial systems, labour productivity, manufacturing productivity, industrial management and plant layout.

References

1. Kalpakjian S, Schmid S.R. *Manufacturing Engineering and Technology*, 4th ed., Prentice Hall Inc. 2001.
2. Manek N.J. *Industrial Engineering*, Laxmi Publications (P) LTD. 2002
3. Turner, W.C. et. al. *Introduction to Industrial and Systems Engineering*, 3rd.ed., Prentice Hall, 1993.
4. Roy, R.K. *Design of Experiments Using the Taguchi Approach Canada*: John Wiley & Sons, Inc. 2001.
5. Donna C. S. Summers. *Quality*,3rd ed.,Prentice Hall, 2003.

EPT 282/3
Manufacturing Process II

Course Synopsis

This course enables students to understand the use of conventional and modern machining processes. The course begins with an overview to both processes, followed by analyses of machine tools. This is followed by CNC programming, CNC processes, tools and control systems. Programming codes which include G, N, and M codes will be taught and student will perform geometry machining using the machines. Students will solve problems related with the programming, design and operations of CNC machines. At the end of the course, students present their individual/group projects related to the targeted outcomes.

References

1. Serope Kalpakjian and Steven R. Schmid, *Manufacturing Engineering and Technology,* Fifth Edition, Prentice Hall, 2006
2. Jon Stenerson, Kelly Curran, *Computer Numerical Control Operation and Programming.* 3rd ed., Prentice Hall, 2007.
3. Steve Krar, Arthur Gill, Peter Smid, *Computer Numerical Control Simplified,* 1st ed., Industrial Press Inc. New York, 2001.

4. By Stephen F. Krar, Arthur Gill, *Exploring Advanced Manufacturing Technologies,* Industrial Press Inc. New York, 2003.
5. *Manufacturing Processes And Materials*, George F. Schrader, Ahmad K. Elshennawy, Lawrence E. Doyle, Society Of Manufacturing Engineers, 2000

EPT 283/2
Computer Aided Design

Course Synopsis

This course focuses on developing students' skills on the basis of 3D modeling and its application in engineering by using 3D Modeling software. It includes details on 3D modeling followed by producing 2D drawing, assembly drawing, exploded drawing, surface modeling, rendering and animation.

References

1. James H. Earle, "Engineering Design Graphics", IIth ed.,Pearson Prentice-Hall, 2004.
2. Frederick E. Giesecke, Henry Cecil Spencer, John Thomas Dygdon, Alva Mitchell, Ivan , Leroy Hill, James E Novak, "Technical Drawing" 10th Ed., Prentice Hall, 2002.
3. Farid M. Amirouche, Principles of Computer Aided Design and Manufacturing Prentice Hall; 2nd edition (January 22, 2004)
4. Cornelius T. Leondes , Cornelius Leondes, Computer-Aided Design,
5. Engineering, and Manufacturing: Systems Techniques and Applications, Volume II, Computer-Integra, CRC Press; 1st edition (December 12, 2000).
6. Thomas Strothotte (Author), Stefan Schlechtweg (Author) Non-Photorealistic
7. Computer Graphics: Modeling, Rendering, and Animation (The Morgan Kaufmann Series in Computer Graphics) [Hardcover] Morgan Kaufmann; 1st edition (April 26, 2002)

EPT 228/3
Fluids Mechanics I

Course Synopsis

In Fluid Mechanics I, students apply basic properties of fluid and concepts of dimensional analysis on fluid flow measurement, fluid friction in pipes, and flow over immersed bodies. This course also covers analysis of hydrodynamical flow fields. It emphasizes the analysis and importance of boundary layer, ideal, and compressible flow in practical engineering applications. The course will also provide the analysis of flow through fluid machines such as pumps and turbines. At the end of the course, students should be able to apply the theory to solve problems related to flow of fluids.

References

1. J.F. Douglas, J.M. Gasiorek, J.A. Swaffield, L.B. Jack, *Fluid Mechanics,* Fifth Edition, Prentice-Hall, 2005.
2. B. R. Munson, D. F. Young and T. H. Okiishi. *Fundamentals of Fluid Mechanics.* John Wiley & Sons.
3. B.S. Massey, *Mechanics of fluids*, Chapman & Hall, London.
4. C.T., Crowe, D. F. Elger and J. A. Roberson, *Engineering Fluid Mechanics*, Eight Edition, John Wiley & Sons, 2005.
5. R.L. Mott, *Applied Fluid Mechanics*, Sixth Edition, Prentice Hall, 2006.

EPT 235/3
Thermodynamics

Course Synopsis

In this course, basic concepts in thermodynamic laws used in engineering applications such as steam power plant, air-conditioning & refrigeration systems, and internal combustion engine will be covered. The course emphasizes the study of energy sources and conservation through its concept and definition. By the end of semester, students should be able to analyse mixture and the performance of compressors and heat exchangers.

References

1. Cengal Y.A. and Boles M.A., *Thermodynamics: An Engineering Approach*, 7th Edition, McGraw-Hill Inc., New York, 2006.
2. Eastop T.D. & Mac Conkey A., *Applied Thermodynamics for Engineering Technologists*, 5th Ed., Prentice Hall, 1993.
3. Stephen R. Turns, *Thermodynamics: Concepts and Applications,* Cambridge University Press, 2006.
4. Michael J. Moran & Howard N. Shapiro, *Fundamentals of Engineering Thermodynamics*, 6th Edition, Wiley, 2007.

5. Mohd Kamal Ariffin, " Termodinamik Asas", UTM Press, 2005. W.Z. Black and J.G.Hartley. (1996). *Thermodynamics,* English/ SI Version.3rd Edition Prentice-Hall.

EPT 262/2
Measurement and Instrumentation System

Course Synopsis

This course introduces students to the basic principles in measurement systems including various sensing methods, instrument types and their characteristics, display and recording elements, and their applications in the measurement of temperature, pressure, force, level, and displacement, among many others.

References

1. Beckwith, T.G., Maragoni, R.D., Lienhard, J.H., Mechanical Measurement, 6th ed., Prentice Hall, 2006.
2. Bently, J. P., Priciple of Measurement System, 3rd ed., Logman, 1995.
3. Figliola, R.S., Beasly, D.E., Theory and Design for Mechanical Measurements, 3rd ed. John Wiley, 2000.
4. Morris, A.S., Measurement and Instrumentation Principles, 1st ed., Butterworth Heinemann, 2001.
5. W. Bolton,Measurement and Instrumentation Systems, Butterworth-Heinemann; 1st Ed. edition (March 23, 1998).

EPT 293/3
Engineering Product Design I

Course Synopsis

This course aims to develop an understanding of customer's needs and techniques to interpret data into product conceptual solutions that have market value. Students will learn the appropriate engineering approaches and methods to analyze user needs in conjunction with engineering science principles such as materials, statics, dynamics, solid, fluid and thermodynamics to produce conceptual solutions that fulfill customer needs. The course also focuses on the manipulation of 3D CAD based software to construct product conceptual solutions.

References

1. Rudolph J. Eggert, "Engineering Design" New Jersey: Prentice Hall, 2005.
2. Karl T. Ulrich and Steven D. Eppinger, "Product Design and Development" McGraw- Hill, 2008.
3. Clive L. Dym and Patrick Little, "Engineering Design: A Project Based Introduction", John Wiley & Sons, 2008.
4. Lance Bettencourt Service Innovation: How to Go from Customer Needs to Breakthrough Services, McGraw-Hill; 1st edition (May 26, 2010).
5. Turkka Kalervo Keinonen, Roope Takala Product Concept Design: A Review of the Conceptual Design of Products in Industry, Springer; 1st edition (January 23, 2006).

EPT 312/3
Vibration and Mechanics of Machines

Course Synopsis

This course is designed so that students learn the application of concepts in mechanics (statics and dynamics) to solve real world mechanical engineering problems pertaining to various machines that include belt and pulley systems, gears, flywheels and gyroscopes. Student will also learn the methods of balancing rotating masses and parts of a combustion engine. The concepts of vibration with respect to one-degree-of-freedom are also studied. At the end of this course, students should be able to solve problems related to various mechanical systems. In addition, they should be able to evaluate analytically the parameters of components of various machines under study.

References

1. Pennock Gordon R., Shigley Joseph E., Uicker John J., *Theory of Machines and Mechanisms*, OXFORD University Press, 2003.
2. D. J. Inman, *Engineering Vibration*. Pearson Prentice Hall, 2001.
3. S. S. Rao, *Mechanical Vibrations*. Pearson Prentice Hall, 2004.
4. Che Abas Che Ismail, Mohd. Pauzi Abd. Ghani, Mohd. Yunus Abdullah, *Teori Getaran dengan Penggunaan*. Universiti Teknologi Malaysia, 1997.
5. W. J. Palm, *Mechanical Vibration.* John Wiley, 2006.

EPT 335
Applied Thermodynamics

Course Synopsis

Applied Thermodynamics is designed to enhance and extend students' ability to apply thermodynamic principles, especially the first and second laws of thermodynamics, and the laws of conservation of mass, momentum and energy, to industrial systems. It covers the broad application of the theory to many engineering applications, and emphasizes the analysis of energy transfers during power generation, heating, air-conditioning and refrigeration processes. At the end of the course, students should be able to apply relevant thermodynamic and conservation principles and perform calculations to evaluate the performance of gas and vapor power cycles, various compressors, and the performance of air-conditioning, refrigeration and heat pump cycles. Students should also be able to perform thermodynamic analyses of gas mixtures and gas-vapor mixtures.

References

1. Cengal Y.A. and Boles M.A., *Thermodynamics: An Engineering Approach*, 7 th Edition, McGraw-Hill Inc., New York, 2006.
2. Eastop T.D. & Mac Conkey A., *Applied Thermodynamics for Engineering Technologists*, 5th Ed., Prentice Hall, 1993.
3. Stephen R. Turns, *Thermodynamics: Concepts and Applications*, Cambridge University Press, 2006.
4. Michael J. Moran & Howard N. Shapiro, *Fundamentals of Engineering Thermodynamics,* 6th Edition, Wiley, 2007.
5. Mohd Kamal Ariffin, "Termodinamik Asas", UTM Press, 2005.
6. W.Z. Black and J.G.Hartley.(1996). *Thermodynamics*, English/SI Version.3rd Edition Prentice-Hall.

EPT 341/3
Solid Mechanics II

Course Synopsis

This course reviews the earlier course of Solid Mechanics I regarding axial load, torsion, bending and shear. Students will be exposed to problems of thin-walled tubes having closed cross sections and bending deformation of a straight member. The course also discusses the solution of problems where several internal loads occur simultaneously on a member's cross section. The deflection of beam problems is taught using various methods including the application of energy methods. This energy method covers the principle of conservation of energy, virtual work and Castigliano's theorem.

References

1. Hibbeler, R.C. 2005. *Mechanics of Materials,* 5th ed., Prentice Hall.
2. Raymond, Parnes. 2001. *Solid Mechanics in Engineering*, John Willey & Sons.
3. Madhukar, Vable. 2002. *Mechanics of Materials*, Oxford University Press.
4. Barber, J.R . 2001. *Intermediate Mechanics of Materials*, McGraw-Hill.
5. Pytel, Kiusalaas. 2001. *Mechanics of Materials*, 3rd ed., McGraw-Hill.

EPT 361/4
Instrumentation and Control

Course Synopsis

This course prepares students with the knowledge and skill in instrumentation and control for instrumentation systems and control engineering in manufacturing industries. Students study basic concepts of instrumentation systems, elements, transducers, instrumentation system analysis, design criteria for measuring instrument and suitable materials. This course will enhance students' knowledge of the principals and usage of instrumentation in manufacturing industries. Students will also learn control system concepts and methods commonly used in the industries. They will be able to apply instrumentation and control techniques in manufacturing environments. In addition, they will also learn how to analyze and design simple controllers.

References

1. C. S. Rangan, G. R. Sarma, V. S. V. Mani, *Instrumentation Devices and Systems,* Tata McGraw Hill, 1994.
2. Nise, Norman S., *Control Systems Engineering*. 4th ed., USA, John Wiley & Sons, 2004.
3. R. C. Dorf, R. H. Bishop, *Modern Control System*, 11th ed., Prentice Hall,2008.
4. K. Ogata, *Modern Control Engineering*, Prentice Hall, 4th edition, 2002.
5. W. Bolton, *Instrumentation and control*, Elsevier, 2004.

EPT 363/3
Automatic Control

Course Synopsis

In this course, control systems which involve mathematical models of control system, characteristic of feedback control system, performance of feedback control system, stability of feedback control system, Root-Locus Method, and design of feedback control systems will be covered.

References

1. Benjamin C. Kou., Automatic Control System, John Willey &Sons. Inc.
2. Dorf, R.C. and Bishop, R.H., Modern Control Systems, Addison Wesley, 8th Edition, (1998)
3. Mahmud, Che Mat Hadzer, Sistem Kawalan Automatik. USM (1999)
4. Ogata, K., Modern Control Engineering, 3rd Edition, Prentice Hall, (1997)
5. Farid Golnaraghi,Benjamin C. Kuo, Automatic Control Systems, Wiley; 9th edition (July 7, 2009)

EPT 381/3
Tools and Die Design

Course Synopsis

This course gives an understanding to students about the concepts and principles of Tool & Die and Mould design applications. It is divided into two sections. The first section deals with Tool & Die design with include the calculation and analysis of part and die using CATIA CAD software. The second section will cover the mould design application with includes calculation and analysis using MouldFlow Software. Students need to carry out projects individually or in a team, and present the project at the end of semester.

References

1. Ivana Suchy. *Handbook of Die Design*. 2nd Edition, McGraw-Hill 2006.
2. Vukota Boljanovic J.R. Paquin. *Die Design Fundamentals*. 3rd Edition. Industrial Press Inc. 2006.
3. Szumera, Jim. *The Metal Stamping Process, Your product from concept to customer*. Industrial Press Inc. 2003.
4. David A. Smith. *Fundamentals of Pressworking*. Society of Manufacturing Engineers, Dearborn, Michigan. 1994.
5. R.G.W.Pye, *Injection Mould Design*, Logman Scientific & Technical, 4th Edition, 1991.

EPT 383/3
Automation and Robotics

Course Synopsis

This course introduces industrial automation and robotic which have been used in the industries today. Its covers topics regarding automation systems such as pneumatic, hydraulic, programmable logic control (PLC), material handling, Automated Storage/Retrieval System (ASRS), Automated Guided Vehicles (AGV), Flexible Manufacturing System (FMS), Automated Production Lines, and Automated Assembly Lines. Students learn how to design pneumatic and hydraulic circuits manually before using programmable logic control (PLC) with FluidSIM software in the lab. The course covers an explanation of the classification of robots, robot systems, end-of-arm tooling, sensors, robot safety and robot utilisation in the industries. In addition, Combination of Modular Production System (MPS) with Automation and Robotic Systems are also discussed.

References

1. Jon Stenerson, *Industrial Automation and Process Control.*, Prentice Hall, 2003.
2. James A. Rehg, Glenn J. Sartori, *Programmable Logic Controllers*, Prentice Hall. New Jersey, 2007.
3. Jon Stenerson, *Fundamentals of Programmable Logic Controllers, Sensors, and Communications*, 3rd ed., Prentice Hall, 2004.
4. Khairur Rijal Jamaludin, *Reka Bentuk Sistem Kuasa Bendalir*, Universiti Teknologi Malaysia., 2004
5. John S. Cundiff, *Fluid Power Circuits and Controls, Fundamentals and Applications.*, CRC Press. 2002.

EPT 385/3
Metrology and Quality Control

Course Synopsis

This course gives an understanding about the concepts and techniques in dimensional metrology and quality control and the relationship between these fields of knowledge. Students will be exposed to dimensional metrology equipment such as the equipment used in linear measurement, angular measurement, surface measurement and coordinate measuring machine. In addition, students learn about quality control tools (7 old and new tools), sampling and reliability of engineering systems. Practical work will help students gain effective understanding.

References

1. *Metrology & Measurement*, Bewoor, Tata Mcgraw-Hill, 2009.
2. *Metrology And Properties Of Engineering Surfaces*, By Evaristus Mainsah, Jim A. Greenwood, Derek G. Chetwynd, Springer, 2001
3. *Quality Control*, 8th Edition, Dale H. Besterfield, Pearson/Prentice Hall, 2008.
4. *Quality Control, Reliability, And Engineering Design*, Volume 1984, Balbir S. Dhillon, Marcel Dekker, 1985.
5. *Process Quality Control: Troubleshooting And Interpretation Of Data*, 4th Edition, By Ellis Raymond Ott, Edward G. Schilling, Dean V. Neubauer, American Society For Qualit, 2005

EPT 384/3
Advanced Manufacturing Technology

Course Synopsis

This course introduces students to advanced manufacturing technology. The content of the course covers advanced manufacturing technology such as Electrochemical Machining (ECM), EBM, LBM, micro-machining and nano-fabrications. It also covers process selections and economics of 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. At the end of the course, students will present a proposal to manufacture a particular component.

References

1. S. Kalpakjian, S.R.Schmid, *Manufacturing Engineering and Technology*. 5th ed., Prentice Hall International, 2006.
2. Mikell P. Groover, *Fundamentals of Modern Manufacturing*, 2nd ed. John Wiley & Sons, Inc., 2002.
3. Philip F. Ostwald, Jairo Munoz, *Manufacturing Processes and Systems*, 9th ed., John Wiley, 1997.
4. E. Paul DeGarmo, J T. Black, Ronald A. Kohser, *Materials and Processes in Manufacturing*, 8th ed., John Wiley & Sons, Inc., 1997.
5. Michael Fitzpatrick, *Machining and CNC Technology*, McGraw Hill Higher Education., New York, 2005.

EPT 393/3
Engineering Product Design II

Course Synopsis

In the Product Design Engineering 1 course, students learnt all engineering design phases, focusing on the first two phases which are Problem Formulation and Conceptual Design. In contrast, the course Product Design Engineering 2 focuses on the next phase of Engineering Design, which is Configuration Design. Students will firstly study Product Architecture and then continue to look on the details of Design for X; such as Design for Manufacturing and Assembly, Design for Reliability and Safety, Design for Quality and Robustness, and Design for Environment. At the end of this course, students are usually required to complete a case study.

References

1. Rudolph J. Eggert, "Engineering Design" New Jersey: Prentice Hall, 2005.
2. Karl T. Ulrich and Steven D. Eppinger, "Product Design and Development" McGraw- Hill, 2008.
3. Clive L. Dym and Patrick Little, "Engineering Design: A Project Based Introduction", John Wiley & Sons, 2008.
4. Charles S. Wasson, System Analysis, Design, and Development: Concepts, Principles, and Practices (Wiley Series in Systems Engineering and Management), Wiley-Interscience (December 23, 2005).
5. Baxter, Mike Product design: a practical guide to systematic methods of new product development / Mike Baxter, Cheltenham: Stanley Thornes , c1995.

EPT 394/3
Product Ergonomic and Safety

This course addresses ergonomics knowledge in product design. It explains the application of anthropometrics data in products, equipment and tool designs. Students will learn about fundamental knowledge of ergonomics, its applications in design and basic assessment tools to analyze design problems. The course also exposes students to specific considerations, needs or requirement for special populations such as the elderly or the disabled in the design. It also looks into ergonomic hazard, safety analysis & prevention, and the product safety.

References

1. Green, W. S. and Jordan, P. W., "Human Factors in Product Design", Taylor & Francis, Florida, 1999.
2. Kroemer, K. H. E, Kroemer, H. B., and Kroemer-Elbert, K. E., "How to Design for Ease and Efficiency", 2nd Edition, Prentice Hall, New Jersey, 2001
3. David L. Geotsch, Occupational Safety and Health for Technologists, Engineers and Manager, 4th Edition, 2002
4. George E. Dieter, Engineering Design, A materials and Processing Approach, 3rd Edition, University of Maryland. 2000
5. Waldemar Karwowski, Gavriel Salvendy, Advances in Human Factors, Ergonomics, and Safety in Manufacturing and Service Industries (Advances in Human Factors and Ergonomics Series), CRC Press; 1st edition (June 24, 2010)

EPT 371/2
Finite Element Analysis

Course Synopsis

The main objective of the course is to provide students with the knowledge, comprehension and analysis of some problems using finite element analysis (FEA). Topics covered in this course include introduction and brief history, element and terminology, stress and balance, boundary condition, continuity approach, mathematics approach, finite element model (FEM), linear shape function, potential energy approach, Galerkin approach, stiffness matrix formation, finite element equation, quadratic function, 2-D coaxial problems, partial element numerical metric and integration with higher order element, 2-D and 3-D framework's problems with FEA. Topics such as steady heat transfer, torsion and flow problems, finite element formulation, element mass matrix, eigen value evaluation and eigen vector by interactive method and Jacobi are also included. There will be a design project that uses finite element software.

References

1. Chandrupatla, T.R. & Belegundu, A.D. 2003. *Introduction to Finite Elements in Engineering,* 3rd Ed. Prentice Hall International.
2. Zienkiewicz, O.C. & Taylor, R.L. 2005. *The Finite Element Methods*, 6th Ed. Mc Graw Hill: NewYork.
3. Cook, R.D., Malkus D.S. & Plesha, M.E. 2001. *Concepts and Applications of Finite Element Analysis*, 4th Ed. John Wiley & Sons: New York.
4. Buchanan, G.R. 1995. *Theory and Problems of Finite Element Analysis*. Schaum's Outline Series, Mc Graw Hill: New York.
5. Huebner, K.H., Thornton, E.A. & Byrom, T.G. 1995. *The Finite Element Method for Engineers.* 3rd Ed, John Wiley & Sons: New York.

EPT 315
Machine Components Design

Course Synopsis

This course prepares students to determine structural integrity of common machine components such as fasteners, shafts, gears, springs, and bolted joints. It introduces engineering design methodology and its relationship to top-level mechanical systems. It illustrates the isolation of the critical factors from a practical engineering problem, the application of known knowledge to quantitatively formulate the critical process, the assembly of the information needed for a solution, and the proper application of the solution in practical designs. This course will show to identify the critical design parameters for any engineering component design and to manipulate them as part of the design process.

References

1. Robert C. Juvinall and Kurt M. Marshek, *Fundamental of Machine Components Design.* John Wiley & Sons, 2005.
2. Shigely, J. E and Mischke, C. R., *Mechanical Engineering Design.* McGraw Hill 1989
3. M. F. Spotts, T. E. Shoup and L. E. Hornberger, *Design of Machine Elements*. Pearson Prentice Hall 2004.
4. Dan F. Marghitu, *Kinematic Chains and Machine Components Design*. Academic Press 2005.
5. V. B. Bhandari, *Design of Machine Elements*. Tata McGraw-Hill 2007.

EPT 314/3
Machines Mechanism

Course Synopsis

The course offers students knowledge of basic 3D rigid body kinematics, balancing on rotation mass, gear systems and follower, mechanism-kinematics diagramme, movement ability, position analysis, velocity and acceleration analysis. At the end of this course, students should be able to solve problems related to various mechanical systems. In addition, they should be able to evaluate analytically the parameters of components of various machines under study.

References

1. Myszka, D.H., Machines and Mechanism: Applied Kinematic Analysis, 3rd eds., Prentice Hall (2005).
2. Hannah, J. and Stephens, R.C. Mechanics of Machines. Elementary Theory and Examples, 4th eds., Edward Arnold, 1991.
3. Che Abas Che Ismail,Mohd. Yunus Abdullah,Roslan Abd Rahman, “Mekanik Mesin” Universiti Teknologi Malaysia, 2003.
4. Machines and Mechanisms”, OXFORD University Press, 2003.
5. P.L. Ballaney, Theory of Machines and Mechanisms, Khanna Publisher 1995.

EPT 364/3
Mechatronics

Course Synopsis

The aim of this course is to deliver the fundamental knowledge of mechatronics system. Topics covered include input device, output device, signal conditioning, input and output interfacing, networking, and fault finding analysis. Students will also learn how to design and analyse mechatronics systems using Programmable logic Control (PLC).

References

1. Bolton, W “Mechatronics Electronic Control Systems in Mechanical and Electrical Engineering”, 2rd ed., Pearson-Prentice Hall., 1999.
2. R. Iserman, “Mechatronic Systems: Fundamental”, Springer, 2003.
3. W. Bolton, Mechatronics: A Multidisciplinary Approach (4th Edition) Prentice Hall; 4th edition (June 1, 2009).
4. Sabri Cetinkunt, Mechatronics, Wiley; 1st edition (January 23, 2006).
5. W. Bolton, Programmable Logic Controllers, Fifth Edition, Newnes; 5th edition (August 7, 2009).

EPT386/3
Design for Manufacture

Course Synopsis

This course introduces a method that is used to determine the suitable manufacturing processes and raw materials for a product. It also introduces the DFA methodology that helps to produce products which are correct and cost-effective for a production process and assembly requirement, for both manual assembly and also for automatic assembly processes. There are a number of design guidelines and rules in this course that can be used to develop a suitable component design according to the manufacturing process required. Students will have a group project to analyze an existing product design and then will propose a better design so that the assembly efficiency can be improved and the manufacturing cost can be reduced.

References

1. G. Boothroyd, P. Dewhurst, W. Knight, ‘Product Design for Manufacture and Assembly’, 2nd Edition, Marcel Dekker Inc., 2002.
2. G. Boothroyd, P. Dewhurst, W. Knight, ‘Product Design for Manufacture and Assembly, (Manufacturing Engineering and Materials Processing)’, Third Edition, CRC Press, 2010
3. James Bralla, ‘Design for Manufacturability Handbook’, Mc-Graw Hill, 1998.
4. David M. Anderson, ‘Design for Manufacturability & Concurrent Engineering; How to Design for Low Cost, Design in High Quality, Design for Lean Manufacture, and Design Quickly for Fast Production’, CIM Press, 2004.
5. R. Dixon, ‘Engineering Design and Design for Manufacturing’, Fieldstone Publishers, 1995.

EPT 395/3
Engineering Product Design III

Course Synopsis

In this course, students will increase their skills and knowledge in designing new products. They will produce drawings using Geometry Dimensioning and Tolerance symbols in real industrial environment. Through this course, students will perform analysis on the tolerance of 3D models before they produce a prototype for a new product. The course also focuses on the methods in designing plastic products and analyses of plastic material flow inside plastic injection mould to produce plastic products. Students learn to apply and integrate knowledge and understanding of engineering science disciplines to support engineering design activities. In designing activities, students will study reliability testing for the new product development. Lastly, students will study the laws and the actual steps to acquire patents for a new product.

References

1. Injection Mould Design Engineering, David O. Kazmer
2. R.J. Crawford, "Plastic Engineering", 2nd Edition, Pergamon Press, Unted Kingdom, 1990.
3. L. Sors and I. Balazs, "Design of Plastic Moulds and Dies", Elsevier, Amsterdam, 1989.
4. Mechanical Tolerance Stackup and Analysis, Bryan R. Fischer, 2006.
5. Geometric Tolerancing Workbook.

EPT324/2
Heat Transfer

Course Synopsis

The main objective of this course is to enable student to understand the concepts of conduction, convection and radiation which form the basics of heat transfer. Student will also perform theoretical calculations such as thermal conductivity, heat loss, and other important theories.

References

1. Yunus A. Cengel., 1998, *Heat Transfer: A practical approach*. McGraw Hill.
2. Tariq Muneer., Jorge Kubie., Thomal Grassie., 2003, *Heat Transfer: A problem solving approach,* volume 1.
3. Jack Philip Holman., 2009, *Heat transfer.* McGraw Hill Higher Education.
4. Adrian Bejan., 1993, *Heat transfer.* John Wiley & Sons, Inc.
5. Anthony F. Mills., 1999, *Heat Transfer.* Prentice Hall.

EPT 328/3
Fluid Mechanics II

Course Synopsis

Fluid Mechanics II will enable students to analyse hydro dynamical flow fields. It will emphasise on the analysis and the importance of boundary layer, ideal and compressible flow in practical engineering applications. The course will also provide the analysis of flow through fluid machines such as pump and turbine. At the end of the course, students should be able to demonstrate and apply the theory to solve problem related to flow of fluids.

References

1. J. F. Douglas, J.M. Gasiorek, J. A. Swaffield, L.B. Jack, *Fluid Mechanics*, Fifth Edition, Prentice-Hall, 2005.
2. B. R. Munson, D. F. Young and T. H. Okiishi. *Fundamentals of Fluid Mechanics.* John Wiley & Sons.
3. B. S. Massey, *Mechanics of fluids*, Chapman & Hall, London.
4. C. T., Crowe, D. F. Elger and J. A. Roberson, *Engineering Fluid Mechanics,* Eight Edition, John Wiley & Sons, 2005.
5. R. L. Mott, *Applied Fluid Mechanics*, Sixth Edition, Prentice Hall, 2006.

EPT329/3
Fluid Mechanics II

Course Synopsis

Fluid Mechanics II will enable students to analyse hydrodynamical flow fields. To enhance understanding of fluid behavior through application of dimensional reasoning, drag and lift considerations, boundary layer theory, compressible flow theory, measurement techniques and pump and turbine theory, computational fluid dynamics and computer applications and simulations. At the end of the course, students are able to develop an appreciation of the design principles in thermo-fluid system and the ability to analyze existing thermo-fluid systems and contribute to new designs.

References

1. J. F. Douglas, J.M. Gasiorek, J.A. Swaffield, L.B. Jack, *Fluid Mechanics*, Fifth Edition, Prentice-Hall, 2005.
2. C. T., Crowe, D. F. Elger and J. A. Roberson, *Engineering Fluid Mechanics,* Eight Edition, John Wiley & Sons, 2005.
3. B. R. Munson, D. F. Young and T. H. Okiishi. *Fundamentals of Fluid Mechanics.* John Wiley & Sons.
4. R.L. Mott, *Applied Fluid Mechanics*, Sixth Edition, Prentice Hall, 2006.
5. B.S. Massey, *Mechanics of fluids*, Chapman & Hall, London.
6. Daugherty, RL, Franzini, JB & Finnemore, EJ, Fluid Mechanics with Engineering Applications, SI metric edn, McGraw-Hill. Douglas, JF, Gasiorek, JM & Swaffield, JA, Fluid Mechanics, Longman.

EPT 403/3
Advanced Materials

Course Synopsis

In this course, students learn about recent developments of various classes of advanced materials used in applications such as aerospace, automotive, biomedical and electronic industries. It will emphasize on the important properties exhibited by metallic, polymeric, ceramics and composite materials that make them selected for high-end and advanced applications. The physical and mechanical properties of the various classes of advanced materials (super alloys, titanium and aluminum alloys, intermetallic and biomaterials) will be detailed, and so will the processing techniques associated with producing these materials. The course will also cover the latest advanced materials being developed such as nonmaterial's, shape memory alloys and other functional materials. At the end of the course students should be able to gain understanding of the physical and mechanical properties of advanced materials and apply the knowledge to select suitable materials for a given engineering application.

References

1. El-Eskandarany. S.M. (2001). *Mechanical alloying for Fabrication of advanced Engineering Materials*. Noyes Publication
2. Edelstein. A, Cammarata R.S. (1996). *Nanomaterials: synthesis, properties and application.*
3. Mathew, F.L., Rawlings, R.D (1998). *Composite Materials: Engineering and Science.* Chapman & Hall.
4. James F. Shackelford, *Introduction to Materials Science for Engineers*, 7th edition,Pearson Higher Education.2009
5. R.E. Smallman, A.H.W. Ngan, *Physical Metallurgy and Advanced Materials,* 7th Edition. Butterworth-Heinemann 2007.

EPT 412/3
Mechanical System Design

Course Synopsis

This course incorporates elements covered in an earlier course, Machine Components Design. It completes the overall understanding mechanical system design. Topics covered include: design for installation, limit and matching, impervious, hydraulic system and pneumatic, automation, movement control. The simulation system design such as ADAMS will be introduced. Lectures and projects will cover problem solving methodology in the design, analysis, and synthesis of mechanical and thermal systems. This serves as a foundation for dealing with broad engineering projects. Emphasis will be given on creative thinking in the engineering design process in projects involving optimal conversion of resources.

References

1. Ullman D.G. 2004. *The Mechanical Design Process*, 3rd Ed. International Edition, New York, McGraw Hill.
2. Crose. N. 2000. *Engineering Design Methods, Strategies for Product Design,* 3rd Ed. Chichester, Wiley.
3. Esposito A. 2000. *Fluid Power with Applications*. New Jersey: Prentice Hall Inc.
4. Norton R. L. 2005. *Machine Design: An Integrated Approach.* 3rd ed. New Jersey: Prentice Hall Inc.
5. Clive L. Dym and Patrick Little. 2004. *Engineering Design*: A Project-Based Introduction. 2nd ed. New Jersey: Wiley.

EPT 427/3
Pneumatics and Hydraulics System Design

Course Synopsis

This course discusses basic pneumatics, sensors, electro-pneumatics, and hydraulic technologies that are related to industrial applications. Students will study the construction and design of circuits by means of examples and exercises.

References

1. Pepperl & Fuchs, training Package Sensoric, Peppel & Fuchs, 2005.
2. Croser P, Thomson J.,Basic Pnuematics textbook, 3rd edition, Festo Didactic, 2002.
3. Exner H. Freitag R., Hydraulics: Basic Principle and Componets, volume 1, 3rd Edition, Bosch rexroth AG, 2002.
4. Andrew Parr ,Hydraulics and Pneumatics, Second Edition, Butterworth-Heinemann; 2nd edition (March 22, 1999).
5. Jay F. Hooper, Basic Pneumatics, Carolina Academic Press (May 2003).

EPT415/3
Vibration

Course Synopsis

The concept of vibration with respect to one-degree-of-freedom and second degree-of freedom, vibration transition, continuity system and instrumentation for measuring vibration are studied. At the end of the course, students should be able to solve problems related to various mechanical systems.

References

1. Thompson, W. T., Theory of vibration with application, 6th Edition, New Jersey, Prentice Hall, 1993.
2. Rao, S.S., Mechanical Vibration, 3rd Edition, John wiley and Sons, 1995.
3. Daniel J. Inman, Engineering Vibration (3rd Edition) Prentice Hall; 3rd edition (May 19, 2007).
4. J.P. Den Hartog, Mechanical Vibrations, Crastre Press (November 4, 2008).
5. S. Timoshenko, Vibration Problems In Engineering, 2nd Edition, Wolfenden Press; 2nd edition (November 4, 2008).

EPT 424/2
Heat Transfer

Course Synopsis

The main objective of this course is to enable student to understand the concepts of conduction, convection and radiation which form the basics of heat transfer. Student will also perform theoretical calculations such as thermal conductivity, heat loss, and other important theories.

References

1. Yunus A. Cengel., 1998, *Heat transfer: A practical approach*. Mc-Graw Hill.
2. Tariq Muneer., Jorge Kubie., Thomal Grassie., 2003, *Heat transfer: A problem solving approach,* volume 1.
3. Jack Philip Holman., 2009, *Heat transfer.* Mc-Graw Hill Higher Education.
4. Adrian Bejan., 1993, *Heat transfer.* John Wiley & Sons, Inc.
5. Anthony F. Mills., 1999, *Heat transfer.* Prentice Hall.

EPT463/3
Automatic Control

Course Synopsis

In this course, student will be exposed to the mathematical modeling for electrical and mechanical system using block diagram and transfer functions. In addition, they will be able to determine and analyze the characteristic, stability and performance of feedback control system in time and frequency domain. The students will also learn how to design a feedback control system.

References

1. Ogata K. (2010). Modern Control Engineering. 5th ed. Prentice Hall.
2. Norman S. Nise. (2011). Control System Engineering. 6th ed. John Wiley & Sons
3. Kuo B. C. (2010). Automatic Control System. 9th ed. John Wiley & Sons.
4. Richard C. Dorf, Robert H. Bishop (2011), Modern Control Systems, 12th ed. Prentice Hall.
5. Franklin G. F., Powell J. D. and Emani-Naeni A. (2009). Feedback Control of Dynamic Systems System. 9th ed. Prentice Hall.
6. U. A. Bakshi, S.C. Goyal, Feedback Control System, 2nd Revised ed. Technical Publication Pune.
7. Charles L. Phillips, Royce D. Harbor, Feedback Control System, 4th ed. Prentice Hall.

EPT 484/2
Lean Manufacturing

Course Synopsis

This course offers students to understand the concept of Lean Manufacturing. Students learn about lean philosophies and techniques used in lean manufacturing. They will also learn Value Stream Mapping (VSM) which is the heart of Lean Manufacturing solution. Lab sessions will enable students to use lean tools properly through case studies given using simulation software. At the end of this course, students are expected to be able to apply and analyse lean tools to solve appropriate problems incurred on the manufacturing shop floor.

References

1. Pascall Dennis, *Lean Production Simplified,* Productivity Press, 2002.
2. Shingo, S. *A Study of the Toyota Production System*, Revised Edition, Cambridge, 1989.
3. Taiichi Ohno, *Toyota Production System: Beyond Large-Scale Production,* Productivity Press ; 1st Edition 1988.
4. Shigeo Shingo, *A Study of the Toyota Production System: From an Industrian Engineering Viewpoint*, Productivity Press ; 1st Edition 1989.
5. James P. Womack, Daniel T. Jones, *Lean Thinking*, Simon & Schuster, 1st Edition, 1996.

EPT 485/2
Production Planning and Control

Course Synopsis

In this course, students will understand issues related to production management. At the end of the course students are able to use the appropriate tools and techniques in manufacturing and production lines. The course includes Introduction to Production Management, Demand Forecasting, Capacity Planning, Process Selection & Facility Layout, Aggregate Planning, Inventory management, Materials Requirement Planning (MRP), Production Scheduling and Supply Chain Management.

References

1. *Operations Management*, 10th Edition, William J. Stevenson Mcgraw-Hill/Irwin, 2008
2. *Manufacturing Resource Planning (Mrp II): With Introduction To Erp, SCM And CRM* By Khalid Sheikh, Mcgraw-Hill Professional, 2003
3. *Operations Management: Providing Value In Goods And Services,* 3rd Edition, James B. Dilworth, Dryden Press, 2000
4. *Operations Management,* Jae K. Shim, Joel G. Siegel, Barron's Educational Series, 1999.
5. *Operations Management* By C. Donald J. Waters, Donald Waters, Kogan Page Publishers, 1999.

EPT 495/2
Operational Research

Course Synopsis

The course is divided into deterministic and stochastic categories used in the engineering field. Both categories involve modeling of problems using tools such as simplex, tasking and transportation. The course also covers operational problems which essentially involve probability such as queuing line and simulation models. All these methods aim to arrive at an optimum solution.

References

1. F. S. Hillier and Lieberman, G.J, *Introduction To Operation Research*, 7th Ed. Mc Graw Hill, N. Y. 2001.
2. H. A. Taha, *Operations Research: An Introduction,* Prentice-Hall, New Jersey, 1997.
3. H. A. Eiselt and Carl-Louis Sandblom. *Operation Research: A Model Based Approach,*1st Edition. Springer, 2010.
4. David J. Rader, *Deterministic Operations Research: Models and Methods in Linear Optimization,* Wiley 2010.
5. Wayne L. Winston., *Operations Research: Applications and Algorithms*, 4th Edition. Duxbury Press 2003.

Career Opportunities

- Process Engineer
- Quality Engineer
- Industry Safety Engineer
- Maintenance Engineer
- Production Design Engineer
- Process Design Engineer
- Research & Development Engineer (R&D)
- Academician
- Consultancy

School of Materials Engineering

Program Offered

- Diploma in Metallurgical Engineering
- Bachelor of Engineering (Materials Engineering)
- Bachelor of Engineering (Metallurgical Engineering)
- Bachelor of Engineering (Polymer Engineering)
- M.Sc (Materials Engineering)
- M.Sc Mixed Mode (Polymer Engineering)
- Ph.D.

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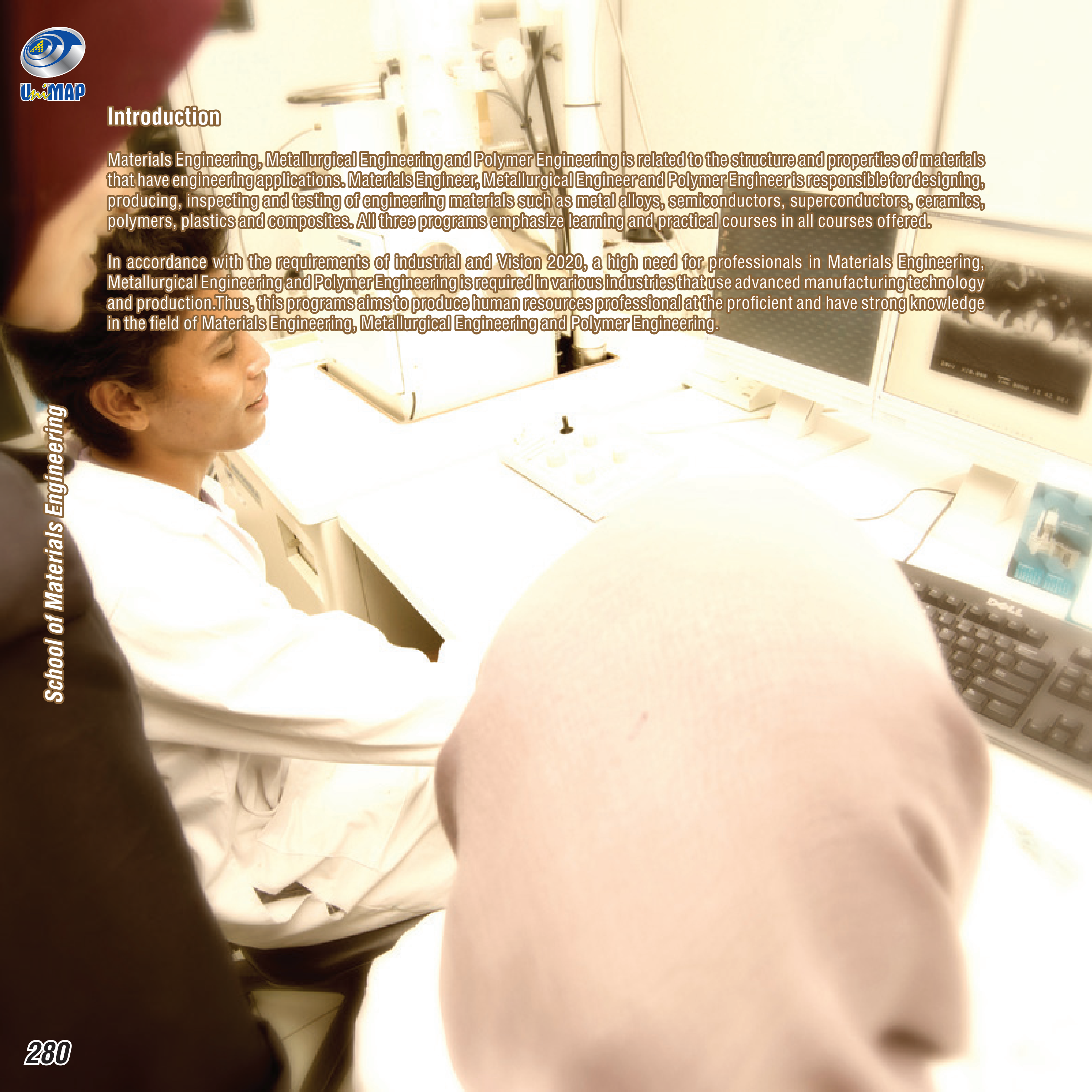
Introduction

Materials Engineering, Metallurgical Engineering and Polymer Engineering is related to the structure and properties of materials that have engineering applications. Materials Engineer, Metallurgical Engineer and Polymer Engineer is responsible for designing, producing, inspecting and testing of engineering materials such as metal alloys, semiconductors, superconductors, ceramics, polymers, plastics and composites. All three programs emphasize learning and practical courses in all courses offered.

In accordance with the requirements of industrial and Vision 2020, a high need for professionals in Materials Engineering, Metallurgical Engineering and Polymer Engineering is required in various industries that use advanced manufacturing technology and production.Thus, this programs aims to produce human resources professional at the proficient and have strong knowledge in the field of Materials Engineering, Metallurgical Engineering and Polymer Engineering.



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Bachelor Of Engineering (Honours) (Materials Engineering)

Programme Objectives (PEO)

PEO 01
Graduates who are leaders in the field of materials engineering or chosen field as demonstrated through career advancement.

PEO 02
Graduates who are members and contribute to professional society.

PEO 03
Graduates who engage in lifelong learning or continuous education opportunities.

PEO 04
Graduates who contribute towards research and development.

PEO 05
Graduates who are entrepreneurial engineers.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and in-depth technical competence in materials engineering discipline.

PO 02
Ability to identify, formulate and solve engineering problems.

PO 03
Ability to design a system, component or process to meet desired needs.

PO 04
Ability to design and conduct experiments, as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for engineering practices

PO 06
Ability to demonstrate the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to demonstrate entrepreneurship, the process of innovation and the need for sustainable development of the environment.

PO 08
Understanding of professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively.

PO 11
Understanding of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles.

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Materials Engineering)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	**I**	**II**	**III**	**IV**	**V**	**VI**		**VII**	**VIII**
Engineering Core	EBT151/3 Engineering Drawing	EBT109/3 Quality Control Engineering	EBT207/4 Materials Structure & Properties	EBT254/3 Transportation Phenomenon in Materials Processing	EBT317/3 Engineering Fluid Mechanics	EBT303/3 Process Control	EIT 300/6 Industrial Training & Engineering Innovation	*#EBT401/3 Non Destructive Testing OR #EBT425/3 Thermoelectric Materials*	*#EBT422/3 Composite Materials OR #EBT426/3 Advanced Electronic Packaging*
	EET103/4 Electrical Technology	ECT112/3 Engineering Skills	EBT251/3 Engineering Materials Chemistry	EBT211/4 Physical Metallurgy	EBT323/4 Materials Characterization	EBT315/2 Surface Engineering		EBT402/3 Corrosion Engineering	EBT423/4 Materials Selection & Design
	EKT150/3 Computer Programming	EBT112/3 Statics	EBT252/4 Strength of Materials	EBT222/4 Fundamentals of Ceramics	EBT326/4 Polymer Properties	EBT322/3 Polymer Processing		*#EBT421/3 Advanced Material Engineering OR #EBT424/3 Construction Materials*	EBT446/4 Final Year Project 2
	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EBT212/3 Dynamics	EBT253/3 Analytical Chemistry	EBT351/3 Electronic Materials Engineering	EBT324/3 Materials Thermodynamics		EBT427/3 Technical Ceramic	
			EQT203/3 Engineering Mathematics III	EQT271/3 Statistic For Engineer				EBT445/2 Final Year Project 1	
Non Engineering	EUT122/2 Skill & Technology in Communication					EUT440/3 Engineer in Society			EUT443/2 Engineering Management
University Required	UUWXXX/2 Option Subject	UUW114/2 University Malay Language	UUW223/2 University English		UUW322/2 Thinking Skill			UUW224/2 Engineering Entrepreneurship	
	UZWXXX/1 Co-Curriculum	UZWXXX/1 Co-Currriculum	UUW235/2 Ethnic Relation		UZWXXX/1 Co-Currriculum			UUW233/2 TITAS	
120	**15**	**12**	**17**	**17**	**14**	**14**	**4**	**14**	**13**
17	University English, Engineering Entrepreneurship, TITAS, Ethnic Relation, Thinking Skill, University Malay Language, Co-Curiculum, Option Subject								
Total Units for Graduation 137									

* Course begins in the first semester but total credits are given upon completion of the second semester.
\# Elective Subject

School of Materials Engineering

Bachelor Of Engineering (Honours) (Metallurgical Engineering)

Programme Objectives (PEO)

PEO 01
Graduates who are leaders in the field of metallurgical engineering or chosen field as demonstrated through career advancement.

PEO 02
Graduates who are members and contribute to professional society.

PEO 03
Graduates who engage in lifelong learning or continuous education opportunities.

PEO 04
Graduates who contribute towards research and development.

PEO 05
Graduates who are entrepreneurial engineers.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and in-depth technical competence in metallurgical engineering discipline.

PO 02
Ability to identify, formulate and solve engineering problems.

PO 03
Ability to design a system, component or process to meet desired needs.

PO 04
Ability to design and conduct experiments, as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for engineering practices

PO 06
Ability to demonstrate the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to demonstrate entrepreneurship, the process of innovation and the need for sustainable development of the environment.

PO 08
Understanding of professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively.

PO 11
Understanding of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles.

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Metallurgical Engineering)

YEAR		FIRST		SECOND		THIRD			FOURTH	
SEMESTER		I	II	III	IV	V	VI		VII	VIII
Engineering Core		EBT151/3 Engineering Drawing	EBT109/3 Quality Control	EBT207/4 Materials Structure & Properties	EBT211/4 Physical Metallurgy	EBT311/4 Mechanical Metallurgy	EBT303/3 Process Control	EIT300/6 Industrial Training & Engineering Innovation	*#EBT401/3 Non Destructive Testing OR #EBT413/3 Welding Metallurgy*	EBT412/3 Applied Metallurgy
		EET103/4 Electrical Technology	ECT112/3 Engineering Skills	EBT251/3 Engineering Materials Chemistry	EBT213/4 Extractive Metallurgy I	EBT317/3 Engineering Fluid Mechanics	EBT314/3 Metallurgical Thermodynamics		EBT402/3 Corrosion Engineering	EBT415/4 Metallurgical Forensic Analysis
		EKT150/3 Computer Programming	EBT112/3 Statics	EBT252/4 Strength of Materials	EBT253/3 Analytical Chemistry	EBT313/4 Metallurgical Characterization	EBT315/2 Surface Engineering		*#EBT411/3 Engineering Alloys OR #EBT414/3 Electronic Metallurgy*	EBT446/4 Final Year Project 2
		EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EPT212/3 Dynamics	EBT254/3 Transportation Phenomenon in Materials Processing	EBT351/3 Electronic Materials Engineering	EBT316/3 Metallurgical Design		EBT417/3 Extractive Metallurgy II	
				EQT203/3 Engineering Mathematics III	EQT271/3 Statistic For Engineer				EBT445/2 Final Year Project 1	
Non Engineering		EUT122/2 Skills & Technology in Communication					EUT440/3 Engineer in Society			EUT 443/2 Engineering Management
University Required		UUWXXX/2 Option Subject	UUW114/2 Bahasa Melayu Universiti	UUW223/2 Bahasa Inggeris Universiti		UUW322/2 Kemahiran Berfikir			UUW233/2 Titas	
		UZWXXX/1 Co-Currriculum	UZWXXX/1 Co-Currriculum	UUW235/2 Hubungan Etnik		UZWXXX/1 Co-Currriculum			UUW224/2 Keusahawanan Kejuruteraan	
120		15	12	17	17	14	14	4	14	13
15		University English, Engineering Entrepreneurship, TITAS, Ethnic Relation, Thinking Skill, University Malay Language, Co-Curiculum, Option Subject								
Total Units for Graduation 137										

* Course begins in the first semester but total credits are given upon completion of the second semester.
# Elective Subject

Bachelor Of Engineering (Honours) (Polymer Engineering)

Programme Objectives (PEO)

PEO 01
Graduates who are leaders in the field of polymer engineering or chosen field as demonstrated through career advancement.

PEO 02
Graduates who are members and contribute to professional society.

PEO 03
Graduates who engage in lifelong learning or continuous education opportunities.

PEO 04
Graduates who contribute towards research and development.

PEO 05
Graduates who are entrepreneurial engineers.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and in-depth technical competence in polymer engineering discipline.

PO 02
Ability to identify, formulate and solve engineering problems.

PO 03
Ability to design a system, component or process to meet desired needs.

PO 04
Ability to design and conduct experiments, as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for engineering practices

PO 06
Ability to demonstrate the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to demonstrate entrepreneurship, the process of innovation and the need for sustainable development of the environment.

PO 08
Understanding of professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively.

PO 11
Understanding of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles.

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Polymer Engineering)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	I	II	III	IV	V	VI		VII	VIII
Engineering Core	EQT101/3 Engineering Mathematics I	EQT102/3 Engineering Mathematics II	EQT203/3 Engineering Mathematics III	EBT109/3 Quality Control	EBT317/3 Engineering Fluid Mechanics	EBT303/3 Process Control	EIT302/4 Industrial Training & Engineering Innovation	EBT435/3 Polymer in Electronic Application	# EBTXXX/3 Elective
Engineering Core	EET103/4 Electrical Technology	EBT 131/3 Engineering Mechanics	EBT 233/4 Plastic Materials	EBT231/4 Elastomeric Materials	EBT334/4 Polymer Testing & Characterization	EBT 333/4 Rubber Processing		EBT437/3 Polymer Composites	EBT446/4 Final Year Project 2
Engineering Core	EKT150/3 Computer Programming	EBT 106/4 Introduction to Polymer	EBT232/4 Polymer Synthesis	EBT 235/3 Structure & Polymer Properties	EBT 335/4 Polymer Blends	EBT337/4 Mass & Heat Transfer in Polymer		EBT441/3 Polymer Engineering Design	EBT 431/3 Polymer Engineering Product
Engineering Core	EBT105/4 Organic Chemistry	ECT112/3 Engineering Skills	EBT 238/3 Physical Chemistry	EQT271/3 Engineering Statistics	EBT336/4 Plastic Processing	EBT338/4 Latex Processing			
Engineering Core				EBT239/4 Thermodynamic in Polymer				EBT445/2 Final Year Project 1	
Non Eng	EUT122/2 Skills & Technology in Communication					EUT443/2 Engineering Management			EUT440/3 Engineer in Society
University Required (15)	UUWXXX/2 Option Subject	UUW114/2 Bahasa Melayu Universiti	UUW223/2 Bahasa Inggeris Universiti		UUW322/2 Kemahiran Berfikir			UUW233/2 Titas	
University Required (15)	UZWXXX/1 Co-Currriculum	UZWXXX/1 Co-Currriculum	UUW235/2 Hubungan Etnik		UZWXXX/1 Co-Currriculum			UUW224/2 Keusahawanan Kejuruteraan	
120	19	16	18	17	18	17	4	15	13
17	University English, Engineering Entrepreneurship, TITAS, Ethnic Relation, Thinking Skill, University Malay Language, Co-Curiculum, Option Subject								
Total Units for Graduation 137									
# Elective: EBT 433/3 Polymer Adhesive & Coating; EBT434/3 Environmental Friendly Polymer									

Course Synopsis

EBT 105/4
Organic Chemistry

Course Synopsis

This course is developed to introduce the basic concepts of organic chemistry, chemical structures and reactions, to familiar with mechanism concepts of reactions and to understand the theoretical and conceptual background of organic chemistry.

References

1. Paula, Y. B., 'Organic Chemistry', 4th ed., Person Education International, 2004.
2. John Mc Murry., 'Organic Chemistry', 6th ed., Thomson Learning, Inc., 2004.
3. Janice Gorzynski Smith, 'Organic Chemistry, second Edition, McGraw. Hill International Edition, 2006.
4. Solomons, T.W.G, Craig B.F. 2011. Organic Chemistry, International Student Version, Tenth Edition, John Wiley & Sons, Inc.
5. Harold Hart. 1991. Organic Chemistry: A Short Course Eighth Edition, Houghton Mifflin Company, Boston.

EBT 106/4
Introduction to Polymer

Course Synopsis

The aim of this course is to enable the students to learn the concepts of polymer classification, identification, properties and their application in polymer engineering.

References

1. Joel R. Fried., 'Polymer Science and Technology', 2nd ed., Prentice Hall Profesional Technical Reference Upper saddle River, 2003.
2. Barbara H. Stuart, 'Polymer Analysis', John Wiley and Sons, 2002.
3. Paul C, Michall, M. C., 'Fundamental of Polymer Science', CRC press, 2000.
4. Sperling, L. H., 'Introduction to Physical Polymer Science', 4th ed., Wiley-Interscience, 2006.

EBT 109/3
Engineering Quality Control

Course Synopsis

Introduction to quality: Definitions of quality, History of quality, Overview of quality concepts. Total Quality management – Principles and Practices, Quality management systems - ISO 9000, GMP, Basic Quality tools, Cost of Quality, Fundamental of statistics, Fundamentals of Probability, Reliability, Control chart for variables, Control charts for attributed, Capability analysis, Lot by lot acceptance sampling by attributes, Acceptance sampling system.

References

1. Douglas C. Montgomery. (2004). *Introduction to Statistical Quality Control*. 4th Edition Wiley.
2. Dale H. Besterfield. (2001). *Quality Control*, 7th edition, Prentice Hall.
3. Juran J.M. and Gryna F.M. (1988). Juran's Quality Control Handbook. 4th Ed. Singapore: McGraw-Hill.
4. Ishikawa K. (1986). Guide to Quality Control. 2nd Ed. Tokyo: Asian Productivity Organization.
5. Shewhart W.A. (1986). Statistical Method from the Viewpoint of Quality Control. New York: Dover Publications.

EBT 112/3
Statics

Course Synopsis

This course involves the introduction to mechanics, force vector, equilibrium of particle, force system resultants, equilibrium of rigid body, structural analysis, friction, centroids and center of gravity.

References

1. Meriam, J. L. & Kraige, L. G. (2013). Engineering Mechanics, Statics seventh Edition. John Wiley & Sons, Inc.

2. Bedford, A.M. & Fowler, W. (2007). Engineering Mechanics: Statics & Dynamics, 5th Edition. Prentice Hall.
3. Riley, W, Sturges, L. & Morris, D. (2007). Mechanics of Materials. John Wiley & Sons, Inc.
4. Ferdinand P. B, Johnson Jr., E. R. & William E. C. (2004). Vector Mechanics for Engineers Statics Seventh Edition. Mc-Graw Hill.

EBT 131/3
Engineering Mechanics

Course Synopsis

The main objective of this course is to expose students about basic concepts of force and resultant force. They will also learn about friction and distributed forces. Students will apply this basic knowledge to analyze 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 solutions for kinetics problems, which can be considered by using forces acceleration method and work and energy method.

References

1. Beer, F.P., Johnston, E.R. Jr. & Eisenberg, E.R., Vector Mechanics for Engineers: Statics. 7th ed. In SI Units, Canada, McGraw-Hill, 2004.
2. Beer, F.P., Johnston, E.R. Jr. & Eisenberg, E.R., Vector Mechanics for Engineers: Dynamics. 7th ed. In SI Units, Canada, McGraw-Hill. 2004.
3. Hibbeler, R.C., Engineering Mechanics: Statics. 3rd ed., Singapore, Prentice Hall, 2004.
4. Hibbeler, R.C., Engineering Mechanics: Dynamics. 3rd ed., Singapore, Prentice Hall, 2004.
5. Meriam, J.L. & Kragie, L.G., Engineering Mechanics: Statics. 5th ed. USA, SI ver. Wiley, 2003.
6. Meriam, J.L. & Kragie, L.G., Engineering Mechanics: Dynamics. 5th ed. USA, SI ver. Wiley, 2003.

EBT 151/3
Engineering Drawing

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

References

1. Cecil Jensen, Jay D. Helsesl and Dennis R. Short, (2008). *Engineering Drawing & Design*. 7th Edition. New York: McGraw-Hill.
2. Shah, M. B., (2005). *Engineering drawing*. New Delhi: Pearson Education.
3. Boundy, A. W., Albert William, (2002). *Engineering drawing.* Boston: McGraw-Hill.
4. Madsen D.A. (2006). Engineering Drawing and Design. 4th Ed. Stamford: Cengage Learning
5. Marelli R. and McCuistion P. (2001). Geometric Tolerancing: A Text-Workbook. 6th Ed. Singapore: McGraw Hill.

EBT 207/4
Materials Structure & Properties

Course Synopsis

This course will introduce student to historical perspective, materials science and engineering, materials classification. The contents include fundamental concept of **atomic structure** and their bonding; the classification of **crystalline and non crystalline** materials and their applications; comprehensive guide for identification of **imperfection** in solids such as point defects in metals, ceramic, impurities in solids, defects in polymer, dislocations (linear defects), interfacial defects, bulk or volume defect, atomic vibrations; introduction to diffusion. Mechanical properties of materials involves **stress-strain behavior**, non elastic and elastic properties of materials, compression property, shear, fatigue, creep, and flexural strength, hardness of materials, **electrical** properties - Ohm's law, electrical conductivity, electronic and ionic conduction, electrical properties using Ohm's Law, energy band structure, conduction in terms of band and atomic bonding models, electron motion, semiconductivity, electrical conduction in materials, **thermal** properties - heat capacity, thermal expansion, thermal conductivity, thermal stresses, **magnetic** properties - diamagnetism, paramagnetisme, ferromagnetisme, antiferromagnetisme, temperature effect on the magnetic behaviour, domain and hysteresis, hard and soft magnets, superconductor and **optical** properties - electromagnetic ray, solid and light interaction, atomic and electronic interaction, optical properties of metals and non metals, refraction, reflection, absorption, transmission, applications of optical phenomena - laser, fibre optic in communication.

References

1. Callister, W.D. Jr. (2000). *Materials Science and Engineering: An Introduction*. 5th Ed. New York: John Wiley.
2. Smith, W.F., (1990). *Principles of Materials Science and Engineerings*. 2nd Ed. Singapore: McGraw Hill.
3. Donald R. Askeland & Pradeep P. Phule, (2003). *The Science and ngineering of Materials*. 4th Ed. Thomson Brooks/Cole.
4. Brick R.M. et al. (1977). Structure and Properties of Engineering Materials. Singapore: McGraw-Hill.
5. Hayden H.W. et al. (1965). The Structure and Properties of Materials, Volume 3: Mechanical Behavior. New York: John Wiley & Sons.

EBT 211/4
Physical Metallurgy

Course Synopsis

This course will introduce student to differentiate between process or extractive metallurgy and physical metallurgy. General characteristic of metals, physical and mechanical properties of metals, atomic structure and bonding of metals. Phase transformation concepts in metals. Phase stability, categories of phase transformation, and kinetics of phase transformation. **Solidification Process** - Process of solidification and two energy involved in solidification process, distinguish between equiaxed and columnar grains.
Imperfections in Solid - Imperfection in solid metals and deformation mechanism for metals (edge and screw dislocation, plastic and elastic deformation). Slip: concept of slip, dislocations, twins, and their role in plastic deformation of single crystal. Critical slip system in FCC, BCC and HCP single crystal. Resolved shear stress by using Schmid Law.
Brief Introduction to Phase Diagram - Binary isomorphous system and binary eutectic system, phase diagram with intermediate phase or compound. Iron- iron carbide phase diagram, microstructure development in Fe-C alloy. Basic concept, solid state reaction kinetics, multiphase transformation, microstructure changes, and Fe-C properties.
Introduction to IT Diagram - Isothermal transformation diagram (IT) and continuous cooling transformation (CCT) diagram.
Strengthening Mechanism - Grain size reduction, Solid solution strengthening, Strain hardening, Dispersion strengthening by phase transformation, interfacial energy, age/precipitation hardening, and microstructural development in age hardening.
Hardenability - Mechanical behaviour of Fe-C alloy, tempered martensite, hardenability, jominy test, effect of

alloying to hardenability, cold work. Recovery, recrystallization and grain growth. Procedure of steel heat treatment: austenitizing, annealing, full annealing, normalizing, quenching, tempering.
Surface Heat Treatment - Introduction, types of treatment (carburizing, nitriding, carbonitriding and cyaniding). Diffusion- steady and non steady state diffusion.
Non Ferous Alloys - Classification, heat treatability, microstructure and general properties of aluminum alloys, copper alloys, magnesium alloys, titanium alloys, nickel alloys.
Metallography Quantitative - Grain size by metallography quantitative, ASTM grain size number and average grain size diameter. Important of grain size on the behaviour of crystalline metals.

References

1. John E. Neely, Thomas J. Bertone, (2000). *Practical Metallurgy and Materials for Industry*.
2. L. Carl Love. (1985). *Principles of Metallurgy*. Reston.
3. Verhoeven J.D. (1975). Fundamentals of Physical Metallurgy. New York: Wiley
4. Smallman R.E. and Ngan A.H.W. (2007). Physical Metallurgy and Advanced Materials. 7th Ed. Oxford: Butterworth-Heinemann.
5. Abbaschian R. and Reed-Hill R.E. (2008). Physical Metallurgy Principles. Stamford: CL-Engineering.

EBT 212/3
Dynamics

Course Synopsis

Students will be introduced to the concepts of mechanics in dynamic conditions. The course is 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, student learns the dynamics of a particle, followed by topics in rigid-body dynamics in two and then three dimensions. Emphasis will be given on the kinematics and kinetics of a particle, planar kinematics and kinetics of a rigid body, three dimension kinematics and kinetics of a rigid body.

References

1. Hibbler R. C., 2010. Engineering Mechanics- Dynamics, 12th ed. Prentice Hall.
2. Meriam J. L. & Kraige L.G., 2008. *Engineering Mechanics, Dynamics*, 6th ed. in SI Version, John Wiley & Sons, Inc.
3. Beer, F. B., Johnston, E. R. Jr. and Clausen, W. E., Vector Mechanics for Engineers: Dynamics. 8th ed. in SI Units, Canada, McGraw-Hill, 2007.

EBT 213/4
Extractive Metallurgy I

Course Synopsis

This course will introduce student to **Mineral Processing** - Advantages of mineral processing. Crushing: definition, type of crusher and its characteristics, selection of crusher. Grinding: grinding mills, mill liners, grinding action, critical speed. Laboratory Sizing Control: Sizing methods (screening, sedimentation), sizing scales. Industrial sizing: type of industrial screening, screening efficiency. Gravity concentration: gravity concentration methods (heavy medium separation, jigging, sluicing). Magnetic and Electrostatic Separation: Principles, type of separators. Flotation: process, flotation reagents, conditioning and flotation circuits.
Hydrometallurgy - Ore processing using hydrometallurgy method. Kinetic of heterogeneous reaction. Leaching process. Mode and leaching techniques. Solution Purification: Solvent extraction, solvent components (extraction mechanism), counter-current extraction, and application of solvent extraction in industrial worldwide. Purification of pregnant solution: ion exchange and activated carbon.
Electrometallurgy - Galvanics: Redox reactions, Electrochemical cells, reactions, and EmF, Cell EmF, Standard EmFs and electrode potentials. Cell types. Electrolytic cells Electrowinning, Electrorefining, Electroextraction, Electroleaching, Electrosynthesis. Metal and metal compound recovery:

crystallization, cementation, hydrogen gas reduction. Thermodynamic and hydrogen reduction kinetics.

References

1. A.R. Burkin, (2001). *Chemical Hydrometallurgy :Theory and principle*. London Imperial College Press.
2. Samsul Bahar Sadli, (1998). *Asas Proses Metalurgi*. Dewan Bahasa dan Pustaka, Kuala Lumpur.
3. Fathi Habashi, (1997). *Handbook of Extractive Metallurgy, Volume II.* Wiley-VCH.
4. Chiranjib Kumar Gupta, (2003). *Chemical Metallurgy.* Wiley-VCH.
5. Rosenqvist T. (2004). Principles of Extractive Metallurgy. 2nd Ed. Trondheim: Tapir Academic Press.

EBT 222/4
Fundamentals Of Ceramics

Course Synopsis

Student will be exposed wiht history of ceramic. Crystal structure of ceramic including silicate structure.
Properties of Ceramic Structure - Porosity, voids content, tensile and compression strength.
Raw Material - Basic concept of raw materials properties and production naturally or synthetically that normally used in ceramic industry. Preparation and production of clay and characterization of clay including plasticity and heat applied. Preparation of synthetic alumina powder by Bayer process and magnesium oxide from seawater.
Forming Technique - Fundamental concept. Powder pressing forming including isostatic, hot isostatic and cold isostatic pressing. Plastic forming including extrusion and injection molding technique. Slip casting and tape casting forming technique. Factors that influence the properties of green body of ceramic after forming.
Drying and Firing Process - Effect of heat to the vitrification and microstructure of ceramic body. Types of kiln including periodic and continuous kiln. Shrinkage and defect after drying and firing. Theory and mechanism of sintering. Types of sintering including solid state and liquid state sintering. Solid-state sintering and microstructure changes in initial, intermediate and final stages of sintering.

References

1. Michel Barsoum, (1997). *Fundamentals of Ceramics.* McGraw-Hill New York.
2. James S. Reed, (1995). *Principles of Ceramics Processing, 2nd ed.* John Wiley and Son Inc New York.
3. Allen Dinsdale diterjemah oleh Prof. Dr. Radzali Othman dan Prof. Madya Dr. Ahmad Fauzi Mohd Noor, (1993). *Sains Tembikar:Bahan, Proses dan Hasilan*. Penerbit USM P. Pinang.
4. Lawrence H. Van Vlack diterjemahkan oleh Zainal Arifin Ahmad. *Seramik Fizik Untuk Jurutera.*
5. Bengisu, M (2001). *Engineering Materials: Engineering Ceramics.* Springer, New York.

EBT 231/4
Elastomeric Materials

Course Synopsis

To introduce the basic knowledge of elastomeric materials on structure and properties, characterization, concept of rubber elasticity and principles of rubbers in engineering application.

References

1. Nagdi, K., ‘Rubber As An Engineering Materials: Guide For Users, Hanser Publisher, 1993.
2. Ciesielski, A., ‘An Introduction To Rubber Technology’, Rapra Technology Ltd., 2001.
3. Crompton, Roy, ‘Determination of Additives in Polymers and Rubbers’, Rapra Technology, 2007.
4. Wood, P.R., ‘Mixing of Vulcanisable Rubbers and and Thermoplastic Elastomers’, Rapra Technology, 2004.
5. Chandra, R., Mishra, S., ‘ Rubber and Plastic Technology’, CBS Publishers & Distributors, 1995.

EBT 232/4
Polymer Synthesis

Course Synopsis

This course is developed to introduce the basic concepts of synthesis polymer, the use of chemical structures and reaction schemes. Familarity with mechanistic concepts. Uderstanding the theorectical and conceptual background of synthesis polymer.

References

1. Braun, D., Chandra, H. Ritter, H., 'Polymer Synthetic, Theory and Practice', 3rd ed. 2001, Germany.
2. Harry R.A. Frederic K.W.L, James E.M., 'Contempory Polymer Chemistry', 3rd ed., Person Education, 2003.
3. Braun, D., Cherdron, H., Ritter, H., 'Polymer Synthesis: Theory and Practice: Fundamentals. Methods, Experiments', 4th ed., Springer, 2005.
4. Malcom P.S, 1997. Polymer Chemistry, Universitiy of Hartford, Oxford University Press, Inc. New York.
5. Odian G. 2004. Principle of Polymerization, 4th ed. City University of New York. Wiley-Inter Science.

EBT 233/4
Plastic Materials

Course Synopsis

This course is offered to introduce some basics of plastic materials: promote an understanding on structure/property relationship of plastic materials and provide some ideas on plastic material selection principles, testing and characterization

References

1. Brydson, J.A., 'Plastic Materials', 7th ed., Oxford: Butterworth – Heinemann, 1999.
2. Henry, S. Pascault, P. C., 'Thermosetting Polymers', Marcel Dekker,Inc., 2003.
3. Charles, A. H., 'Modern Plastic Handbook', Mc Graw Hill, Inc., 2000.
4. Sidney H. Goodman, 'Handbook of Thermoset Plastics', 2nd ed., RAPRA Tech., 2003.
5. Domininghaus, H.,'Plastic for Engineers: Materials, Properties, Applications', Hanser Pub., 2003.

EBT 235/3
Structure and Polymer Properties

Course synopsis

This course is offered to provide knowledge on principles and concept of structure/property relationship of polymeric materials. This includes the understanding on concepts of viscoelasticity, transition phenomena, mechanical and thermal properties of polymers

References

1. Gottfried, W. E., 'Polymeric Material: Structure-Properties-Applications', Carl Hanser Verlag, 2001.
2. Sperling, L.H., 'Introduction to Physical Polymer Science', John Wiley and Sons, Inc., 2001.
3. Allcock, H.R., Lampe, F.W.and Mark, J.E., 'Contemporary Polymer Chemistry', 3rd ed., Pearson Education, Inc.: Prentice Hall, 2003.
4. Domininghaus, H., 'Plastic for Engineers: Materials, Properties, Applications', Hanser Pub., 1993.
5. Gnanou, Yves, 'Organic and Physical Chemistry of Polymers', Wiley Interscience, 2008.

EBT 238/3
Physical Chemistry

Course Synopsis

The aim of this course is to introduce the knowledge of physical chemistry, calculate and solve problem of physical chemistry in polymeric materials.

References

1. Sperling, L. H., 'Introduction to Physical Polymer Science', 4th ed., Wiley-Interscience, 2006.
2. Gnanou, Yves, 'Organic and Physical Chemistry of Polymers', Wiley Interscience, 2008.

3. Teraoka, I. 2002. Polymer Solutions An Introduction to Physical Properties, Wiley & Sonn Inc., Publication.
4. Silbey, R.J., Alberty, R.A. & Bawendi, M.G. 2005. Physical Chemistry, Wiley & Son, Inc., Publication.

EBT 239/4
Thermodynamics In Polymer

Course Synopsis

The aim of this course is to introduce the knowledge of thermodynamic in polymer, calculate and solve problem of thermodynamic in polymer engineering process.

References

1. Irving M. K and Robert M, R (2005), Chemical Thermodynamics, Wiley & Sons, Inc., Publication, United State (USA).
2. Myron Kaufman (2002), Principles of Thermodynamic, Marcel Dekker, Inc., New York.
3. Rastogy R.P. and R.R. Misra, (1978), An Introduction to Chemical Thermodynamics, Vikas Publishing House, New Delhi.
4. Utracki, L.A., 'Polymer Blends', Rapra Technology, 2002.
5. Ronald P. Danner, Martin S (1993). Handbook of Polymer Solution Thermodynamics, Wiley.

EBT 251/3
Engineering Materials Chemistry

Course Synopsis

Introduction to Thermodynamics - First law of thermodynamics, expansion and contraction of work, enthalpy, heat capacity, thermochemistry and it application in metallurgy.
Second Law of Thermodynamics - Differentiate entropy function, cyclic process, several relations of thermodynamics which involving Gibbs Free Energy, relationship between equilibrium constant and temperature in reaction.
Reaction Kinetics - Effect of reactants and products concentration, determination of order and velocity constant of reaction, effect of temperature for reaction, theory of absolute reaction rates for catalyst, diffusion in solid state.
Electrochemistry - Electrolytes, electrolytic conduction, electrode potentials, galvanic cell, calculation of e.m.f. and cell potential, reduction and oxidation potential, standard electrode potential series.
Interface Phenomenon - Surface energy and surface tensions, interfacial energy except gas/liquid interface, interfacial of three phases, absorption and colloid.

References

1. Azizan Aziz dan Kamarudin Hussin. (2000). *Pengenalan Kimia Metalurgi*. Pulau Pinang: Penerbit USM.
2. Moore, J.J. (1998). *Chemical Metallurgy*. 2nd Edition. London: Butterworths.
3. Fahlman B.D. (2007). Materials Chemistry. 2nd Ed. New York: Springer.
4. Allcock H.R. (2008).Introduction to Materials Chemistry. New York: Wiley.
5. West A.R. (1999). Basic Solid State Chemistry. 2nd Ed. New York: Wiley.

EBT 252/4
Strength of Materials

Course Synopsis

Stress analysis, stress theory, strain analysis, strain theory, relationship of stress- strain and stress- strain temperature. Axial load, torsional loading, bend loading, bending stress, strain deflection.
Failure Criterion - Elastic deflection failure, excessive yielding failure, fracture failure, excessive deflection failure, and progressive failure.
Statically Indeterminate Beam Analysis - Method of integration, moment- area method, method of superposition, energy method, and plastic analysis.
Combined Loading - Combined axial and bending load, combined axial, bending and torsion load.
Column - Buckling of column, end-support conditions, empirical formula.
Joint - Rivet and bolt analysis (average shear strength and tensile strength), welding, and connection analysis.

References

1. Ferdinand P. Beer, E. Russell Johnston, Jr., John T. DeWolf. (2004). *Mechanics of Materials.* 3rd, McGraw Hill.
2. Hibbeler, R. C. (2003). *Mechanics of Materials*. 5th Edition, Prentice Hall.
3. Megson, T. H. G. (2002). *Structural and Stress Analysis*. Butterworth: Heinemann.
4. Shackelford, J.F. (2008). Introduction to Materials Science for Engineers. 7th Ed. New York: Prentice Hall.
5. Askeland, D.R. et al. (2010). The Science and Engineering of Materials. 6th Ed. Stamford: Cengage Learning.

EBT 253/3
Analytical Chemistry

Course Synopsis

The main purpose of the Course is to provide students with a strong theoretical and practical grounding in the principles and practices of Analytical Chemistry. Basically student will learn Analytical objective, Stoichiometric Calculations, General Concept of Equilibrium, Gravimetric Analysis, Complexometric Titrations, Precipitation Reactions and Titrations, Redox and Potentiometric Titrations, Chromatographic methods and Environmental Analysis. Student will undertake Analytical Chemistry Laboratory for helping student to further develop hands-on skills.

References

1. Christian, Gary. D., (1994). *Analytical Chemistry, Fifth Edition*. University of Washington: John Wiley & Sons, inc.
2. Skoog, Douglas. A., West, Donald. M et al,. (2004). *Fundamentals of Analytical Chemistry, Eigth Edition*. Stanford University, San Jose State University, University of Kentucky and Michigan University: Thomson Learning Academic Resources Center.
3. Higson, Seamus. P. J., (2004). *Analytical Chemistry*. Oxford University: Oxford University Press.

EBT 254/3
Transportation Phenomenon In Materials Processing

Course Synopsis

Heat Transfer - Fourier's law and thermal conductivity, thermal conductivity of gases, thermal conductivity of solids, thermal conductivity of liquids, thermal conductivity of bulk materials, heat transfer and the energy equation, quenching heat transfer coefficient, heat transfer coefficient in forging.
Solidification of Metals - Solidification in sand moulds, solidification in metal moulds, continuous casting, crystal growth.
Radiation Heat Transfer - Basic characteristic, the black radiator and emissivity, the energy distribution and the emissive power, gray bodies and adsorptivity, radiation combine with convection, radiation from gases.
Fick's Law and Diffusion in Materials - Definition of fluxes, Fick's first law, diffusion in solids, diffusion under composition gradient effect, Darken's equation, diffusion based on temperature in solids, diffusion in ceramic materials, diffusion in semiconductor materials, diffusion in liquids, diffusion in gases.
Diffusion in Solids - Steady state diffusion experiments, microelectronic diffusion processing, homogenization of alloys, formation of surface layers.
Mass Transfer in Fluid Systems - Diffusion through a stagnant gas film, diffusion in moving gas stream, the mass transfer coefficient, mass transfer in chemical vapor deposition.
Interphase Mass Transfer - Two-resistance mass transfer theory, mixed control in gas-solid reactions, iron carbonization with surface reaction and diffusion as control factor, transportation in gas phase and diffusion as control factor, silicon oxidation, alloys vaporizing during melting.

References

1. James R. Welty, Charles E. Wick, Robert E. Wilson, Gregory Rorrer. (2001). *Fundamentals of Momentum, Heat Transfer and Mass Transfer.* 4th Edition, John Wiley.
2. Poirier, D.R., Geiger, G.H. (1994). *Transport Phenomena in Material Processing.* A Publication of TMS.

3. Thomson W.J. (2000). Introduction to Transport Phenomena. New York: Prentice Hall.
4. Deen W.M. (1998). Analysis of Transport Phenomena (Topics in Chemical Engineering). USA: Oxford University Press.
5. Bird R.B. (2006). Transport Phenomena. 2nd Ed. New York: John Wiley & Sons.

EBT 303/3
Process Control

Course Synopsis

Basic concept for process control system, continuous and batch control. Application of computer software is extended in order to implement control algorithm for selected processes. Instrumentation selection is introduced for process control. Managing and implementing project. Designing and implementing process control.

References

1. Dorf, R.C., Bishop, R.H.(1998). *Modern control system.* Addision Wesley.
2. Coughanow, D.R. (1991). *Process System Analysis And Control.* McGraw Hill.
3. Dunn W. (2005). Fundamentals of Industrial Instrumentation and Process Control. Singapore: McGraw-Hill.
4. Johnson C.D. (2005). Process Control Instrumentation Technology. New York: Prentice Hall.
5. Chau P.C. (2002). Process Control: A First Course with MATLAB. Cambridge: Cambridge University Press.

EBT 311/4
Mechanical Metallurgy

Course Synopsis

This course is designed to introduce the students various aspects of Mechanical Metallurgy such as elastic plastic behaviour, stress concept, tensile deformation of ductile metal, ductile and brittle behaviour, elastic stress-strain relations, Mohr'circle of stress, stress tensor, calculation of stresses from elastic strain, strain energy, stress concentration, finite element method. Elements of the theory of plasticity such as flow curve, true stress-strain, Von Mises yielding criterion, maximum shear stress or Tresca criterion. Plastic Deformation of Single Crystals such as concept of crystal geometry, lattice defects, deformation by slip, slip in a perfect lattice, slip by dislocation movement, critical resolved shear stress for slip, deformation by twinning, stacking faults. Dislocation theory; Burgers vector, dislocation loop, dislocation in face-centered cubic lattice, intersection of dislocation, dislocation sources, multiplications of dislocations, dislocation pile-ups. Fracture mechanics theory such as fracture toughness test, design aspects for fracture mechanics. Fatigue of metals such as effect of mean stress on fatigue, cycle stress-strain curve, low-cycle fatigue, crack propogation. Design aspects for low-cycle fatigue. Creep such as creep mechanism, design aspects for creep behaviour. Failure analysis such as techniques for failure analysis, equipments for failure analysis, metallographic sample preparation for failure analysis, excessive load, wear, wear protection, corrosion, brittle fracture at low temperature, shear fracture, failure of heat treatment, fatigue, fracture mode identification, design consideration, type of fatigue fracture.

References

1. John E. Neely, Thomas J. Bertone, (2003). *Practical Metallurgy and Materials for Industry.* 6th Edition. Prentice Hall.
2. Schaffer, Saxena, Antolovich, Sanders & Warner, (1999). *The Science and Design of Engineering Materials.* 2nd Edition. Mc Graw Hill.
3. George E. Dieter. (1988). *Mechanical Metallurgy.* SI Metric Edition.Mc-Graw Hill.
4. Meyers M.A. (1983). Mechanical Metallurgy: Principles and Applications. New York: Prentice Hall.
5. May I.L. (1981). Principles of Mechanical Metallurgy. Amsterdam: Elsevier

EBT 317/3
Fluid Mechanics

Course Synopsis

Course will be concentrate 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 condition. Student also will learn momentum principles including basic equations for controlled system and volume, and then basic equations in differential form. The students will see in fluid application in flow topic in pipes and turbo-machine. The course also concentrates flow measurement aspect, like as tools and procedures which used in flow measurement.

References

1. Clayton T, Crowe, Donald F, Elger, John A. Roberson. (2001). *Engineering fluid Mechanics.* 7th Edition. John Wiley.
2. James R. Welty, Charles E. Wick, Robert E. Wilson, Gregory Rorrer. (2001). *Fundamental of momentum, heat transfer, and mass transfer.* 4th edition. John Wiley.
3. Munson B.R. et al. (2009). Fundamentals of Fluid Mechanics. New York: Wiley.
4. Fox R.W. et al. (2008). Introduction to Fluid Mechanics. New York: Wiley.
5. Mott R.L. (2005). Applied Fluid Mechanics. 6th Ed. New York: Prentice Hall.

EBT 313/4
Metallurgical Characterization

Course Synopsis

This course is designed to expose students the basic principles of metal characterization using LM, SEM, TEM as well as the principles of crystallography, metal texture, x-ray diffraction method and follow by spectroscopic technique and analytical.

References

1. Baldev Raj, G. Amarendra, M.H. Manghnani (2007). *Advanced in Materials Characterization.* CRC Press.
2. Hammond, C (2001). *The Basic of Crystallography and Diffraction*. Oxford University Press,.
3. Elton N. Kaufmann (2003). *Characterization of Material.* John Wiley.
4. Marc De Graef (2003). *Introduction to conventional transmission electron microscopy.* Cambridge University Press.
5. Paolo Samori (2006). *Scanning Probe Microscope Betond Imaging, Manipulation of Molecules and Nanostructures.*

EBT 314/3
Metallurgical Thermodynamics

Course Synopsis

This course is design to review of First and Second laws of thermodynamics.

Chemical Equilibrium - Activity, equilibrium constant, Le-Chatelier's principle, chemical potential, law of mass action. Effect of temperature and pressure on equilibrium constant, Vant Hoff's isotherm. Free energy-temperature diagrams, oxygen potential and oxygen dissociation pressure. Measurement of activity, Gibb's phase rule and its applications, Free energy composition diagram.
Solution Chemistry - Partial molar quantities, Ideal solutions, Rault's law, non ideal solutions, Gibbs-Duhem equation. Free energy of formation of solution, regular solutions. Excess thermodynamic quantities.
Electrochemistry - Electrochemical cell, determination of thermodynamic quantities using reversible electrochemical cell, EMF cell, electrode potential, electrode potential-pH diagrams and their applications. Thermodynamics laws to metallurgical systems with special emphasis on roasting, sintering, smelting and refining processes. Introductory theoretical treatment of alloying and alloy systems. Application of thermodynamic data to phase diagram.

References

1. Ahindra Ghosh, (2004). *Textbook of Materials & Metallurgical Thermodynamics*. Prentice Hall of India.
2. R.H. Tupkary, (1995). *Metallurgical Thermodynamics.* TU Publishers, Nagpur.
3. D.R. Gaskell, (1981). *Introduction to Metallurgical Thermodynamics.* McGraw-Hill Book Co. Inc., New York.
4. Yunus A. Cengel & Michael A. Boles, (2005). *Thermodynamics: An Engineering Approach*. McGraw-Hill.
5. Eric Brian Smith, (2004). *Basic Chemical Thermodynamics.* Imperial College Press.

EBT 315/2
Surface Engineering

Course Synopsis

This course is designed to provide an understanding of the role that surfaces play in materials behavior and to introduce the concepts of surface engineering and how surface engineering may be used to optimize a components performance and to introduce suitable techniques used to evaluate and characterize surfaces. Students will be exposed to a wide variety of topics such as common surface initiated engineering failures, physical and chemical techniques of surface protection, scope and application of conventional surface engineering techniques in engineering materials, advantages and limitation of conventional processes and testing/ evaluation of surface properties.

References

1. Roberge P. (2008). Corrosion Engineering: Principles and Practice. Singapore: McGraw-Hill.
2. Jones D.A. (1995). Principles and Prevention of Corrosion. 2nd Ed. New York: Prentice Hall.
3. A.W. Batchelor, Loh Nee Lam, Andrew William Batchelor & Margam Chandrasekaran, (2000). *Materials Degradation and Its Control by Surface Engineering*. Publisher: Imperial College Press.
4. Fontana, M.G. & Greene, N.D. (1986). *Corrosion Engineering.* 3rd Ed. New York: McGraw-Hill.
5. Wranglen, Gosta. (1985). *Introduction to Corrosion and Protection of Metals*. London: Chapman & Hall.

EBT 316/3
Metallurgical Design

Course Synopsis

Metallurgical design are create to incorporate engineering standards and realistic constrains, including most of the following considerations: economic, ethical, environmental and social. Focus on the design process, and the design method. The development of interdisciplinary teams is a high priority. The course integrates vertically and horizontally concepts from all areas of Metallurgical Engineering into a practical design project designed to train the students in the design practice. Fundamentals of the design process, specifications, decision-making, materials selection, materials process, experimental design, statistic process control and preliminary design are the focus. This course consists in the students playing the role of apprentices to design by teaming up with the interdisciplinary students in the s design projects.

References

1. George E. Dieter, (2000). *Engineering Design, a Materials and Processing Approach, Third Edition.* McGraw-Hill Company.
2. Atila Ertas and Jesse C. Jones, (1993). *The Engineering Design Process*. John Wiley & Sons, Inc.
3. Ashby M.F. and Johnson K. (2009). Materials and Design, Second Edition: The Art and Science of Material Selection in Product Design. 2nd Ed. Oxford: Butterworth-Heinemann.
4. Schaffer J.P. (1998). The Science and Design of Engineering Materials. 2nd Ed. Singapore: McGraw-Hill.
5. Pickering F.B. (1978). Physical Metallurgy and the Design of Steels. London: Applied Science Publishers.

EBT 322/3
Polymer Processing

Course Synopsis

This course is to provide a detailed introduction to the processing variety of materials polymer; rheology and flow melt in polymer, equipment and the important method of polymer processing, influence of factor-factor in polymer processing, defect in current processing and solve problem.

References

1. Callister, W.D. Jr. (2000). *Materials Science and Engineering: An Introduction.* 5th Ed. New York: John Wiley.
2. Budinski, KG. Budinski, M.K. (1999). *Engineering Materials: Properties and Selection.* 6th Edition. Prentice Hall.
3. Peter, C. Powell, (1999). *Kejuruteraan dengan polimer.* Terjemahan Azman Hassan et al, Penerbit UTM.
4. Baird D.G, Collias D.I. (1998). *Polymer Processing- Principles and Design.* John Wiley & Sons, Inc.
5. Richard, C.P, (1993). *Polymer Engineering Principles, Properties, Processes, Test for Design*. Hanser Publication.

EBT 323/4
Materials Characterization

Course Synopsis

This course is designed to expose students the basic principles of materials characterization using LM, SEM, TEM as well as the principles of crystallography , metal texture, x-ray diffraction method and follow by spectroscopic technique and analytical.

References

1. Hammond, C (1998). The Basic of Crystallography and Diffraction, Oxford University Press,.
2. Douglas A. Skoog & James J. Leary. (1992). Principles of Instrumental Analysis, 4th Ed. Sounders College Publishing.
3. Larry, G., Harges (1988). Analytical Chemistry: Principles and Techniques, Prentice Hall.
4. Gary, D., Cristian (1986). Analytical Chemistry, 4th Edition, John Wiley & sons.
5. John Edward Gentle (1982). Atomic Absorption Spectrometry, Elsevier.

EBT 324/3
Materials Thermodynamics

Course Synopsis

Summarised revision on thermodynamic; Phase transformation; Solid state- Reaction . Thermodynamic of the phase diagram; Consideration of the free energy, transformation kinetics - Thermodynamic and kinetics in the glass formation system, precipitation of the different phases at different composition from matrix.

References

1. Boris S. Bokstein, Mikhail I. Mendelev, (2005). *Thermodynamics and Kinetics in Materials Science.* Oxford University Press.
2. Svein Stolen & Tor Grande, (2004). *Chemical Thermodynamics of Materials.* John Wiley & Sons.
3. H.G. Lee, (1999). *Chemical Thermodynamics for Metals and Materials.* Imperial College Press.
4. Yunus A. Cengel & Michael A. Boles, (2005). *Thermodynamics: An Engineering Approach*. McGraw-Hill.
5. J. Susanto, (1988). *Termodinamik Gunaan: Masalah dan Contoh Penyelesaian*. Dewan Bahasa dan Pustaka.

EBT 326/4
Polymer Properties

Course Synopsis

The course is designed to introduce the students various properties of polymer such as thermoplastic, elastomer, thermoset, aspects of polymer physic including amorfous, semi-crystalline and crosslink of polymer, reinforcement of polymer products, mechanical properties, physical properties,characterization and analysis of polymer by using equipments.

References

1. Gottfried W.E. (2001). *Polymeric Materials – Structure-Properties-Application*. Hanser Gardner.
2. Callister, W.D. Jr. (2000). *Materials Science and Engineering: An Introduction.* 5th Ed. New York: John Wiley.
3. Vishu Shah. (1998). *Handbook of Plastics Testing Technology*. John Wiley & Sons, Inc.
4. Richard, C.P, (1993). *Polymer Engineering Principles, Properties, Processes, Test for Design.* Hanser Publication.
5. F.W. Billmeyer.(1984). *Textbook of Polymer Science*. John Wiley & Sons, Inc.

EBT 333/4
Rubber Processing

Course Synopsis

This course 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.

References

1. Gent, A. N., 'Engineering with Rubber: How to Design Rubber Components', 2nd ed. Hanser Publishers, 2001.
2. Mark, J. E.,' The Science and Technology of Rubber', 3rd ed., Elsevier Inc., 2005.
3. Brown, R.,' Physical Testing of Rubber', 4th ed., Springer, 2006.
4. Harry, L., 'Basic Compounding and Processing of Rubber', Rubber Division, American Chemical Society Inc., 1985.
5. Rodgers, B., 'Rubber Compounding: Chemistry and Applications', Marcel Dekker, 2004.

EBT 334/4
Polymer Testing and Characterization

Course Synopsis

This course introduce the basic concepts of testing and characterization, the usage of various polymer characterization equipments, understanding the analysis concept to identify and characterize the polymeric materials.

References

1. Ghottfried W. Ehrenstein, Gabriela Riedel, Pia Trawiel, 'Thermal Analysis of Plastic', Hanser, 2004.
2. Hatakayama, T., Zhenlai, L., 'Handbook of Thermal Analysis', John Wiley and Sons., Inc., 1998.
3. Vishu Shah, 'Handbook of Plastics Testing Technology', 2nd ed., John Wiley and Sons, Inc., 1998.
4. Naranjo, Noriega, Osswald, Roland-Alteza, Sierra. Plastic Testing and Characterization. Hanser, Germany.

EBT 335/4
Polymer Blends

Course Synopsis

To introduce the knowledge of polymer blend and alloys. Promote an understanding on their properties relationship and provide knowledge on characterization, selection principles and application of polymer blend and alloys.

References

1. Paul, D. R & Bucknall, C. B., 'Polymers Blends', John Wiley and Sons, Inc., 2000.
2. Gabriel, O. Shoinake, George, P. S., 'Polymer Blends and Alloys', Marcel Dekker, 1999.
3. Vasile, C.,Kulshrestha, A. K., 'Blends and Composites', Rapra Publisher, 2003
4. Utracki, L.A., 'Polymer Blends', Rapra Technology, 2002.
5. Long, Yu, 'Biodegradable Polymer Blends and Composites From Renewable Resources', Wiley, 2008.

EBT 336/4
Plastic Processing

Course Synopsis

This course is to provide a detailed introduction to the processing variety of materials polymer; rheology and flow melt in polymer, equipment and the important method of polymer processing, influence of factor-factor in polymer processing, defect in current processing and solve problem.

References

1. Baird D. G, Collias D. I.,' Polymer Processing-Principles and Design', John Wiley & Sons, Inc., 1998.
2. Andrew Ciesielski, 'An introduction to rubber Technology', Rapra Technology Ltd., 1999.
3. Tim A. Osswald, 'Polymer Proccesing Fudamentals', Hanser Publishers, 1998.
4. Strong, A. Brent, 'Plastics: Materials and Processing', 2nd ed., Prentice Hall, 2000.
5. Shenoy, A.V., Saini, D.R., 'Thermopalstic Melt Rheology and Processing', Marcel Dekker, 1996.

EBT 337/4
Mass and Heat Transfer in Polymer

Course Synopsis

The aim of this course is to introduce the knowledge of mass and heat transfer in polymer processing. Student will be able to describe the principles of convective mass transfer at boundry layer, mass transfer between phases, to calculate and solve the mass and heat transfer problem in polymer processing equipments such as injection molding and screw extruder and also capable to **plan and evaluate** the heat and mass transfer in conduction, convection and radiation involves during polymer processing.

References

1. James R. Welty *et all* (2007) Fundamental of momentum, Heat, and Mass Transfer, 5th Edition, Jhon Wiley & Son, Inc. USA.
2. Hans Dieter Baehr – Karl Stephan (2006) Heat and Mass Transfer 2nd Edition (revision, Springer, Germany.
3. Coulson & Richardson's (1999) Chemical Engineering, Sixth Edition (Reprint 2009)" Fluid Flow, Heat and Mass Transfer", Elsevier, Great Britain (UK).
4. Henning Bockhorn, Dieter Mewes, Wolfgang Peukert and Hans-Joachim Warnecke (2010) Heat and Mass Transfer – Micro and Macro Mixing: Analysis, Simulation and Numerical Calculation, Springer-Verlag Berlin Heidelberg
5. Rong Zheng, Roger I. Tanner, Xi-Jun Fan (2011) Injection Molding: Integration of Theory and Modeling Methods, Springer Heidelberg Dordrecht London New York
6. Rachid Bennacer (2007) Numerical Methods for Heat & Fluid Flow, International Conference on Computational Heat and Mass Transfer, Emerald Group Publishing Limited 0961-5539

EBT 338/4
Latex Processing

Course Synopsis

To develop the basic knowledge and principles of latex technology, properties due to compounding, characterization and their application. This course is focus on latex compounding, production of latex concentrate and latex processing techniques.

References

1. Blackley, D. C.,'Polymer Latices: Science and Technology', 2nd Edition, Vol. 1 – 3, Chapman & Hall, 1997.
2. Warson, H. and Finch, C. A.,' Application of Synthetic Resin Latices : Fundamental Chemistry of Latices and Applications in Adhesives', John Wiley & Sons, Ltd., 2001.
3. Dunn, David J., 'Natural and Synthetic Latex Polymers: Market report', Rapra Technology, 2002.
4. Vikas Mittal, ' Advances in Polymer Latex Technology', Nova Science Publishers, 2009.
5. Gad, Shayne C., 'Safety Evaluation of Medical Devices (Electronic Resources)', 2nd ed., Marcel Dekker, 2002.

EBT 351/3
Electronic Materials Engineering

Course Synopsis

Elementary materials science concept, electrical and thermal conduction in solid, elementary quantum physics, modern theory of solids, semiconductor, dielectric materials and insulator, magnetic properties and superconductivity, optical properties of materials.
Electronic packaging: Fundamental of electronics packaging design, reliability, thermal management, single chip packaging and multichip packaging.

References

1. S.O. Kasap , Principles of Electronic Materials and Devices, Second Edition, McGraw Hill Higher education, 2002.
2. Rao R. Tummale, Fundamentals of Microsystems Packaging, McGrawhill, 2001.
3. Gardner, Julian W., Microsensors MEMS and Smart Devices, John Wiley , c2001.
4. Harper C. (2009). Electronic Materials and Processes Handbook. Singapore: McGraw-Hill.
5. Kasap S. (2005). Principles of Electronic Materials and Devices. 3rd Ed. Singapore: McGraw-Hill.

EBT 401/3
Non Destructive Testing

Course Synopsis

Non-destructive testing (NDT) is a method used for inspection of a material's internal part. Identifying defects and flaws in material which could not be seen using our naked eyes is absolutely important in determining the material lasting age and the material performance. It is formerly known that the effective method of NDT is almost depending on the knowledge and skill of the person incharge. 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 liquid penetrant, magnetic particle, eddy current, ultrasonic, and radiography technique.

References

1. B. Raj, T. Jay Kumar & M. Thavasimuthu. (2002). *Practical Non-Destructive Testing, Woodhead Publishing and Alpha Science International Ltd.*2nd Edition. New Delhi: India.
2. J. S. Peter. (2002). ,*Non-destructive Evaluation: Theory, Techniques and Applications.* Marcel Dekker Incorporation, New York: USA.
3. F. Kojima, T. Takagi, S.S. Udpa and J. Pavo. (2002). *Electromagnetic Non-destructive Evaluation, IOS Press.* Amsterdam: Netherland.
4. J. H. Charles. (2001). *Handbook of Non-destructive Evaluation.* McGraw-Hill, New York: USA.
5. E. B. Don and K. S. Roderic. (1997). *Non-destructive Evaluation, A Tool in design, manufacturing, and service,* CRC Press Incorporation, Boca Raton: Florida.

EBT 402/3
Corrosion Engineering

Course Synopsis

Student will learn corrosion and surface engineering principles. Therefore, in this subject, the student will be learned electrochemistry, corrosion type, corrosion problems in industries. Electrochemistry principles, corrosion tyes, 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.

References

1. Roberge P. (2008). Corrosion Engineering: Principles and Practice. Singapore: McGraw-Hill.
2. Jones D.A. (1995). Principles and Prevention of Corrosion. 2nd Ed. New York: Prentice Hall.
3. A.W. Batchelor, Loh Nee Lam, Andrew William Batchelor & Margam Chandrasekaran, (2000).

Materials Degradation and Its Control by Surface Engineering. Publisher: Imperial College Press.
4. Fontana, M.G. & Greene, N.D. (1986). *Corrosion Engineering.* 3rd Ed. New York: McGraw-Hill.
5. Wranglen, Gosta. (1985). *Introduction to Corrosion and Protection of Metals*. London: Chapman & Hall.

EBT 411/3
Engineering Alloys

Course Synopsis

This course was designed for students to study various types of engineering alloys including apparent microstructure, microstructural changes after heat treatment, heat-treatment design and applications of engineering alloys. To study metal matrix composites and biomaterials.

References

1. William Smith.(1993). *Structure and properties of engineering alloys*. 2th Edition, McGraw Hill.
2. J. R. Davis. (2001). *Alloying: Understanding the Basics.* ASM International.
3. Mathew, F.L. Rawlings, R.D. (1998). *Composite Materials: Engineering and Science*. Chapman & Hall,
4. Ronal F.G. (1994). *Principle of Composite Materials Mechanics.* McGraw-Hill.
5. Suresh, S., Mortensen, A., Needleman, A., (1993). *Fundamentals of Metal-Matrix Composite.* Elsevier.

EBT 412/3
APPLIED METALLURGY

Course Synopsis

This course is to introduce the students fundamental of metal casting. Casting technology, heating and pouring. Solidification and cooling. Fluidity and fluid flow phenomena in casting processes. Casting quality and casting defects. Characterization of engineering powders. Production of metallic powders . Conventional pressing and sintering. Alternative pressing and sintering techniques. Matereials and products for Powder Metallurgy. Overview of metal forming. Material behaviour. Bulk deformation process in metal working, rolling, forging, extrution bar and wire drawing. Cutting and bending operation, drawing, shear metal forming operation. Mechanics of metal cutting and chip formation. Power and energy relationship in machining.

References

1. Peter Beeley. (2001). *Foundry Technology*. 2nd Ed. Oxford:Butterworth/Heinemann.
2. John E. Neely, Thomas J. Bertone. (2000). *Practical Metallurgy and materials for Industry*.
3. J. Beddoes, M. Bibby. (1999). *Principle of Metal Manufacturing Process.* Butterworth- Heinemann.
4. Serope Kalpakjian. (1991). *Manufacturing processes for Engineering Materials.* Addison Wesley.
5. Degarmo, Black and Koser. (1988). *Material and Processes in Manufacturing.*

EBT 413/3
Welding Metallurgy

Course Synopsis

This course is designed to introduce the students welding metallurgy principles and influencing factor in welding metallurgy selected. Therefore, students will exposure welding principle, metallurgical welding, welding types and welding mechanism, welding problems in varies industries and welding solutions.

References

1. Lancaster J.F. (1999). Metallurgy of Welding. 6th Ed. UK: Abington Publishing.
2. Easterling. K, (1993). *Introduction to Physical Metallurgy of Welding.* Butterworth: Heinemann.
3. Granjon H. (1991). Fundamentals of Welding Metallurgy. UK: Abington Publishing.
4. Kou. S.(1987). *Welding Metallurgy.* John Wiley & Sons.

5. Linnert G.E. (1965) Welding metallurgy;: Carbon and alloy steels. Volume 1: fundamentals. 3rd Ed. USA: American Welding Society.

EBT 414/3
Electronic Metallurgy

Course Synopsis

This course is design for student to review the microelectronic packaging hierarchy, 6 levels of packaging. First and level interconnection techniques in electronic packaging hierarchy.
Die Bonding - Die bonding material and types of metals used. Properties of each metals involved. Function of metals in die bonding.
Wire Bonding - Wire bonding technology and bonding techniques. Metallurgy of wire bonding and its characteristic. Intermetallic compound and metallic interface. Wire bond testing concepts. Bonding issues and reliability failures.
Soldering Technology - Solder materials and microstructures. Flux and solderability. Solder joint and intermetallic formation. Reliability and failure mechanisms. Applications and metallization in flip chip technology and tape-automated bonding.
Processing Technologies - Metal deposition techniques commonly used in microelectronic packaging processes including evaporation, sputtering and elctro- and electroless plating which are used in the fabrication of corrosion-resistant metal pads on IC packages. Advantages and disadvantages of the technique used. Patterning process. Metal-to-metal joining process.
Package Construction - Application of metals in base, lead frames and lids construction.

References

1. Harper C. (2009). Electronic Materials and Processes Handbook. Singapore: McGraw-Hill.
2. Kasap S. (2005). Principles of Electronic Materials and Devices. 3rd Ed. Singapore: McGraw-Hill.
3. J.H. Westbrook, R.L. Fleischer. (2000). *Magnetic, Electrical, and Optical Properties and Applications of Intermetallic Compounds*. Volume 4. Publisher: Wiley.
4. George G. Harman. (1997). *Wire Bonding in Microelectronics: Materials, Processes and Equipment*. Publisher: McGraw-Hill Professional.
5. Mayer J.W. and Lau S.S. (1989). Electronic Materials Science: For Integrated Circuits in SI and GaAs. New York: Prentice Hall.

EBT 415/3
Metallurgical Forensic Analysis

Course Synopsis

This course is designed to bridge the gap between theory and practice of forensic analysis in term of metallurgical aspect. It presents a very practical approach to forensic analysis for metallurgical engineering students who interested in understanding how knowledge of forensic analysis can lead to better productivity. The forensic analysis of product/component failures is also studied from beginning to end for certain case studies that normally happen in industries. The module also provides hands-on experience on alloy forensic analysis both at during laboratory work and on site visit. Student also exposed with technical report writing technique through mini project.

References

1. Das, A. K. (1997). *Metallurgy of Failure Analysis*. McGraw-Hill. New York.
2. Brooks, C.R., Choudhury, A., Brooks, C.R., (2001). *Failure Analysis of Engineering Materials*. McGraw-Hill. New York.
3. McEvily, A.J., (2002). *Metal Failures: Mechanisms, Analysis, Prevention.* John Wiley & Sons. New York.
4. Mobley, R. K., (1999). *Root Cause Failure Analysis.* Butterworth-Heinemann, Woburn.
5. Tawancy, H.M., Nureddin., A. U. Abbas. M., (2004). *Practical Engineering Failure Analysis.* Taylor & Francis. New York

EBT 417/3
Extractive Metallurgy II

Course Synopsis

This course is design to introduce general principle in extracting metal ore using pyrometallurgy route starting from ore treatment, drying, calcination, roasting and sintering. Type of furnace for smelting, including the detail process in smelting and refining will be explain. This course will provide student with the knowledge on the extraction of ferrous and non-ferrous metals and the impact of the pyrometallurgy on the environmental aspects.

References

1. Chiranjib Kumar Gupta, "Chemical Metallurgy", Wiley-VCH, ISBN 3527303766 (2003).
2. Fathi Habashi, "Textbook of Pyrometallurgy" Métallurgie Extractive Québec, ISBN 2922686051 (2002).
3. Samsul Bahar Sadli, "Asas Proses Metalurgi", Dewan Bahasa dan Pustaka, ISBN 9836256350 (1998).
4. Fathi Habashi, "Handbook of Extractive Metallurgy, Volume II", Wiley-VCH, (1997).
5. Colin Bodsworth, "The Extraction and Refining of Metals" CRC Press ISBN 0849344336 (1994).

EBT 421/3
Advanced Materials Engineering

Course Synopsis

Introduction to advanced material (nanostructured, synthethic alloy, ODS alloy), the fabrication process of those materials and its applications also characterization techniques by using TEM, SEM, XRD and BET methods.

References

1. Smallman R.E. and Ngan A.H.W. (2007). Physical Metallurgy and Advanced Materials. 7th Ed. Oxford: Butterworth-Heinemann.
2. Hari Singh Nalwa. (2002). *Nanostructred Materials and Nanotechnology*. Academic Press,
3. El-Eskandarany. S.M. (2001). *Mechanical Alloying For Fabrication Of Advanced Engineering Materials.* Noyes Publication,
4. Bernier P., S. Lefrant, G. Bidan. (1999). *Advance In Synthetics Metals.* Elsevier.
5. Edelstein. A, Cammarata R. S. (1996). *Nanomaterial: Synthesis, Properties And Application.*

EBT 422/3
Composite Materials

Course Synopsis

This course is focusing on three major types of composite materials which are Ceramic Matrix Composite (CMC), Polymer Matrix Composite (PMC), and Metal Matrix Composite (MMC). Lectures cover on several important aspects of composite materials. This includes the introductions, classifications, properties, applications and characterizations of composite materials, matrix and reinforcement phase, manufacturing and processing methods, types and influence of different reinforcement, inter-phase properties, mechanical and failure behavior, current and future potential applications of composite products. At the end of this course, students will have a comprehensive knowledge and well understanding regarding composite materials.

References

1. Mathew, F.L., Rawlings, R.D. (1998). *Composite Materials: Engineering and Science.* Chapman & Hall.
2. Ronal F.G. (1994). *Principles of Composite Material Mechanic.* Mc Graw-Hill.
3. Schwartz, M.M, Composite Materials Handbook, McGraw-Hill, 1992.

EBT 423/3
Materials Selection and Design

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 optimum selection of materials for engineering and industrial applications. The cause of product/ component failure in metals, polymers, ceramics, composites and its alleviation is studied in detail through case studies. The module also provides hands-on testing experience of measuring important mechanical properties through mini project. The course content are as follows; general methodology of design, practical issues in engineering design, practical issues in engineering design, practical issues in engineering design, materials and component failures and selection for the specific purposes.

References

1. Michael, F. Ashby. (1999). *Materials Selection in Mechanical Design.* Butterworth: HeinMann.
2. Pat. L. Mangonon. (1999). *The principles of Materials Selection for Engineering Design.* Prentice Hall.
3. Schaffer, Saxena, Antolovich, Sanders, Warner. (1999). *The Science and Design of Engineering Materials.* Mc Graw Hill.
4. Michael, F. Ashby & David, R. H. Jones. (1996). *Bahan Kejuruteraan: Pengenalan Sifat dan Kegunaan.* USM.
5. Mahmoud M. Farag. (1989). *Selection of Materials and Manufacturing Process for Engineering Design.* Prentice Hall.

EBT 424/3
Construction Materials

Course Synopsis

Introduction to the basic construction materials including raw material, physical and mechanical properties, processing and construction material designs. Also introduction to construction industries in Malaysia and involvement of others organization in supervising construction industry such as JKR, CIDB, IEM, PAM, Sirim, Kementerian Perumahan dan Kerajaan Tempatan dan Pusat Khidmat Kontraktor.

References

1. Mahyudin Ramli, *Teknologi Konkrit dan Pembinaan*, Dewan Bahasa & Pustaka, 1991.
2. R. K. Rajput, *Engineering Material*, S. Chand & Company Ltd, 2000.
3. J. Newman, *Advanced Concrete Technology: Constituent Materials*, Butterworth, Heinemann, 2004.
4. Theodore W. Marotta, *Basic Construction Materials*, Prentice Hall, 7th Editions, 2005.
5. Sidney Mindess, J. Francis Young, David Darwin, *Concrete*, Prentice Hall, 2nd Editions, 2003.

EBT 425/3
Thermoelectric Materials

Course Synopsis

This course is designed as an introduction to thermoelectric materials, concept that effect thermoelectric properties, materials selection and criteria of thermoelectric materials, analysis of thermoelectric.

References

1. D.M. Rowe. (2005). *Thermoelectrics Handbook: Macro to Nano*.
2. M.G. Kanatzidis, T.P. Hogan, S.D. Mahanti. (2003). *Chemistry, Physics and Materials Science of Thermoelectric Materials*. Beyond Bismuth Telluride (Fundamental Materials Research).
3. G. S. Nolas, J. Sharp, H. J. Goldsmid. (2001). *Thermoelectrics: Basic Principles and New Materials Developments*. Springer-Verlag.
4. D.M. Rowe. (1995). *CRC Handbook of Thermoelectrics*.
5. Nolas G.S. et al. (2010). Thermoelectrics: Basic Principles and New Materials Developments. Berlin: Springer.

EBT 426/3
Advanced Electronic Packaging

Course Synopsis

In this course, students will be exposed to the following: Introduction to few types of electronic packages such as Ball Grid Array (BGA), Land Grid Array (LGA), Flip Chip (FC), Chip Scale Package (CSP), Wafer Level-Chip Scale Package (WL-CSP), Direct Chip Attach (DCA) etc. The advantages, disadvantages and challenges of each of the above packages towards meeting the needs of the nanometre range, needs of new devices and market will be shared. On further, the types of materials used such as polymer, ceramic, metal etc. will be shared. The existence of the thermo-mechanical stresses in electronic packages and the suitable design to overcome it will be shared. Electrical, mechanical, optical, physical properties etc. including the reliability of the electronic packages and its material will be shared. Thermal management: heat transfer theory, thermal & cooling design and thermal measurement methodology that involved the software and hardware will be shared. Soldering technology: alloy, soldering technique, microstructure, interconnection, no-clean solder, lead-free solder and lead-free plating will be shared. Interconnection technology: Surface Mount Technology (SMT), Multichip Module (MCM), MEMS, sequential build-up substrate technologies, which enable connection to high-density IC packages with unique trace/via interconnection constraint will be shared. Embedded passive and active components, which significantly reduce the product size that need advanced footprint creation, placement and analysis capabilities will also be shared. Wireless industry-based driven products such as custom ASICs, off-the-shelf ICs; mixed signal, RF, and digital circuitry on the same substrate, Systems-in-package (SiPs) integration of multiple interconnect and devices technologies on a single substrate and lastly stacked die with incredible design densities which pose challenges with localized wirebonding and trace routing density will be shared.

References

1. S.O. Kasap. (2002). *Principles of Electronic Materials and Devices*. 2nd Edition. Publisher: McGraw-Hill.
2. Ken Gilleo. (2001). *Area Array Packaging Handbook*. 1st Edition. Publisher: McGraw-Hill.
3. Charles A. Harper. (2000). *Electronic Packaging and Interconnection Handbook*. 3rd Edition.Publisher: McGraw-Hill.
4. John H. Lau. (2000). *Low Cost Flip Chip Technologies for DCA, WLCSP, and PBGA Assemblies*. Publisher: McGraw-Hill.
5. John Lau, S.W. Ricky Lee. (1999). *Chip Scale Package – Design, Materials, Process, Reliability, and Applications.* Publisher: McGraw-Hill.

EBT 427/3
Technical Ceramic

Course Synopsis

This course is designed to exposed the students to the technical ceramic and important aspect in advance ceramic.
Electro Ceramic - Materials and properties. Basic concept of ceramic to electro ceramic application including insulator, ceramic high frequency, piezoelectric transistor and superconductor.
Refractory - Properties and application of different types of refractory such as silica, alumina silica, magnesit dan crome magnesit.
Ceramic Structure - Materials and properties. Basic principles of ceramic to the aerospace, cutting tools, automobile and biomaterials applications.
Ceramic Matrix Composites - Properties and several toughening technique. Carbon-carbon composites and hybrid composite. Processing of fiber reinforced composites including pultrusion, prepreg production process and filament winding.
Bio Ceramic - Selection, properties and application. Basic concept of toughening and produce ceramic composite for biomaterials application.
Non Structure Ceramic - Materials and properties. Nonstructural application including packaging, sensor, filtering and electrical optic.
Glass - Mechanical, optic, electric and chemical resistance properties of glass. Glass transition temperature and structure of glass including glass forming oxides, glass modifying oxides and intermidiate oxides in glasses. Properties and application of different composition of glasses such as soda lime glass, borosilicate glass and lead glasses. Production and forming methods of glasses including heating, molding, drawing or rolling and annealing.

References

1. Bengisu, M (2001). *Engineering Materials: Engineering Ceramics*. Springer, New York.
2. Lawrence H. Van Vlack diterjemahkan oleh Zainal Arifin Ahmad. *Seramik Fizik Untuk Jurutera*.
3. Kenneth, G. B., Michael, K. B (1999). *Engineering Materials: Properties and Selection. 6th ed.* Prentice Hall International Inc. UK.
4. Ganguly C. et al. (1991). Advanced Ceramics (Key Engineering Materials) Switzerland: Trans Tech Publications.

5. Hench L.L. and West (1990). J.K. Principles of Electronic Ceramics. New York: Wiley-Interscience.

EBT 428/3
Materials for Energy Application

Course Synopsis

Student will be exposed to several materials associate with energy conversion and storage. This is including the properties of materials, fundamental of reaction involved, extended issue and challenge towards green technology.

References

1. Richard J. D. Tilley (2004) Understanding Solids: The Science of Materials, John-Wiley and Sons.
2. A.R. West (1984) Solid state chemistry and its applications, John-Wiley and Sons.
3. C.C. Sorrell, Sunao Sugihara, Janusz Nowotny (2005) Materials for energy conversion devices, Woodhead Publishing Ltd.
4. George G. Libowitz, M. S. Whittingham (1979) Materials science in energy technology, Academic Press.
5. David L Andrew, Energy Harvesting Materials, World Scientific.

EBT 431/3
Polymer Engineering Product

Course Synopsis

To introduce the basic knowledge of polymer engineering product development. Promote an understanding on the concepts of engineering product and requirements. Provide knowledge on characterization, selection principles and application of polymer engineering product.

References

1. Charles, A. H. , 'Handbook of Plastics, Elastomers & Composite', 4th ed., Mc Graw Hill Companies, Inc., 2001.2. Charles, A. H. , 'Handbook of Plastics, Elastomers & Composite', 4th ed., Mc Graw Hill Companies, Inc., 2001.
2. Rosato, D. V., 'Plastics Product Material and Process selection Handbook', Elsevier Ltd, 2004.
3. E. Alfredo Campo. 2006. The Complete Part Design Handbook. Hanser Publishers, Munich.
4. E. Alfredo Campo. 2008. Selection of Polymeric Materials. William Andrew Publisher. USA.

EBT 433/3
Polymer Adhesive and Coating

Course Synopsis

To introduce the basic knowledge on principles and properties of adhesion, adhesives polymer coatings. This course is focus on design formulation of adhesives and coating products, study working properties, testing and characterization and also application of them.

References

1. Mittal, K. L., Pizzi, A., 'Handbook of Adhesive Technology', Marcel Dekker. Inc., 2003.
2. Souheng, Wu, 'Polymer Interface and Adhesion', Marcel Dekker. Inc., 1982.
3. Pillard, D. A., Pocius, A. V., 'Adhesion Science and Engineering', vol. 1-2, Elsevier, 2002.
4. Raymond H. Fernando, Li-piin Sung, 'Nanotechnology Applications in Coatings', American Chemical Society, 2009.
5. Walter Brockmann, Paul Ludwiq Geil, Jurgen Klingen, K. Bernhard Schroder,Bettina Mikhail, 'Adhesive Bonding: Materials, Applications and Technology', Wiley-VCH, 2009.

EBT 434/3
Environmental Friendly Polymer

Course Synopsis

The aim of this course is to provide the knowledge of environment friendly polymer. Solve on their issues and understand the future needs of environmental polymers and create alternative ways for handling polymer issue such as degradable polymer and polymers recycling.

References

1. Francesco La Mantia, 'Handbook of Plastics Recycling', Rapra Technology Limited, Shawbury, 2002.
2. Catia Bastioli, 'Handbook of Biodegradable Polymers', Rapra Technology limited, Shawbury, 2005.
3. Jhonson R.M. 2003. Biopolymer. Sithers Rapra, Vol. 14. U.K.

EBT 435/3
Polymer in Electronic Application

Course Synopsis

To provide knowledge of polymer application in electronic industries. This includes an understanding on the concepts of fabrication processes of various polymers in this application. Provide knowledge on characterization and selection principles of polymer in electronic application.

References

1. S. O. Kasap, 'Principles of Electronic Materials and Devices', 2nd ed., McGraw Hill, 2002.
2. Charles A. Harper, 'Electronic Packaging and Interconnection Handbook', 4th ed., McGraw Hill, 2005.
3. Manas Chandra, Salil K.Roy. 2009. Industrial Polymers, Specialty Polymers, and Their Application. CRC Press, Taylor & Francis Group

EBT 437/3
Polymer Composites

Course Synopsis

This course will provide the concepts of polymer composites with several of fabrication techniques. This course also provides knowledge on fiber reinforcement of polymer matrices and their corresponding properties. The course includes the mechanics of composites and some composite testing methods.

References

1. Deborah, D. L. Chung, 'Composites Materials: Science and Application', Springer-Verlag, Ltd., 2003.
2. Avokali, G., 'Handbook of Composite Fabrication', Rapra Technology Limited, 2001.
3. Barbara H. Stuart, 'Polymer Analysis', John Wiley & Sons, Ltd., 2000.

EBT 441/3
Polymer Engineering Design

Course Synopsis

The aim of this course is to develop knowledge on the polymer engineering design specifically for plastic injection moulding activities, dies for extrusion process and a design that involves a polymerization reactor. The generate knowledge will provide an effective skill to counter and solve the common problem approach on the fundamental basis of polymer engineering design.

References

1. M. S. Peters and K. D. Timmerhaus, Plant Design and Economics for Chemical Engineers, 4th Edition, McGraw-Hill Book Company, New York (1991).
2. Perry's Chemical Engineer's Handbook, 7th Edition, McGraw-Hill Book Company, New York (1997).
3. H. F. Rase, Chemical Reactor Design for Process Plants, Volumes I & II, J. Wiley & Sons, Inc., New York (1977).
4. Micheali, W (1992) Extrusion Dies for plastics and rubber: Design and Engineering. Munich: Hanser Publishers.
5. Michaeli, W.; Greif, H.; Kretzschmar, G.; Ehrig, F. (2001) Training in Injection Molding. Munich: Hanser Publishers.
6. Rosato, D.V, Rosato, D.V, Rosato, M.G (2000) Plastic design handbook. Massachusetts: Kluwer Academic Publishers.
7. Osswald, T.A, Hernandiz-Ortiz, J. P (2006) Polymer Processing: Model and simulation. Munich: Hanser Publishers.
8. Campo, E. A (2006) The complete part design handbook: For injection molding of thermoplastics. Munich: Hanser Publishers.

EBT 445/2 & EBT 446/4
Final Year Project

Course Outcomes

- Able to plan and manage research project.
- Ability to apply theory that had been studied in research project.
- Able to write a technical report professionally.
- Able to present a research project professionally.

Course Synopsis

Research project will be conducted by the final year student. Objective of the project is to introduce the real problem in the field of engineering and familiarize the research method, problem solving, research publication and presentation of the effective results through thesis and seminar.

Job Opportunities

Graduates with a Bachelor of Engineering (Materials Engineering), (Metallurgical Engineering) and (Polymer Engineering) have a broad employment prospects either in the private sector/industry, departments in government and also statutory bodies. Sectors that offer employment opportunities are as follow;

- Metal Industry.
- Polymer Industry.
- Electronic Packaging Industry.
- Materials Processing Industry.
- Automotive Industry.
- Service and Maintenance Industry.
- Engineering Fabrication Industry.
- Quality Control Department.
- Department of Engineering and Product Design.
- Research and Development Institution or Department.
- Institutions of Higher Education.
- Polytechnic / Community College.

The main careers for graduates in these THREE programs are as follows;

- Process Engineer.
- Production Engineer.
- Manufacturing Engineers.
- Quality Control Engineer (QC).
- Quality Assurance Engineer (QA).
- Failure Analysis Engineer.
- Product Development Engineer.
- Process Development Engineer.
- Materials Development Engineer.
- Metallurgical Engineers.
- Negotiation and Site Engineer.
- Research Officer.
- Lecturer for Polytechnic / College Community.
- Teaching Engineer

School of Bioprocess Engineering

Programmes Offered

- Bachelor of Engineering (Honours) (Bioprocess Engineering)
- Bachelor of Engineering (Honours) (Biosystems Engineering)
- Bachelor of Chemical Engineering Technology (Honours) (Industrial Biotechnology)
- Bachelor of Mechanical Engineering Technology (Honours) (Agricultural Systems)
- Bachelor of Chemical Engineering Technology (Honours) (Industrial Chemical Process)
- Master of Science (Bioprocess Engineering)
- Master of Science (Biosystems Engineering)
- Doctor of Philosophy

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Introduction

The School of Bioprocess Engineering (SBE) was first established in October 2005 after approval from the Ministry of Higher Education.

SBE currently offers five (5) Bachelor's Degree programmes namely Bachelor of Engineering (Honours) (Bioprocess Engineering), Bachelor of Engineering (Honours) (Biosystems Engineering), Bachelor of Chemical Engineering Technology (Honours)(Industrial Biotechnology), Bachelor of Mechanical Engineering Technology (Honours) (Agricultural Systems) and Bachelor of Chemical Engineering Technology (Honours) (Industrial Chemical Process).

The field of Bioprocess Engineering, Biosystems Engineering, Industrial Biotechnology, Agricultural Systems and Industrial Chemical Process play a significant role in industrialized countries. Generally, the curricula are designed to enhance student's theoretical knowledge. The primary purpose is to produce holistic graduate engineers who posses not only the technical knowledge and critical skills but also equipped with skills in information technology, communication, entrepreneurship, and also ethics. Hence, the structures of the curricula are designed to deliver these important knowledge and skills.

Bachelor of Engineering (Honours) (Bioprocess Engineering)

Bioprocess Engineering is a specialization of biological processes and Biotechnology in Chemical Engineering field. It deals with the design and development of equipment and processes for the manufacturing of bio-based products such as food, feed, pharmaceuticals, nutraceuticals, chemicals, polymers, and etc, from biological materials. Bioprocess engineering is a conglomerate of mathematics, biology and chemical design,and consists of various spectrums like studying of fermentors (mode of operations etc.), large scale production of biological product, optimization of yield in the end-product and the quality of end-product and microorganism cellular-based productions.

Bachelor of Engineering (Honours) (Biosystems Engineering)

UniMAP's Biosystems Engineering is considered as the biology-focused evolution of typical Agricultural Engineering programme and applies to all living organism systems with an exception of human. It is an engineering programme that "*applies and integrates knowledge in sciences, mathematics, applied biological, environmental and agricultural sciences, and engineering to solve problems and innovate solutions involving biological systems*". The curriculum structure of Biosystems Engineering encompasses courses and exposures related to disciplines in automation and emerging technologies, information technology, power and machinery, postharvest technology, structures and environment, soil and water, and sustainable agriculture.

Bachelor of Chemical Engineering Technology (Honours) (Industrial Biotechnology)

Bachelor of Chemical Engineering Technology (Hons) (Industrial Biotechnology) is a program specifically designed to provide students with blended knowledge and skills in biotechnology-based disciplines such as microbiology, fermentation technology and engineering principles for an industrial oriented profession. Those disciplines are integrated into Chemical Engineering Technology education system that emphasizes on intensive practical skills besides providing adequate communication and soft skills that could equip the graduates to serve in the biotechnology–based industries such as biofuels, biopharmaceuticals, enzymes, biomaterials and bioenergy that ensures sustainability and optimization of resources used.

Bachelor of Mechanical Engineering Technology (Honours) (Agricultural Systems)

The programme aims to generate engineering technologists who are competent and posses a sound and balanced skill in integrating biological, engineering, and management principles. The courses are delivered based on the practical approach covering basic and applied engineering subjects, crops and animal applied biology as well as basic principles in economics and management. Among the engineering courses offered are Engineering Mechanics, Agricultural Mechanics and Workshop Technology, Mechanics of Material, Geodetics Engineering, Farm Power and Machinery, Controlled Environment Agriculture and Food Technology. The students are also exposed to agro-industrial know-how through courses such as Agricultural Economics, Agricultural Production Systems, Principles of Agronomy, Agribusiness Management, Water Resources Management, Advances in Agrotechnology and Food and Herbal Crops Production Technology. The final semester of the programme is dedicated to the industrial training activity attaching students to the relevant industries mainly to enhance their capability and skill in accordance to market needs.

Bachelor of Chemical Engineering Technology (Honours) (Industrial Chemical Process)

Bachelor of Chemical Engineering Technology (Hons.) (Industrial Chemical Process) is a program designed to complement knowledge, application and skills in the field of chemical engineering technology such as reactor technology, upstream and downstream process and separation, and process safety.This program meets the needs and requirements of the chemical-related industries and equip the graduates with hands-on and applied skills to serve in the chemical process industries such as oleochemical, petrochemical, polymer and oil and gas.

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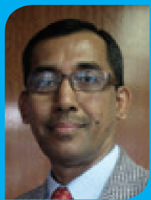

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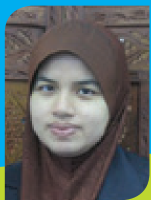

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Bachelor Of Engineering (Honours) (Bioprocess Engineering)

Programme Educational Objectives (PEO)

PEO 01
Graduates who are leaders in the field of chemical engineering in bioprocess or chosen field as demonstrated via career advancement.

PEO 02
Graduates who are members of and contribute to professional society.

PEO 03
Graduates who engage in life-long learning or continuous education opportunities.

PEO 04
Graduates who contribute towards research and development.

PEO 05
Graduates who are entrepreneurial engineers.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and in-depth technical competence in bioprocess/chemical engineering discipline to the solution of complex engineering problem.

PO 02
Ability to identify, formulate and solve complex engineering problems.

PO 03
Ability to design solutions for complex engineering problems and systems, components or processes to meet desired needs.

PO 04
Ability to conduct investigation into complex problems as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for complex engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to understand entrepreneurship, the process of innovation and the need for environmental and sustainable development.

PO 08
Ability to understand the professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large.

PO 11
Recognition of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles.

Curriculum Structure 2013/2014

For Bachelor Of Engineering (Honours) (Bioprocess Engineering)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	**I**	**II**	**III**	**IV**	**V**	**VI**		**VII**	**VIII**
Engineering Core (87)	ERT 105/3 Electrical Technology	ECT 112/3 Engineering Skills	ERT 213/3 Process Instrumentations	ERT 206/4 Thermodynamics	ERT 316/3 Reaction Engineering	ERT 320/3 Bioseparation Engineering	EIT 302/4 Industrial Training	ERT 445/2 Final Year Project 1	ERT 446/4 Final Year Project 2
		EKT 120/4 Computer Programming	ERT 214/4 Material and Energy Balance	ERT 215/3 Fluid Mechanics	ERT 317/4 Biochemical Engineering	ERT 321/4 Process Control & Dynamics		ERT 424/3 Bioprocess Plant Design I	ERT 428/4 Bioprocess Plant Design II
			EQT 203/3 Engineering Mathematics III	ERT 216/4 Heat & Mass Transfer	ERT 318/4 Unit operations	ERT 314/4 Bioreactor System		ERT 425/3 Good Manufacturing Practice For Bioprocess Industries	#ERT4XX/3 Elective II
					ERT 319/3 Industrial Waste Treatment	ERT 322/3 Safety & Loss Prevention		#ERT 4XX/3 Elective I	
						ERT 323/2 Simulation for Bioprocess Engineering			
Non Engineering (33)	EQT 101/3 Engineering Mathematics I	EQT 102/3 Engineering Mathematics II	ERT207/4 Analytical Chemistry	EQT 271/3 Engineering Statistics				EUT443/2 Engineering Management	EUT 440/3 Engineers in Society
	ERT 106/3 Biochemistry	ERT107/3 Microbiology for Bioprocess Engineering							
	ERT 102/4 Organic Chemistry	ERT 108/3 Physical Chemistry							
		EUT 122/2 Skills & Technology in Communication							
University Required (15)	UUW 410/2 University Malay Language		UUW 224/2 Engineering Entrepreneurship	UUW 212/2 University English Language	UUW 322/2 Thinking Skills				
	UUW 1XX/1 Co-Curricular Activity		UUW 233/2 Islamic & Asian Civilizations	UUW XXX/2 Option Subjects	UUW 235/2 Ethnic Relation				
135	**16**	**18**	**18**	**18**	**18**	**16**	**4**	13	14
University Required	University English, Engineering Entrepreneurship, TITAS, Ethnic Relation, Thinking Skill, University Malay Language, Co-Curiculum, Option Subject								
Total Units for Graduation 135									

Elective:
Elective I : **ERT 426/3 Food Engineering, ERT427/3 Design of Experiments**
Elective II : **ERT 429/3 Energy from Bioresources, ERT 430/3 Pharmaceutical Process Engineering**

For Bachelor Of Engineering (Honours) (Biosystems Engineering)

Programme Educational Objectives (PEO)

PEO 01
Graduates who are leaders in the field of agricultural/biosystems engineering or chosen field as demonstrated via career advancement.

PEO 02
Graduates who are members of and contribute to professional society.

PEO 03
Graduates who engage in life-long learning or continuous education opportunities.

PEO 04
Graduates who contribute towards research and development.

PEO 05
Graduates who are entrepreneurial engineers.

Program Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in agricultural/biosystems engineering discipline to the solution of complex engineering problem.

PEO 02
Ability to identify, formulate and solve complex agricultural/biosystems engineering problems.

PEO 03
Ability to design solutions for complex engineering problems and systems, component or process to meet desired needs.

PEO 04
Ability to conduct investigation into complex problems, as well as to analyze and interpret data.

PEO 05
Ability to use techniques, skills and modern engineering tools necessary for complex engineering practices so as to be easily adaptable to industrial needs.

PEO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PEO 07
In-depth understanding of entrepreneurship, the process of innovation and the need for sustainable development.

PEO 08
Understanding of professional and ethical responsibilities and commitment to the community.

PEO 09
Ability to function on multi-disciplinary teams.

PEO 10
Ability to communicate effectively on complex engineering activities with the engineering community and with society at large.

PEO 11
Recognition of the need for, and an ability to engage in life-long learning.

PEO 12
Demonstrate understanding of project management and finance principles.

Curriculum Structure 2013/2014

For Bachelor Of Engineering (Honours) (Biosystems Engineering)

YEAR	FIRST		SECOND		THIRD			FOURTH	
SEMESTER	I	II	III	IV	V	VI		VII	VIII
Engineering Core (94)	ERT 141/4 Fundamentals of Biosystems Engineering	ERT 146/3 Engineering Mechanics	ERT205/4 Fluid Mechanic Engineering	EQT 271/3 Engineering Statistics	ERT 349/4 Soil And Water Engineering	ERT XXX/3 Elective 1	EIT 300/4 Industrial Training	ERT 445/2 Final Year Project 1	ERT446/4 Final Year Project 2
	EET103/4 Electrical Technology		ERT 249/4 Computer Aided Engineering Design For Biosystems Engineering	ERT 246/4 Hydrology And Water Resources Engineering	ERT 245/4 Heat And Mass Transfer In Biological Systems	ERT 352/3 Farm Structures		ERT 460/3 Controlled Environment Engineering	ERT 462/3 Biosystems Engineering Design 2
			ERT 247/4 Geomatic Engineering	ERT248/4 Thermodynamics For Biosystems Engineering	ERT 350/3 Instrumentation, Measurement And Control In Biosystems	ERT 353/3 Energy And Power In Biosystems		ERT 464/3 Design Of Machine & System	ERT XXX/3 Elective 2
				ERT 142/4 Engineering Properties of Biological Materials		ERT 351/3 Sustainable Agrosystems Engineering		ERT 461/3 Biosystems Engineering Design 1	EUT 440/3 Engineers in Society
						ERT 457/3 Design of Automation Systems		EUT 443/2 Engineering Management	
Non Engineering Core (26)	ERT101/4 Biochemistry	ECT 112/3 Engineering Skills	EQT203/3 Engineering Mathematics III						
	EQT101/3 Engineering Mathematics I	EKT120/4 Computer Programming							
		ERT144/4 Microbiology for Biosystems Engineering							
		EQT102/3 Engineering Mathematics II							
		EUT122/2 Skills & Technology in Communication							
University Required (15)	UUW 1XX/1 Co-Curricular Activity		UUW233/2 Islamic & Asian Civilizations		UUW 322/2 Thinking Skills			UUW XXX/2 Option Subject	
	UUW 410/2 University Malay Language		UUW 224/2 Engineering Entrepreneurship	UUW 212/2 University English Language	UUW 235/2 Ethnic Relation				
135	18	19	19	17	15	15	4	15	13
Total Units for Graduation 135									

Elective I : ERT 463/3 Manufacturing And Production Of Biological Products, ERT458/3 Irrigation and Drainage System
Elective II : ERT 456/3 Post Harvest Engineering, ERT 459/3 Waste Management and Utilization Engineering, ERT 426/3Food Engineering

Course Syllabus

Bachelor Of Engineering (Honours) (Bioprocess Engineering)

ERT 102/4
Organic Chemistry

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. Then, focusing on 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 explain the basic concepts theoretically and apply the knowledge of the physical and chemical properties of each functional group.
2. Ability to explain theoretical organic chemical reactions of alkenes, alkynes and alkyhalides at molecular level.
3. Ability to demonstrate the reactions involving alcohol, ether, aldehyde, ketone, carboxylic acid and aromatic compounds.
4. Ability to formulate the knowledge of organic chemical process in industry such as production of biopharmaceuticals.

References

1. Bruice, P.Y. 2004. *Organic Chemistry.* 4th. Edition. Prentice Hall.
2. McMurry, J. 2000. Organic Chemistry 5th Edition, Brooks/Cole.
3. Solomons, T.W.G. and Fryhle, C.B.. 2008. *Organic Chemistry.* 9th Ed. John Wiley.
4. Goerge, T. Austin. *Shreve's Chemical Process Industries.* 5th Edition. McGraw Hill International.
5. Bruice, P.Y. 2006. *Esential Organic Chemistry.* Pearson International Edition, Pearson Prentice Hall.
6. Groggins, P.H. 2001. *Unit Processes in Organic Chemistry Synthesis.* Tata McGraw Hill.

ERT 105/3
Electrical Technology

Course Synopsis

This course is intended to provide students with clear understanding of the DC and AC circuits, basic principles of 3-phase AC circuits, electro-magnetism and magnetic circuits. They will also gain an understanding of the basic operating principles and performance analysis of three most commonly used electric machines, namely, transformers, dc machines, and induction motors.

Course Outcomes

1. Ability to explain the principle elements of DC and AC circuits such as current, voltage, power, energy, nodes, branches etc.
2. Ability to analyze the DC and AC circuits by using Ohm's Law, Kirchhoff's Current Law, Kirchhoff's Voltage Law, Source Transformation and Thevenin's theorem.
3. Ability to calculate and analyze parameters of three phase AC system for Wye and Delta connection.
4. Ability to analyze the basic concept of magnetism and electromagnetism and its application in DC and AC machines.

References

1. Boylestad, Robert L. 2007. Introductory Circuit Analysis, 11th Edition, Prentice Hall.
2. Hughes, 2005. Electrical and Electronic Technology, 9th Edition, Prentice Hall.
3. Richard J. F. 2008. Electricity Principles and Applications, 7th Edition, Mc Graw Hill.
4. Charles K. A. and Matthew N.O.Sadiku. International Third Editions. Fundamentals of Electric Circuits, McGraw-Hill.
5. Nilsson, J.W. and Riedel, S.A. 2005. Electric Circuits, 7th Edition, Pearson Prentice Hall.

ERT 106/3
Biochemistry

Course Synopsis

The topics covered in this course include the origin of life and structure of prokaryotes and eukaryotes cells, properties of water and structure, classification and function of biomolecules such as carbohydrates, lipids and amino acids. The role of proteins and enzymes in biochemistry, purification of protein, molecular biology and genetics will be featured in the course. Electron transportation, citric acid cycle and photosynthesis in biological processes will also be briefly highlighted in this course.

Course Outcomes

1. Ability to define and describe the biochemical concepts and terms associated with life.
2. Ability to differentiate the structure, classification and function of carbohydrates, lipids and nucleic acids.
3. Ability to differentiate the role of proteins in biochemistry and purification of proteins. To introduce enzymes.
4. Ability to evaluate electron transportation, citric acid cycle and photosynthesis in biological processes.

References

1. McKee, T. & McKee, J. 2003. *Biochemistry, 3rd Edition*, McGraw Hill. New York.
2. Voet D. & Voet, J.G. 2004. *Biochemistry 3rd Edition*, Wiley International Edition, New York.
3. Elliott, W.H. & Elliott, D.C. 2005. *Biochemistry 3rd Edition*. Oxford University Press.
4. Campbell, M.K. & Farrell, S.O. 2006. Biochemistry 5th Edition. Belmont, CA.
5. Mathews, C.K., van Holde, K.E. & Ahern, K.G. 2000. Biochemistry 3rd Edition. Benjamin Cumming, San Francisco.

ERT 107/3
Microbiology for Bioprocess Engineering

Course Synopsis

This course covers the role of bacteria, fungi and virus in bioprocess industries. Comparison of prokaryotes and eukaryotes; microbial metabolism; microbial growth kinetics and fermentation process; and factors contributing to productivity, spoilage and preservation in food and industrial microbiology are also discussed.

Course Outcomes

1. Ability to define and describe important concepts and terminology in microbes and their metabolism.
2. Ability to demonstrate practices in microscopy, staining, sterilization, isolation and identification of bacteria and fungi.
3. Ability to apply microbial growth in fermentation and biological process.

References

1. Prescott, L. M., Harley, J. S & A. Klein, D. A. 2005. *Microbiology*. McGraw Hill.
2. Bauman, R. 2006. *Microbiology with diseases by taxonomy 2nd Edition.* Pearson Education, Prentice Hall.
3. Cowan, M.K. 2006. *Microbiology: a systems approach 1st edition.* McGraw-Hill Higher Education.
4. Black, J.G. 2005. *Microbiology: principles and explorations 5th edition.* John Wiley, New York.
5. Waites, M.J., Morgan, N.L., Rockey, J.S. & Higton, G.H. 2001. *Industrial Microbiology: An Introduction.* Blackwell Science, United Kingdom.

ERT 108/3
Physical Chemistry

Course Synopsis

This course is designed to prepare engineering students for advance knowledge in chemistry such as thermodynamics, chemical equilibria and chemical kinetics.

Course Outcomes

1. Ability to apply the phenomena, basic concepts, laws and principles in physical chemistry.

2. Ability to calculate and solve a problem concerning physical chemistry.
3. Ability to evaluate various fundamental laws in physical chemistry.

References

1. Atkins, P and de Paula, Julia. 2006. *Physical Chemistry*. Oxford University Press, 8th Edition.
2. Bahl, B.S.; Bahl, Arun & Tuli, G.D. 2006. *Essentials of Physical Chemistry*. S. Chand, New Delhi.
3. Paul Monk, 2004. *Physical Chemistry*, John Wiley & Sons.
4. Levine I. N. , 2002. Physical Chemistry, McGraw Hill, 5th Edition.
5. Silbey R. J., Alberty R. A., Bawendi M. G. 2005. Physical Chemistry, John Wiley & Son, Inc., 4th Edition.

ERT 206/4
Thermodynamics

Course Synopsis

This course covers the concept of chemical and biochemical engineering thermodynamics. It provides the basic tools necessary for the students to be exposed to the fundamentals properties of thermodynamics and the law of thermodynamics in engineering systems. Also are provided with a comprehensive exposure to the theory as well as to the application of thermodynamics solution and the equation of state for pure and mixture fluids, the phase equilibrium and chemical reaction equilibrium calculations.

Course Outcomes

1. Ability to analyze the fundamentals properties of thermodynamics and apply the law of thermodynamics in engineering systems.
2. Ability to calculate heat, work and other thermodynamics properties ideal fluid and manage to solve problems for real fluids using volumetric equations of state.
3. Ability to evaluate the theory of the solution thermodynamics as well as the equation of state for pure and mixture fluids and to calculate phase equilibrium and chemical reaction equilibrium calculations.

References

1. Smith, J.M., Van Ness, H.C. and Abbort, M.M. 2005. Introduction to Chemical Engineering Thermodynamics, Seventh Edition, McGraw-Hill..
2. Cengel, Y.A. and Boles, M.A. 2007. Thermodynamics-An engineering Approach, 6th edition, McGraw-Hill.
3. Iynkaran, K., David, J. and Tandy. 2004. Basic Thermodynamics – Applications and Pollution Control, 2nd edition, Pearson Prentice Hall.
4. Daubert, Thomas, E. 1985. Chemical engineering Thermodynamics, McGraw-Hill.
5. (The book is in bahasa version available at the library, translated by Prof. Mashitah Hassan, 1990)

ERT 207/4
Analytical Chemistry

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. To introduce, discuss and apply classical analytical methods such as gravimetriy and titrimetry. This course also meant to introduce, discuss and apply modern methods in analytical chemistry such as chromatographic and spectroscopic technique.

Course Outcomes

1. Ability to analyze the correct statistical method for data analytical and to remember the steps in quantitative analysis
2. Ability to evaluate the concentration of analytes of various classical titrimetric (acid-base, complexation, redox and precipitation) and gravimetric methods for mass determination
3. Ability to evaluate modern chromatography and spectroscopic principles and to interpret and calculate the sample concentration.

References

1. Christian, G. D. 2004. Analytical chemistry. 6th ed. John Wiley & Sons, Inc.
2. Harvey, D. 2000. Modern Analytical Chemistry. McGraw-Hill.

3. Keeley, D and Haines, P. J. 2002. Analytical Chemistry. Oxford: Bios Scientific
4. Skoog, D. A., West, D. M. and Holler, F. J. 1996. Fundamentals of Analytical Chemistry. Saunders College Publication.
5. David S. Hage and James R. C. 2010. Analytical Chemistry and Quantitative Analysis. First edition. Prentice Hall.
6. James Miller and Jane C Miller. 2010. Statistics and Chemometrics for Analytical Chemistry (6th Edition), Pearson Education Canada

ERT 213/3
Process Instrumentations

Course Synopsis

The course objective is to prepare the students with the necessary skills in the process industry. The course begins with introduction to process measurements involved in the process industries, followed by introduction to fundamental of industrial valves. Students then will be taught about ISA symbology, where students will be taught with the universal symbols used in process industry. Students then will be taught how to write the identification letter as well as the tag numbers for unit operation and piping. To complete the course, students will learn how to read and develop process flow diagram (PFD) and also piping and instrumentation diagram (P & ID).

Course Outcomes

1. Ability to illustrate the function of different types of valves; describe and discuss the operational aspects of the valves.
2. Ability to analyze the ISA Symbology for the Process Flow Diagram; apply appropriate symbols and sketch the Process Flow Diagram.
3. Ability to propose the ISA Symbology for the Process Flow Diagram; apply appropriate symbols and develop the Process Flow Diagram.
4. Ability to evaluate the ISA Symbology for the Piping & Instrumentation Diagram; apply appropriate symbols and sketch the Piping & Instrumentation Diagram.

References

1. Smith, C.A. and Corripio, A. 2006. *Principles and Practice of Automatic Process Control, Third Edition,* John Wiley.
2. McCabe, W.L., Smith, J.C. and Harriott, P. 2005. *Unit Operations of Chemical Engineering, Seventh Edition,* McGraw-Hill.
3. Skousen, P.L. 2004. *Valve Handbook, Second Edition,* McGraw-Hill.
4. Perry, R.H. and Green, D.W. 1997. *Perry's Chemical Engineers' Handbook, Seventh Edition,* McGraw-Hill.
5. Murrill, P.W. 2000. *Fundamentals of Process Control Theory, Third Edition*, ISA.
6. McAvinew, T. and Mulley, R. 2005. *Control System Documentation: Applying Symbols and Identification, Second Edition,* ISA.
7. Meier, F.A., and Meier, C.A. 2004. *Instrumentation and Control Systems Documentation,* ISA.

ERT 214/4
Material and Energy Balance

Course Synopsis

This course starts with engineering calculations. Students are taught to interpret series of data and to interpret graphs. Material balance as well as energy balance also will be covered in the course. The course will be completed with the introduction of several methods in calculating material balance and energy balance in a system.

Course Outcomes

1. Ability to solve basic engineering calculations, convert units in the same dimensions and scientifically interpret series of data.
2. Ability to identify single unit and multiple unit processes, distinguish parameters given in order to find a solution. Students are able to discuss mass balance concept and solv e material balance problems.
3. Ability to measure parameters, solve energy balance problems and discuss energy balance concepts.
4. Ability to evaluate steam tables to solve problems in a system and also analyze all possible information

data given in a system to provide a solution combining of material and energy balance.

References

1. Felder, R. 2005. Elementary Principles of Chemical Processes, John-Wiley, 3rd Update Edition.
2. Himmelblau, R. 7th Edition. Basic Principles and Calculations in Chemical Engineering, Prentice Hall.
3. Bailey and Ollis. 2005. Biochemical Engineering Fundamentals, McGraw Hill, 2nd Edition.
4. Doran, M.P. 1995. Bioprocess Engineering Principles, Elsevier Science.
5. Richardson, J.F. 1994. Chemical Engineering, Volume 3, Prentice Hall.
6. Reklaitis G.V. 1983. Introduction to Material and Energy Balance, John Wiley.

ERT 215/3
Fluid Mechanics

Course Synopsis

This course emphasizes fundamental concepts and problem-solving techniques. Topics to be covered include fluid properties, static and kinematics, control volume analysis, momentum analysis of flow system, dimensional analysis, internal flows (pipe flows), differential analysis, and external flows (lift and drag).

Course Outcomes

1. Ability to analyze the essential parameters describing a fluid system and recognize the common devices used in measuring pressure and flow rates, and turbo machineries.
2. Ability to calculate pressures, forces, and stability in static fluid systems and identify whether a flow is steady or unsteady, uniform or non-uniform, laminar of turbulent and flow rate in dynamic fluid system and distinguish the link between conserved quantities and the equations of fluid mechanics.
3. Ability to evaluate appropriate control volumes and surfaces for developing the equations of fluid mechanics.

References

1. Cengel, Cimbala. 2006. Fluid Mechanics; Fundamentals and Applications. N.Y. Mc Graw Hill.
2. Mott, R.L. 2006. Applied Fluid Mechanics, 6th Edition, Prentice Hall.
3. Crowe, C.T., Elger, D.F., Robertson, J.A. 2005. Engineering Fluid Mechanics, John Wiley, 8th Edition.
4. Bruce, R.M., Donald , F.Y. and Okishi, T.H. 1990, Fundamentals of Fluid Mechanics, John Wiley and Sons.
5. Dauglas, J.R. 1991. Fluid Mechanics, 3rd Ed., Pitman.

ERT 216/4
Heat & Mass Transfer

Course Synopsis

This course covers the modes of heat transfer, which are conduction, convection and radiation, the application of the principle in various unit operations in plant. The principle of mass transfer will also be discussed. The application of mass transfer will be covered in the next course called bioseparation engineering and unit operation.

Course Outcomes

1. Ability to calculate mode of heat transferred.
2. Ability to calculate mode of mass transferred.
3. Ability to evaluate heat transfer knowledge as well as designing heat transfer equipment.

References

1. Christie J. Geankoplis. 2003. Transport Processes and Separation Process Principles: Includes Unit Operations. McGraw-Hill, Fourth Edition.
2. Holman J.P. 2001. Heat Transfer, Eighth SI, McGraw-Hill.
3. McCabe *et. al*. 2005. Unit Operations of Chemical Engineering, McGraw Hill, New York.
4. Doran M. P. 2006. Bioprocess Engineering Principles, Academic Press, London.

5. Incropera, F. P. and De Witt, D. P. 2006. *Fundamentals of heat and mass transfer*, 6th Ed, Wiley, New York.

ERT 314/4
Bioreactor System

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 the important principles and techniques that are used in the design and analysis of various types of bioreactor system for microbial, animal and plant cell cultures. It also covers relevant issues in 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.

References

1. Doran, P. M. 2006. Bioprocess Engineering Principles. London: Academic Press.
2. Shuler, M. L. and Kargi, F. 2001. Bioprocess Engineering: Basic Concepts. 2nd Ed. Upper Saddle River, NJ: Prentice Hall PTR.
3. Asenjo, J. A. and Merchuk, J. A. 1995. Bioreactor System Design. New York: Marcel Dekker Inc.
4. Najafpour, G.A. 2007. Biochemical Engineering and Biotechnology. Amsterdam: Elsevier B.V.
5. Mitchell, D. A., Krieger, N. and Berovic, M. 2006. Solid-state fermentation bioreactors: Fundamentals of design and operation. Springer Berlin Heidelberg.
6. Scragg, A. H. 1992. Bioreactors in Biotechnology: A Practical Approach. Ellis Horwood.
7. Stanbury, S.F. and Whitaker, A. 1984. Principle of Fermentation Technology. New York: Pergamon Press.

ERT 316/3
Reaction Engineering

Course Synopsis

Reaction Engineering is concerned 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 categorize design equation for most common industrial reactors and calculate the rate law and rate law parameters.
2. Ability to calculate Residence Time Distribution (RTD) functions in non-ideal reactors.
3. Ability to develop conversion and sizing for chemical reactors and to explain steady-state isothermal reactor.
4. Ability to evaluate catalysis and catalytic reactions.

References

1. Fogler, H. S. 2006. Elements of Chemical Reaction Engineering. 4th ed. Prentice Hall Inc. U.S.
2. Levenspiel, O. 2001.Chemical Reaction Engineering. 3rd ed. John-Wiley. U.S.
3. Davis, M. E and Davis, R. J. 2002 Fundamentals of Chemical Reaction Engineering. 1st ed. Mc Graw Hilll, U.S.
4. Fogler, H. S. 2010. Essentials of Chemical Reaction Engineering. 1st ed. Prentice Hall. U.S.
5. Salmi, T. O., Mikkola, J. P. and Warna, J. P. 2010. Chemical Reaction Engineering and Reactor Technology (Chemical Industries). CRC Press.

ERT 317/4
Biochemical Engineering

Course Synopsis

This course focuses on the interaction between chemical engineering, biochemistry, and microbiology. Mathematical representations of microbial systems are featured among lecture topics. Kinetic of growth, death and metabolism are also covered. Batch and continuous fermentation and the effect of agitation, mass transfer and enzyme technology are included. The laboratory exercises introduce students to the fundamental practices in biochemical engineering.

Course Outcomes

1. Ability to explain the concepts and differentiate types of enzymes and calculate the kinetics in enzymatic processes.
2. Ability to evaluate the metabolic pathways in microorganisms and calculate the kinetics in both batch and continuous reactors.
3. Ability to analyze the usage and methods for cultivating plant and animal cell culture.
4. Ability to propose the bioconversion technologies for production of organic chemicals and biofuel from agricultural biomass.

References

1. Shuler, M. L. and Kargi, F. Latest Edition. *Bioprocess Engineering: Basic Concept. 3rd Ed.* Upper Saddle River, NJ: Prentice Hall PTR.
2. Dutta, R. 2008. *Fundamentals of Biochemical Engineering.* New Delhi: Ane Books India.
3. Katoh, S. and Yoshida, F. 2009. *Biochemical Engineering: A Textbook for Engineers Chemists and Biologists*. Weinheim: Wiley-VCH Verlag GmbH & Co.
4. Nielsen, J., Villadsen, J. and Gunner L. 2011. *Bioreaction Engineering Principles. 3rd Ed*. New York: Springer Science+Bussiness Media.
5. Najafpour, G.A. 2007. *Biochemical Engineering and Biotechnology*. Amsterdam: Elsevier B.V.

ERT 318/4
Unit Operations

Course Synopsis

This course includes introduction to mass transfer theories and applications followed by specialized unit operations including gas absorption, distillation, adsorption, liquid-liquid extraction, solid-liquid extraction (leaching), membrane separation process, filtration and centrifugation. The theory is supported by performing laboratory experiments.

Course Outcomes

1. Ability to develop a basic design for single effect and multiple-effect evaporators, packed cooling towers.
2. Ability to develop and evaluate a basic design for gas-liquid separation and vapour-liquid separation equipment.
3. Ability to characterize solid particle, identify different types of size reduction equipment, and to apply equation for one-dimensional motion of particles through a fluid.

References

1. McCabe, W. L., Smith, J. C. and Harriott, P. 2004. Unit Operations of Chemical Engineering, McGraw-Hill.
2. Geankoplis, C.J. 2003. Transport Processes and Separation Process Principles, Prentice Hall.
3. Seeder, J.D. and Henly, E. J. 2006. Separation Process Principles, John Wiley and Son.
4. Wankat, P. C. 2006. Separation Process Engineering, Pearson Education.
5. Benitez, J. 2009. Principles and Modern Applications of Mass Transfer Operations, John Wiley and Son.

ERT 319/3
Industrial Waste Treatment

Course Synopsis

This course covers waste treatment methods that are commonly used in industries. It's introduced to the terms that are related to *waste* and how to calculate the properties such as *biological oxygen demand* (BOD), *chemical oxygen demand* (COD) and *total carbon* (TOC). From these calculations and other given information, basic unit operations involved in the treatment of waste can be design. This course also give an understanding on the processes involved in waste treatment for different industries keeping in view of the Environmental Impact Assessment (EIA), Life Cycle Assessment (LCA) and legal framework.

Course Outcomes

1. Ability to calculate the physical, chemical, and biological properties of waste material and describe its toxicology.
2. Ability to design the basic structure of waste treatment unit operations.
3. Ability to interpret compare, and choose the correct method for a particular waste for treatment.
4. Ability to propose the common waste management practice in industry and describe the legal framework structure.

References

1. Metcalf and Eddy. 2003. Wastewater Engineering: Treatment and Reuse, Inc, 4th Ed. (or latest edition) Mc Graw-Hill.
2. Davis, M.L. and Cornwell, D.A. 1998. Introduction to Environmental Engineering, 3rd Ed., Mc Graw-Hill.
3. Paul T. W. 2005. Waste Treatment and Disposal, 2nd Ed., John Wiley.
4. Droste, R.L. 1997. Theory and Practice of water and wastewater treatment, John Wiley.
5. Nelson, L. N. 2006. Industrial Waste Treatment, Elsevier Science & Technology Books.
6. Wang, L. K., Hung, Y.T., Lo, H.H. and Yapijakis, C. 2006. Waste Treatment in The Process Industry, Taylor and Francis.

ERT 320/3
Bioseparation Engineering

Course Synopsis

This course focuses on the the recovery, isolation, purification and polishing of products synthesized by biotechnological processes like r-DNA technology, conventional microbial fermentation and enzyme technology. The principles, advantages and limitations of certain purification units also discussed. At the end of this course, students are able to understand the process involved in bio separation and propose a suitable process for different types of product in integration of bio separation schemes.

Course Outcomes

1. Ability to analyze process and important parameters involved in recovery and isolation of bioproducts for selected bioseparation units.
2. Ability to evaluate process and important parameters involved in purification and polishing steps of bioproducts for selected bioseparation units.
3. Ability to propose bioseparation techniques/processes and RIPP (Recovery, Isolation, Purification and Polishing) scheme.

References

1. Harrison, R.G. Todd, P., Rudge S.R. and Petrides D.P. 2003. Bioseparations Science and Engineering, Oxford University Press.
2. Rajni Hatti-Kaul et al. 2003. Isolation and Purification of proteins (Biotechnology and Bioprocessing), Marcel Dekker Ltd.
3. Sabramanian Ganapathy. 1998. Bioseparation and Bioprocessing. A handbook, 2nd Edition, Wiley.
4. Paul, A. Belter, Clussler, E.L. and Wei-Shou Hu. 1998. Bioseparations: Downstream Processing for Biotechnology, Wiley.
5. Michael S. Verral. 1996. Downstream Processing of Natural Products, A Practical Handbook, Wiley.
6. Sivasankar, B. 2006. Bioseparations: Principles and Technique, Prentice Hall.
7. Ladisch, M. R. 2001. Bioseparations Engineering: Principles, Practice and Economics, Wiley-Interscience.

ERT 321/4
Process Control & Dynamics

Course Synopsis

This course includes an introduction to process control and dynamics, feedback controllers, control system instrumentation, overview of control system design, theoretical models, dynamic behavior of processes, PID controller design and troubleshooting. The theory is supported by performing laboratory experiments.

Course Outcomes

1. Ability to derive and develop theoretical model of chemical processes, analyze Laplace transform techniques to simplify first order and second order processes and creat transfer functions and state space models.
2. Ability to develop dynamic behavior of first and second order processes, analyze dynamic response characteristics of more complicated processes and development of empirical models from process data.
3. Ability to analyze control system instrumentation and propose feedback control system for bioprocess and chemical processes.
4. Ability to calculate and analyze dynamic behavior of closed-loop control system.

References

1. Seborg, D.E., Edgar, T.F., Mellicamp D.A. 2011. Process Dynamic and Control. John-Wiley, 3rd Edition.
2. Riggs, J.B. 2006. Chemical and Bioprocess Control. Pearson.
3. Bequette, B.W. 2003. Process Control; Modelling, Design, and Simulation. Prentice Hall.
4. Marlin, T. 2002. Process Control: Designing Processes and Control System for Dynamic Performance. McGraw-Hill.
5. Coughonowr. 2001. Process system, Analysis and Control, 3rd edition, McGraw-Hill.

ERT 322/3
Safety & Loss Prevention

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. The course will be concluded with biohazard and biosafety in bioprocess.

Course Outcomes

1. Ability to analyze the source, toxic release and dispersion models and evaluate the significance of the events.
2. Ability to distinguish fires and explosion as well as examine ways to prevent it.
3. Ability to evaluate relief concepts as well as calculate or sizing the relief system.
4. Ability to propose and evaluate process safety to identify the hazard and risk in the industry.

References

1. Mohanad El-Harbawi .2010. Process Safety and Loss Prevention, LAP Lambert Academic Publishing AG & Co KG.
2. Crowl, D. A., Louvar, J. F. 2002. Chemical Process Safety; Fundamentals with Applications. 2nd edition, Prentice Hall, New Jersey.
3. Mannan, S. 2005. Lee's Loss Prevention in the Process Industries: Hazard Identification, Assessment and Control, 3rd edition, Butterworth-Heinemann, Massachusetts.
4. Sanders, R. E. 2005. Chemical Process Safety; Learning From Case Histories. Elsevier Butterworth Heinemann, Third Edition. Amsterdam.
5. Dennis P. Nolan 2010. Loss Prevention and Safety Control: Terms and Definition, Saudi Aramco, Dhahran, Saudi Arabia , USA, CRC Press.

ERT 323/2
Simulation for Bioprocess Engineering

Course Synopsis

The course covers introduction of simulation of bioprocess, material and energy balances, equipment sizing and costing, and environmental impact assessment. Students are exposed to the usage of SuperPro design software for modeling and simulation purposes. Subsequently, sustainability assessment will be introduced, emphasizing on economic and profitability analysis.

Course Outcomes

1. Ability to analyze Modelling and Simulation of Bioprocess: Batch process modeling.
2. Ability to analyze Modeling and Simulation of Bioprocess: Process Scheduling and Project economic evaluation.

3. Ability to evaluate Modeling and Simulation of Bioprocess: Biochemical Case Study – Chromatographic and filtration processes involving bio-based product.
4. Ability to develop Modeling and Simulation of Bioprocess: Throughput Analysis and debottlenecking Strategies.
5. Ability to develop Sustainability Assessment.

References

1. Heinzle, E. Biwer, A. P. and Cooney C. L. 2007. Development of Sustainable Bioprocesses: Modelling and Assessment. Wiley.
2. Dunn, Irving J., Heinzle, Elmar, Ingham, John, and Prenosil, Jiri E. 2003. Biological Reaction Engineering Dynamic Modelling Fundamentals with Simulation Examples 2nd Edition. John Wiley.
3. Shuler, M.L. 2001. Bioprocess Engineering: Basic Concepts. 2nd Edition. Prentice-Hall.

ERT 424/3
Bioprocess Plant Design 1

Course Synopsis

This course contains the preliminary design of bioprocess plant. It focuses on process creation, simulation to assist in process reation and heuristic for process analysis, synthesis of process equipment design. Simulation Software will be the main feature and implemented through out the course in the process flow sheeting and equipment design.

Course Outcomes

1. Ability to apply engineering principles like reaction engineering rules, bioreaction stoichiometry, thermodynamics, kinetics, unit operations and unit procedures and also develop the bioprocess plant system.
2. Ability to design a suitable unit operation in a bioprocess plant based on bioprocess system involved.
3. Ability to develop and solve unit operation design using modern simulation and create the Process Flow Diagram (PFD) for bioprocess plant.

References

1. Seider, W.D., Seader, J.D. and Lewin, D.R. Process Design Principles: Synthesis, Analysis and Evaluation', New York (Latest)
2. Douglas, J.M., The Conceptual Design of Chemical Processes, New York, McGraw-Hill (Latest).
3. Coulson, J.M.(John Metcalfe), Richardson, Jon Francis and Sinnott, R.K. 1999. Chemical Engineering Design, Vol.6, 3rd Edition, Butterworth-Heinemann.
4. Peters, M.S. and Timmerhaus, K.D. 2002. Plant Design And Economics For Chemical Engineers, 5th Edition, New York, McGraw-Hill.
5. Turton, Richard, Bailie, Richard C., Whiting Wallace B. and Shaeiwitz, Joseph A. 1997. Analysis, Synthesis And Design Of Chemical Processes, Prentice Hall.
6. Biegler, Lorenz T., Grossmann, Ignacio E., Westerberg, Arthur W. Systematic Methods Of Chemical.

ERT 425/3
Good Manufacturing Practice for Bioprocess Industries

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 pilot plant.

Course Outcomes

1. Ability to analyze the concepts and the requirements of GMP and Validation, the Standard Operation Procedure (SOP) and Safety and Health Environment (SHE) aspects.
2. Ability to develop the GMP requirement and primary and secondary bioprocess engineering products, together with the Hazard Analysis and Critical Control Point (HACCP).
3. Ability to evaluate the utilities and services, laboratory design, process development facilities and pilot manufacturing facilities.

References

1. Nally, J.D. 2007. Good Manufacturing Practices for Pharmaceuticals, Sixth Edition, Informa Healthcare Inc, New York, USA.
2. Alli, I., Food, Quality Assurance, CRC PRESS, New York, 2004.
3. Bliesner, D.M. 2006. Establishing A Cgmp Laboratory Audit System: A Practical Guide, John Wiley & Sons, Inc., Hoboken, New Jersey.
4. Bennet, B. 2003. Pharmaceutical Production: an Engineering Guide, Institution of Chemical Engineers (IChemE), Warwickshire, UK.
5. WHO Guidelines, Quality assurance of pharmaceuticals, Good manufacturing practicesand inspection, WHO Press, World Health Organization, Geneva, Switzerland, 2007.

ERT 426/3
Food Engineering

Course Synopsis

This course covers multidisciplinary field of applied physical sciences which combines science, microbiology, and engineering education for food and related industries. Topics to be covered include introduction to food engineering, food ingredients, nutrition, nutritional information, spoilage, food production systems, preservation processes, freezing, drying, direct-heating, radiation, extrusion and packaging.

Course Outcomes

1. Ability to interpret ingredients and nutrition in food.
2. Ability to differentiate the principle of food engineering operation.
3. Ability to evaluate the problem that involved in food engineering operation.

References

1. Singh, R. Paul and Dennis, R. H. 2009. Introduction to Food Engineering, Fourth Edition (Food Science and Technology). Academic Press. Elsevier.
2. Side, Catherine "Food Product Development : Based on Experience", Wiley-Blackwell, 2008.
3. Barbosa-Cánovas, Gustavo V. Schmidt, Shelly Fontana, Anthony. 2008. Water Activity in Foods: Fundamentals and Applications, Wiley-Blackwell.
4. Williams, C. 2006. Improving the Fat Content of Foods, Woodhead Publishing, Limited.

ERT 427/3
Design of Experiments

Course Synopsis

The course begins with the strategy of experimentation using appropriate statistical software. Calculation on analysis of variance is also included as well as 2^k factorial design and 2^{k-p} fractional factorial design. Further study on Response Surface Methods (RSM) such as Central Composite Design (CCD) and Box-Behnken designs for fitting a second order model. The incorporation of Design of Expert software in analyzing the chemical or biochemical process will make the students learning more effective. Finally, introduction to Taguchi approach to process optimization is discussed.

Course Outcomes

1. Ability to apply and analyze principles for designing experiment and building empirical models.
2. Ability to calculate and evaluate the analysis of variance and principles of factorial design.
3. Ability to design for fitting first order and second order model using Response Surface Methodology.

References

1. Douglas C. Montgomery. 2012. Design and analysis of experiments, 8th Edition", Wiley and Sons Inc.
2. Douglas C.Montgomery, George C.Runger. 2011. Applied Statistics and probability for engineers 5th edition", John Wiley and Sons Inc.
3. Douglas C.Montgomery. 2012. Design and analysis of experiments, International Student Version, 8th Edition", Wiley and Sons Inc.
4. Douglas C.Montgomery, George C.Runger, Norma F. Hubele. 2011. Engineering Statistics, SI Version, 5th Edition, John Wiley and Sons Inc.

5. Raymond H.Myers, Douglas C.Montgomery. 1995. Response Surface Methodology, Process and product optimization using designed experiments, John Wiley and Sons Inc.

ERT 428/4
Bioprocess Plant Design 2

Course Synopsis

This course encompasses modern strategies for the design of bioprocess plants including piping and instrumentation diagram (P&ID), control strategies, economic analysis, costing and profitability analysis. Students will be exposed to the software application using simulation software to simulate and analyze the designed processes. Students are to present their design project in group.

Course Outcomes

1. Ability to classify and recommend safety and risk assessment on the bioprocess plant system.
2. Ability to design the typical control strategies for the safe plant operation and recommend the waste management for any visual impact from the process effluent to meet the environmental friendliness of the products.
3. Ability to propose the technique used for estimation of plant economics and compare economic feasibility of the process plant for project evaluation and process optimization.

References

1. Coulson, J.M. (John Metcalfe), Richardson, Jon Francis and Sinnott, R.K. Chemical Engineering Design, Vol.6, 3rd Edition, Butterworth-Heinemann, (Latest).
2. Seider, W.D., Seader, J.D. and Lewin, D.R. Process Design Principles: Synthesis, Analysis and Evaluation, New York, (Latest).
3. Douglas, J.M., The Conceptual Design of Chemical Processes, New York, McGraw-Hill (Latest).
4. Peters, M.S. and Timmerhaus, K.D. 2002. Plant Design And Economics For Chemical Engineers', 5th Edition, New York, McGraw-Hill.

ERT 429/3
Energy From Bioresources

Course Synopsis

The aim of this course is to introduce and develop the energy that can be generated from bioresources or biomass which is the alternative way of producing energy from fossil-based fuels. This course intends to teach the students of emphasizing the use of more environmental-friendly technologies which can lead to reduction of pollution, sustain and maintain the ecology system. This course starts with the introduction of biomass resources and the characteristics of biofuels followed by the analysis of the biological processes in producing ethanol and butanol. In the subsequent weeks, the students will be taught the chemical and thermochemical processes in producing biodiesel, biohydrogen and methane biogas. This course ends with the proposal of production of biofuels from microalgae and seaweeds.

Course Outcomes

1. Ability to analyze and develop the biomass resources and characteristics of biofuels. Develop ethanol and butanol production through biological processes.
2. Ability to design and evaluate the thermochemical and chemical conversion of biomass to power and biofuels. Develop chemical conversion process for biodiesel production.
3. Ability to evaluate the production of biohydrogen and the utilization of methane biogas. Design and evaluate the biofuels production from microalgae and seaweeds.

References

1. Cheng, J. 2010. Biomass to Renewable Energy Processes. CRC Press.
2. Vertes, A., Qureshi, N., Blaschek, H. P. and Yukawa, H. 2010. Biomass to Biofuels: Strategy for Global Industries, John Wiley & Sons, Ltd.
3. Pandey, A. 2009. Handbook of Plant-based Biofuels, CRC Press.
4. Brown, R. C. 2003. Biorenewable Resources: Engineering New Products From Agriculture, Iowa State Press.
5. Lee, S., Speight, J. G. and Loyalka, S. K. 2007. Handbook of Alternative Fuel Technologies, CRC Press.

ERT 430/3
Pharmaceutical Process Engineering

Course Synopsis

The aim of present course is to describe the principles of drug pharmacokinetics: absorption, distribution, metabolism and excretion of drugs. This course describes the scientific and technological aspects of the designing and manufacturing of pharmaceutical products.

Course Outcomes

1. Ability to analyze the basic concept of drug absorption and disposition and evaluate related pharmacokinetics.
2. Ability to design and demonstrate pharmaceutical production facilities.
3. Ability to formulate and evaluate the pharmaceutical engineering processes in pharmaceutical formulation and production.

References

1. Anthony J. Hickey and Ganderton, D. 2009. Pharmaceutical Process Engineering: 2nd Edition. New York: Informa Healthcare.
2. Sambamurthy, K. 2005. Pharmaceutical Engineering. New Delhi: New Age International Publishers.
3. Shargel, L., Wu-Pong, S. and Yu, A.B.C. 2005. Applied Biopharmaceutics & Pharmacokinetics. McGraw Hill.
4. Aulton, M. E. 2002. Pharmaceutics. The science of dosage form design. 2nd Edition. London: Churchill Livingstone.
5. Crommelin, D.J.A., & Sindelar, R.D. 2002. Pharmaceutical Biotechnology. An Introduction for Pharmacist and Pharmaceutical Scientist. (2nd ed). London: Taylor and Francis.
6. Glick, B. R., and Pasternak, J.J. 2003. Molecular Biotechnology: Principles and Application of Recombinant DNA (2nd ed.). Washington D.C.: ASM Press.

ERT 445/2
Final Year Project 1

Course Synopsis

This course consists of lecture 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 to the internal examiners.

Course Outcomes

1. Ability to synthesize information including standards, code of practice, journals, policies, field data, etc, relevant to the specific research to be undertaken and relate with societal and global issues. Ability to review information source then recognize, construct and justify the suitable research information.
2. Ability to analyze scenario and compose the problem statements and the research objectives of the project.
3. Ability to formulate research methodology incorporating clear fundamentals, theories and benchmarked against standard practices governing the research project.
4. Ability to prepare and defend research proposal with effective communication skills.

References

1. Donald, H. McBurney and Theresa, L. White. 2007. Research Methods, 7th Edition, Thomson Wadsworth.
2. Leo Finkelstein, Jr. 2008. Pocket Book of Technical Writing for Engineers and Scientist. 3rd Edition, McGraw Hill.
3. Rowena, M. 2006. How to write a thesis. Open University Press. England.
4. Hoang, P. 2006. Springer Handbook of Engineering Statistic. Springer-Verlang, London.
5. Bailey, S. 2003. A practical guide for students. TJ International Ltd. USA.
6. A Guide To Student Final Year Project, 2003. UniMAP.
7. Daniel Holtom and Elizabeth Fisher. 1999. Enjoy Writing Your Science Thesis or Dissertation, Imperial College Press.
8. Academic journals.

ERT 446/4
Final Year Project 2

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 examiner.

Course Outcomes

1. Ability to conduct research experiments, analyze and interpret data and deduce good conclusion.
2. Ability to use techniques and modern tools to solve research problems.
3. Ability to plan activities pertaining to research project and execute the plan to meet the required research objectives and datelines.
4. Ability to write research report that conforms to standard thesis format and performs verbal presentation.

References

1. Donald, H. McBurney and Theresa, L. White. 2007. Research Methods, 7th Edition, Thomson Wadsworth.
2. Leo Finkelstein, Jr. 2008. Pocket Book of Technical Writing for Engineers and Scientist. 3rd Edition, McGraw Hill.
3. Rowena, M. 2006. How to write a thesis. Open University Press. England.
4. Hoang, P. 2006. Springer Handbook of Engineering Statistic. Springer-Verlang, London.
5. Bailey, S. 2003. A practical guide for students. TJ International Ltd. USA.
6. A Guide To Student Final Year Project, 2003. UniMAP.
7. Daniel Holtom and Elizabeth Fisher. 1999. Enjoy Writing Your Science Thesis or Dissertation, Imperial College Press.
8. Academic journals.

Bachelor Of Engineering (Honours) (Biosystems Engineering)

ERT 101/4
Biochemistry

Course Synopsis

Topics covered in this course include the origin of life, structure of prokaryotes and eukaryotes cells, properties of water and structure, classification and function of biomolecules such as carbohydrates, lipids and amino acids, role of proteins and enzymes in biochemistry, purification of protein, molecular biology and genetics. Electron transportation, citric acid cycle and photosynthesis are also highlighted in this course.

Course Outcomes

1. Ability to explain the biochemical concepts and terms associated with life.
2. Ability to differentiate the structure, classification and function of carbohydrates, lipids and nucleic acids.
3. Ability to differentiate the role of proteins and enzymes in biochemistry and analyze purification of protein.
4. Ability to illustrate electron transport, citric acid cycle and photosynthesis.

References

1. McKee, T., McKee, J. 2003. *Biochemistry.* 3rd Ed. McGraw Hill.
2. Voet, D.; Voet, J. G. and Pratt, W. C. 2002. *Fundamentals of Biochemistry*. Upgrade Edition. John Wiley
3. Elliott, W.H. & Elloitt, D.C. 2005. *Biochemistry.* 3rd Edition. Oford University Press.
4. Campbell, M.K. & Farrell, S.O. 2006. *Biochemistry.* CA: Belmont
5. Mathews, C.K., Van Holde, K.E. & Ahern, K.G. 2000. *Biochemistry.* 3rd Edition. San Francisco: Benjamin Cumming.

ERT 141/4
Fundamental of Biosystems Engineering

Course Synopsis

This course introduces concepts of biosystems engineering and its applications in the biosphere, the ecosystem and the biological systems involving microbes, plants and animals. The course covers systems methodologies, life cycle assessment, growth and feedback, biological models and data measurement and analysis with applications of conservation of mass and energy in determining the input , process and output components in agrosystems.

Course Outcomes

1. Ability to explain the scope of Biosystems engineering and its relevance to sustainable development.
2. Ability to illustrate systemic properties of biological systems; apply the system methodologies and engineering principles to the productivity of the biosystems.
3. Ability to analyze the physical and biological information for engineering analytical framework.
4. Ability to analyze the interfacing effect of bio and physical systems in term of efficiency of production.

References

1. Alocilja, E. C. 2000. *Principle of Biosystems Engineering*. Erndition Books. MN. ISBN 15-8692098-7
2. Saterbak, K. Y. Sen; L. V. McIntire. 2007. *Bioengineering Fundamentals.*
3. K. Konopka. 2007. *System Biology*. ISBN 0824725204
4. Gardiner,D.T, Miller, R.W. 2008. Soils in Our Environment.11th edition. Pearson Education, Inc., Upper Saddle River, New Jersey.
5. Lynch, Daniel R. 2009. Sustainable natural resource management for scientists and engineers, Cambridge University Press, New York.

ERT 142/4
Engineering Properties of Biological Materials

Course Synopsis

The course is designed to introduce the properties of biological materials and to encourage students to be able to identify physical properties of materials required for analysis and design of agricultural, food and biological systems. Upon completion of the course, the student will be able to determine (measure, search, calculate, estimate) the value of a particular engineering property based on available data or experimentally measure the property based on existing methods and theories.

Course Outcomes

1. Ability to identify physical attributes of materials required for analysis and design of agricultural, food and biological systems.
2. Ability to repeat and discuss concept, techniques and calculation of thermal and rheological properties of biological materials.
3. Ability to repeat demonstrate and calculate thermal and electromagnetic properties of biological materials.
4. Ability to apply and illustrate concepts and principles of water activity, handling, storage and moisture management of biological materials.

References

1. Sahin, S and Sumnu,S.G. 2006. *Physical Properties of Foods.* Springer Science.
2. Barbosa-Canovas G.V., Juliano.P. and Peleg, M. 2008. *Engineering Properties of Foods, in Encyclopedia of Life Support System.* (EOLSS) UNESCO.
3. Jose M.Aguilera and Peter J.Lilliford. 2008. *Food Materials Science.* Springer Verlag Berlin Heidelberg.
4. Ludger O.Figura and Arthur A.Teixera. 2007. *Food Physics : Physical Properties-Measurement and Applications.* Springer –Verlag Berlin Heidelberg.
5. Stroshine, R. 2000. Physical Properties of Agricultural Materials and Food Products, Purdue University, West Lafayette, IN.

ERT 144/4
Microbiology for Biosystems Engineering

Course Synopsis

This course covers the fundamental concepts, historical aspects and the relationship among human, microorganisms and the environment with particular emphasis on the characteristic and taxonomy of bacteria, fungi, virus and protozoa. Basic microbiological and microscopy techniques, harmful effects of microorganisms to plants and animals and their roles in food and industrial application are also discussed.

Course Outcomes

1. Ability to infer historical aspect and explain fundamental concepts of microbiology
2. Ability to classify the characteristics of bacteria, fungi, virus and protozoa
3. Ability to apply and follow basic microbiological techniques
4. Ability to discuss the role of microorganisms in food and industrial application and their harmful effects to plants and animals

References

1. Black, J.G. 2008. *Microbiology: principles and explorations 6th edition.* John Wiley, New York.
2. Bauman, R. 2007. *Microbiology with diseases by taxonomy 2nd Edition.* Pearson Education, Prentice Hall.
3. Cowan, M.K. 2006. *Microbiology: a systems approach 1st edition.* McGraw-Hill Higher Education.
4. Tortora, G.J., Funke, B.R. & Case, C.L. 2007. Microbiology: An Introduction. 9th Edition, The Benjamin Cummings, San Francisco, California, USA.
5. Brock, T.D., Madigan, M.T., Martinko, J.M. & Parker, J. 2003. Biology of microorganisms, 10th Edition. Prentice Hall Englewood Califfs, New Jersey.
6. Pollack, R.A., Findlay, L., Mondschein, W. & Modesto, R.R. 2002. Laboratory exercises in microbiology, John Wiley & Sons, Inc.

ERT 146/3
Engineering Mechanics

Course Synopsis

This course covers vector representation of forces, moments and couples of static equilibrium of particles, rigid bodies, and engineering structures, together with analysis of external and internal forces in structures via the methods of free-body diagrams and properties of cross-sectional areas. In addition, the course also elaborates on kinematics and kinetics of system of particles and of rigid bodies in two and three-dimensional spaces covering force and acceleration, linear and angular momentum, and energy conservation.

Course Outcomes

1. Ability to apply the basic principles of statics and dynamics on mechanism and bodies
2. Ability to describe the concepts of a static body in equilibrium, kinetics and kinematics motion of a particle.
3. Ability to analyze systems/ problems related to forces, loads, displacement for bodies in rest and kinematics-kinetics motions
4. Ability to analyze systems/ problems related to forces, loads, displacement for bodies in motion

References

1. Bedford and Fowler, Engineering Mechanics: Statics and Dynamics, 5th Edition, Pearson-Prentice Hall, 2007.
2. R.C. Hibbler, Engineering Mechanics: Statics and Dynamics, 11th Edition, Peason Prentice Hall, 2006.
3. S.D. Sheppard and B.H. Tongue, Statics. Analysis and design of systems in equilibrium, Wiley, 2005.
4. B.H. Tongue and S.D. Sheppard, Dynamics. Analysis and design of systems in motion, Wiley, 2005.
5. F.P. Beer and E.R. Johnston, Vector mechanics for engineers: statics and dynamics, 8th edition, 2006.

ERT 205/4
Fluid Mechanics Engineering

Course Synopsis

This course emphasizes fundamental concepts and problem-solving techniques. Topics to be covered include fluid properties, static and kinematics, control volume analysis, momentum analysis of flow system, dimensional analysis, internal flows (pipe flows), differential analysis, and external flows (lift and drag).

Course Outcomes

1. Ability to analyze the essential parameters describing a fluid system and recognize the common devices used in measuring pressure and flow rates, and turbo machineries.
2. Ability to calculate pressures, forces, and stability in static fluid systems and identify whether a flow is steady or unsteady, uniform or non-uniform, laminar of turbulent and flow rate in dynamic fluid system and distinguish the link between conserved quantities and the equations of fluid mechanics.
3. Ability to analyze appropriate control volumes and surfaces for developing the equations of fluid mechanics.

References

1. Cengel, Cimbala. 2006. Fluid Mechanics; Fundamentals and Applications. N.Y. Mc Graw Hill.
2. Mott, R.L. 2006. Applied Fluid Mechanics, 6th Edition, Prentice Hall
3. Crowe, C.T., Elger, D.F., Robertson, J.A. 2005. " Engineering Fluid Mechanics", John Wiley, 8th Edition
4. Bruce, R.M., Donald , F.Y. and Okishi, T.H. 1990, Fundamentals of Fluid Mechanics, John Wiley and Sons.
5. Dauglas, J.R. 1991. Fluid Mechanics, 3rd Ed. , Pitman.

ERT 245/4
Heat and Mass Transfer in Biological Systems

Course Synopsis

This course elaborates and analyzes mechanisms by which heat is transferred from one body to another. The course covers steady state and transient heat conduction, convection, radiation, heat exchangers, and also mass transfer with special address on biological systems. Emphases are on formulation and application of respective mathematical models of heat and mass transfer across both physical and biological bodies.

Course Outcomes

1. Ability to differentiate and understanding of different modes of heat transfer and mass transfer.
2. Ability to understand and apply the principles and basic calculations of heat transfer by conduction, convection and radiation are featured.
3. Ability to apply the heat exchange equipment such as heat exchangers and single and multiple effect evaporators are also included.

References

1. Yunus A. Cengel. 2006. Heat and Mass Transfer: A Practical Approach, 3rd Ed. McGraw Hill, New York,
2. Truskey, F.A. 2004,Transport Phenomena in Biological Systems. McGraw Hill, New York.
3. Holman, J.P. 2002. Heat Transfer, 9th Ed., McGraw Hill, New York.
4. Incropera, F.P. 2002. Introduction to Heat and Mass Transfer, 4th Ed., John Wiley and Sons, New York.
5. Kreith, F. And Bohn, M.S. 2000. Principles of Heat Transfer, 6th Ed., Brooks and Cole.

ERT 246/4
Hydrology and Water Resources Engineering

Course Synopsis

This course introduces principles of surface and ground 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 analysis with respect to basic design procedures for on-farm water management practices.

Course Outcomes

1. Ability to apply the principles of hydrology, engineering analysis and design of water resources and implication to biosystems.

References

1. Bedient B. P; Huber W.C and Vieux B.E,. 2008 Hydrology Floodplain Analysis, 4th Ed. Prentice-Hall, Inc, Upper Saddle River, NJ 07458
2. Subramaya K. 2008, Engineering Hydrology, 3rd Ed. McGraw Hill, New York, N.Y.
3. DID. 2000, Urban Stormwater Management Manual for Malaysia, DID, Malaysia.
4. Mays, L.W 2001, Water Resources Engineering, John Wiley & Sons,New York,N.Y
5. Ward, A.D. and Trimble, S.W. 2004, Environmental Hydrology, 2nd Ed., Lewis Publisher.

ERT 247/4
Geomatic Engineering

Course Synopsis

This course covers geodetic, remote sensing, and geographical information systems (GIS) with emphases on basic surveying, fundamentals of remote sensing and its applications, and principles and applications of GIS in agricultural field. The students are exposed to field works to develop skill in using surveying equipments. The main topics discussed are traversing, tacheometry, mapping, calculation of areas and volumes, GIS, GPS, remote sensing and topographic survey.

Course Outcomes

1. Ability to understand the comprehensive guide to basic principles and technologies in the application of Remote Sensing Technology and geographic imformation system (GIS).
2. Ability to *interphasing* between electronics, ICT and biological systems.
3. Ability to apply computer programming in the study of biosystems such managing natural resources and productivity of farmland.

References

1. Kavanagh, B.F. 2009, Surveying: Principles and applications, 8th Ed. Prentice Hall, New York, NY.
2. Lillesand, T.M. 2007, Remote Sensing and Image Interpretations, John Wiley and Sons, New York
3. McCormack, J. 2004, Surveying, 5th Ed., John Wiley and Sons, New York, NY.
4. Bannister, A. 1992, Surveying, 6th Ed. Longman Scientific.
5. Chandra, A.M. and Ghosh, S.K. 2006, Remote Sensing and Geographical Information Systems, Alpha Science International

ERT 248/4
Thermodynamics for Biosystems Engineering

Course Synopsis

Thermodynamics is the study of heat related to matter in motion. The First Law of Thermodynamics involves the conversion of energy from one form to another while the Second Law determines the direction of heat flow, and the availability of energy to do work. In this course, students will be studying the terminology, principles, theory, and practical application of the First and Second Law of engineering thermodynamics.

Course Outcomes

1. Ability to recognise the laws of thermodynamics for processes.
2. Ability to manipulate and calculate the properties of pure substances and mixtures.
3. Ability to apply the Clapeyron equation to pure substances using an analytical equation of state.
4. Ability to perform phase equilibrium calculations using software and ability to perform reaction equilibrium calculations.

References

1. Cengel, Y.A. and M.A.Boles, Thermodynamics-An engineering Approach, 36th edition, McGraw-Hill, 2007.

2. Smith, J.M., Van Ness, H.C., Abbott, M. M. 2005. "Introduction to Chemical Engineering Thermodynamics", 7th Edition,McGraw - Hill
3. Sandler, S., Chemical, Biochemical, and Engineering Thermodynamics, Wiley, 2006.
4. Wark. K.,and Richards, D.E.,1999, Thermodynamics, 6th Edition., McGraw-Hill.
5. Eastop, T.D. and McConkey, A. 2000, Applied Thermodynamics for Engineering Technologist, 4th Ed., Longman.

ERT 249/4
Computer Aided Engineering Design for Biosystem Engineering

Course Synopsis

This course introduces and elaborates the use of drafting and modeling and acquire knowledge of computer graphics, 2-D and 3-D geometry related to drafting and design of mechanical and structural components and/or systems. The primary software used in this course is AUTODESK AutoCAD.

Course Outcomes

This course is a companion for the course of mechanical design. In this course the proper knowledge of mechanical design will be emphasized on the strength of design analysis and optimization.

References

1. Ibrahim Zeid. 2002. CAD/CAM Theory and Practice, McGraw Hill International
2. David G. Ullman. 2003. The Mechanical Design Process. 3rd Edition. McGraw-Hill.
3. Simon Dnaher. 2004. The Complete Guide to Digital 3D Design. Cambridge: ILEX.
4. Julien M. Calmettes. 2005. Best of 3D Virtual Product Design. Singapore: Page One Publishing Private Ltd.
5. Bruce Hannah. 2004. Becoming a Product Designer. John Wiley and Sons.

ERT 349/4
Soil and Water Engineering

Course Synopsis

This course covers the engineering properties of soil and water and it application in soil-water-plant relationshinp for on-farm irrigation and drainage and soil and water management practices. It include design of surface , subsurface , sprinkler and micro-irrigation systems for various crop production system and hydraulic structures for soil and water conservtion practices.

Course Outcomes

1. Ability to analyze soil and water relation in biosystems production.
2. Ability to design drainage size and requirement for on farm irrigation and drainage for surface and subsurface system.
3. Ability to analyze soil and water management system in erosion control and water conservation.
4. Ability to design microirrigation system and determine it efficiencies for various crops production system.

References

1. Fangmeier, D.D., Elliot, W.J., Workman, S.R. Huffman, R.L, Schwab, G.O.2006. Soil and Water Conservation Engineering 5th Edition.Thomson Delmar Learning. United State of America.
2. Gardiner, D.T, Miller, R.W. 2008. Soils in Our Environment. 11th edition. Pearson Education, Inc., Upper Saddle River, New Jersey 07458
3. Subramaya, K. 2000. Flow in Open Channel. 2nd edition. Tata McGraw Hill, Delhi, India.
4. Plaster, E.J. 2009. Soils Science and Management, 5th Ed., Delmar Cengage Learning.
5. Liu, C and Evett, J.B. 2004. Soils and Foundation, Pearson Education.

ERT 350/3
Instrumentation, Measurement and Control in Biosystems

Course Synopsis

The course covers the general concept of instrumentation, various measuring devices, and the manipulation, transmission, and recording of data. Reference to instrumentation use in biosystems engineering made where applicable. Students will be able to comprehend measurement standards, data analysis and calibration methods which are essential features of any measurement programme.

Course Outcomes

1. Ability to identify and differentiate and illustrate main components in instrumentation, their integration and working principle of various measurement devices.
2. Ability to differentiate and illustrate roles and features of appropriate instruments for various biosystems engineering application.
3. Ability to demonstrate the interphasing of different instrumentation and design the integration or connectivity.

References

1. Nakra, B.C. and Chaudhry, K.K., *Instrumentation,Measurement and Analysis, Second Edition,* Tata McGraw Hill, 2004. (3rd edition in print).
2. Singh, S.K. *Industrial Instrumentation and Control, Third Edition,* Tata McGraw Hill, 2009.
3. Doebelin, E.O. *Measurement Systems – Application and Design,* McGraw Hill, 2004.
4. Morris, A.S. 2001. Measurements and Instrumentation Principles, 3rd Ed., Butterworth-Heinemann.
5. Figliola, R.S. and Beasley, D.E. 2005, Theory and Design for Mechanical Measurement, 4th Ed., John Wiley and Sons.

ERT 351/3
Sustainable Agrosystems Engineering

Course Synopsis

This course discusses important components of sustainability for agrosystems which can be optimized through suitable application of engineering principles to reinforce the conventional wisdom of agrosystems production. Important engineering approaches invoking reviewing current practice and design will be covered. At the end of the course, student will recognized the scope of engineering that can be a sustainable factor for the farming system.

Course Outcomes

1. Ability to distinguish agrosystems practices and sustainability indicators which include soil, water, biomass and waste.
2. Ability to apply and formulate mathematical model for sustainable agrosystems.
3. Ability to design components and processes of sustainable agrosystems

References

1. Lynch, Daniel R., *Sustainable natural resource management for scientists and engineers*, Cambridge University Press, New York, 2009.
2. Michel De Lara and Luc Doyen, *Sustainable management of natural resources : Mathematical models and method*, Springer-Verlag Berlin Heidelberg, 2008.
3. Mason. J., *Sustainable agriculture. 2nd ed.*, Landlinks Press, Collingwood Vic. Australia, 2003.
4. Gliessman, Stephen R., *Agroecosystem sustainability : developing practical strategies,* CRC Press, Washington, 2001.
5. Pretty. J. 2008. Sustainable Agriculture and Food, Earthscan, London, UK.

ERT 352/3
Farm Structures

Course Synopsis

This course covers planning, engineering analysis and design; and cost estimating of biosystems engineering related structures elements for agricultural buildings, greenhouses, and structures for livestocks husbandry. The student will exposed to structural design using timber, reinforce concrete, and steel.

Course Synopsis

1. Ability to plan biosystems structures layout and materials for structural elements.
2. Ability to design structural members in tension, compression, and bending.
3. Ability to estimate cost of construction of the biosystems agricultural structures.

References

1. McKenzie, W.M.C 2013. Design of Structural Elements 2nd edition. Palgrave McMillan, UK
2. Seward,D. 2009. Understanding Structures: Analysis, Materials, Design 4th Edition, Palgrave McMillan, UK
3. Arya, C. 2009. Design of Structural Elements: Concrete Steelwork Masonry and Timber Designs to British Standards and Eurocodes 3rd Edition. Taylor & Francis.
4. Mosley, B. 2006. Reinforced Concrete Design to Eurocode 2. Palgrave McMillan, UK
5. Lindley, J.A and Whitaker, J.H. 1995. Agricultural Buildings and Structures, ASAE

ERT 353/3
Energy and Power In Biosystems

Course Synopsis

The course encompasses on the concepts of energy and power generation from mechanical devices including engine, pumps, compressor, fan and blowers. The recent technology, production processes and engineering renewable energy development for sustainability from various sources such as wind, solar, hydro power, bioethanol and biohydrogen are also discussed..

Course Outcomes

1. Ability to illustrate the working principles of the internal combustion engines.
2. Ability to analyze the performance and efficiency of different types of engines, solid and liquid mover's devices.
3. Ability to illustrate different types of renewable energy sources suitable for production and processing of biological materials.
4. Ability to differentiate biofuels, biodiesel and biogas for production and processing of biological materials.

References

1. Ayhan D. 2009 *"Green Energy and Technology"* Springer, Verlag London.
2. Aldo Viera R. 2009. *"Fundamentals of Renewable Energy"* Elsevier Inc. UK.
3. Grupta H.N. .2006. "*Fundamentals of Internal Combustion Engines*" Prentice Hall of India.
4. Forsthoffer'W.E. 2005. *"Forsthoffer's Rotating Equipment Handbooks Pump"* Elsevier USA
5. Pulkrabek W. W., 2004. *"Engineering Fundamentals of the Internal Combustion Engine"* Pearson Prentice Hall, UK.

ERT 426/3
Food Engineering

Course Synopsis

This course covers multidisciplinary field of applied physical sciences which combines science, microbiology, and engineering education for food and related industries. Topics to be covered include introduction to food engineering, food ingredients, nutrition, nutritional information, spoilage, food production systems, preservation processes, freezing, drying, direct-heating, radiation, extrusion and packaging.

Course Outcomes

1. Ability to interpret ingredients and nutrition in food.
2. Ability to differentiate the principle of food engineering operation.
3. Ability to evaluate the problem that involved in food engineering operation.

References

1. R. Paul Singh, Dennis R. Heldman. 2009. Introduction to Food Engineering, Fourth Edition (Food Science and Technology). Academic Press. Elsevier.
2. Side, Catherine "Food Product Development : Based on Experience", Wiley-Blackwell, 2008.
3. Barbosa-Cánovas, Gustavo V. Schmidt, Shelly Fontana, Anthony "Water Activity in Foods: Fundamentals and Applications", Wiley-Blackwell, 2008.
4. Williams, C., "Improving the Fat Content of Foods" Woodhead Publishing, Limited, 2006.

ERT 445/2
Final Year Project 1

Course Synopsis

This course consists of lecture 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 to the internal examiners.

Course Outcomes

1. Ability to synthesize information including standards, code of practice, journals, policies, field data, etc, relevant to the specific research to be undertaken and relate with societal and global issues.
2. Ability to analyze scenario and compose the problem statements and the research objectives of the project.
3. Ability to formulate research methodology incorporating clear fundamentals, theories and benchmarked against standard practices governing the research project.
4. Ability to prepare and defend research proposal with effective communication skills.

References

1. Rowena, M. 2006. How to write a thesis. Open University Press. England.
2. Hoang, P. 2006. Springer Handbook of Engineering Statistic. Springer-Verlang, London.
3. Bailey, S. 2003. A practical guide for students. TJ International Ltd. USA.
4. A Guide To Student Final Year Project. 2003. UniMAP.
5. Academic Journals

ERT 446/4
Final Year Project 2

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 examiner.

Course Outcomes

1. Ability to conduct research experiments, analyze and interpret data and deduce good conclusion.
2. Ability to use techniques and modern tools to solve research problems.
3. Ability to plan activities pertaining to research project and execute the plan to meet the required research objectives and datelines.
4. Ability to write research report that conforms to standard thesis format and performs verbal presentation.

References

1. Rowena, M. 2006. How to write a thesis. Open University Press. England.
2. Hoang, P. 200). Springer Handbook of Engineering Statistic. Springer-Verlang, London.
3. Bailey, S. 2003. A practical guide for students. TJ International Ltd. USA.
4. A Guide To Student Final Year Project. 2003. UniMAP.
5. Academic Journals

ERT 456/3
Post Harvest Engineering

Course Synopsis

Principles of size reduction, sorting and grading, dehydration, refrigeration, and air handling. Equipment and systems for materials handling, drying, and storage. Management of grain drying complex, fruits and vegetable product under local condition and related activities will be emphasis.

Course Outcomes

1. Ability to apply the principle of engineering in the processes involved in conveying, storing, drying, cleaning and sorting agricultural products.
2. Ability to analyse and design machines used for conveying bulk solids and liquids.
3. Ability to understand the theory and practice of drying for grain and forage crops. Moisture and quality control in storage and transport.

References

1. J. De Vries. 2001. *Securing the Harvest*. ISBN 10:0851995640.
2. K. Rajasekaran. 2002. *Crop Biotechnology*. ISBN 10:0841237662.
3. Sarah J. Risch. 2000. *Food Packaging*. 10:0841236178.
4. Stanley P. Burg. 2004 *Postharvest Physiology and Hypobaric Storage of Fresh Produce.* ISBN 10:0851998011.

ERT 457/3
Design of Automation Systems

Course Synopsis

This course covers automation and sensor technology applied in agricultural and biological systems. It also includes the components of automation system such as actuators and drivers, AC and DC motors. Topics such as control engineering application in agricultural and biological systems, and PIC microcontroller are also discussed.

Course Outcomes

1. Ability to apply principle of automation and sensor technology in agricultural and biological systems.
2. Ability to analyze the actuator component and application of an automation system in Biosystems Engineering
3. Ability to evaluate control engineering application in agricultural and biological system.
4. Ability to design automation system for agricultural and biological production systems.

References

1. Bolton, W. 2003. *Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering*. 3rd edition. Prentice Hall.
2. Francis J. Pierce; Qin Zhang. 2012. *Agricultural Automation: Fundamentals and Practices.* CRC Press/Taylor & Francis Group.
3. Eggins, B.R. 2002. *Chemical Sensors and Biosensors*. John Wiley & Sons.
4. Rafael Comeaux and Pablo Novotny. 2009. *Biosensors: Properties, Materials and Applications (Biotechnology in Agriculture, Industry and Medicine Series).* 1st edition Nova Science Pub Inc.
5. George K. Knopf, Amarjeet S. Bassi. 2007. *Smart Biosensor Technology*. CRC Press/Taylor & Francis Group.

ERT 458/3
Irrigation and Drainage System

Course Synopsis

This course covers irrigation and drainage system and technology for crop production with special emphases on planning and design of various irrigation and drainage system, cost analysis, system selection and evaluation. Topics include plant and animal water demand, sprinkler system, micro irrigation, surface and sub-surface drainage practices under commercial scale. The course also addresses water source quality and IT application in irrigation and drainage related project design and management.

Course Outcomes

1. Ability to analyse various irrigation and drainage principle for crop production.
2. Ability to design water delivery system facilities for irrigation and agricultural drainage (channel/pipe/control structures) relevant for water management project.
3. Ability to estimate crop and animals water demand and irrigation scheduling
4. Ability to plan and design cost-efficient irrigation and agricultural drainage project/schemes.

References

1. Anon. 2009. DID manual. Volume 5- Irrigation and Agricultural Drainage. Jabatan Pengairan dan Saliran Malaysia.
2. Sne, M. 2006. Micro irrigation in Arid and Semi-Arid Region: Guideline for Planning and Design. Published by ICID.
3. Hanson, B. 2000. Irrigation pumping plants. University of California, Davis. Division of Agricultural and Natural Resources Publication No 3377.
4. Hanson, B., Schwankl, L., Grattan, S., and Prichard, T. 1996. Drip irrigation for row crops. University

of California, Davis. Division of Agricultural and Natural Resources Publication No 3376.

5. Fangmeier, D.D., Elliot, W.J., Workman, S.R, Huffman, R.L, Schwab, G.O.2006. Soil and Water Conservation Engineering 5th Edition. Thomson Delmar Learning. United State of America.
6. Subramaya,K. 2000. Flow in Open Channel. 2nd edition. Tata McGraw Hill, Delhi,India

ERT 460/3
Controlled Environment Engineering

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 psychrometrics, heat and mass transfer, ventilation, cooling and heating, air distribution within controlled environment buildings.

Course Outcomes

1. Ability to analyze heat and mass transfer of plants, animals and aquaculture structures.
2. Ability to design natural and forced cooling and/or heating for plants, animals, and aquaculture structures.
3. Ability to design natural and forced ventilation for plants, animals and aquaculture structures.
4. Ability to appraise and value the existing designs and safety aspect of plant, animals and aquaculture structures through groupwork project.

References

1. Albright, L.D. 2005. Environmental Control for Plants and Animals. American Society of Agricultural and Biological Engineers, St. Joseph, MI.
2. Incropera, F.P. 2002. Introduction to Heat and Mass Transfer, 4th ed., John Wiley and Sons, New York.
3. Bartok, J. W. 2001. Energy Conservation for Commercial Greenhouses. NRAES. New York.
4. Ibrahim, D. 2003, Microcontroller Based Temperature Monitoring & Control. Newnes, Oxford.
5. Tiwari, G.N. 2003. Greenhouse Technology for Controlled Environment. Alpha Science, New York.

ERT 461/3
Biosystems Engineering Design 1

Course Synopsis

Biosystems Engineering Design is a 2 part course covering aspects of engineering design related to open-ended design projects at professional level engineering design task in biosystems engineering field. The design project is a team-based approach to provide capstone design experience emphasizing on 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, fundamental in engineering design methodology (the process and tools) and systems engineering. Analysis of case studies pertaining to engineering issues in design.

Course Outcomes

1. Ability to differentiate between ethical and legal issues and relate how these are related to design projects in biosystems engineering field.
2. Ability to demonstrate team work through group weekly meetings, project planning and management, analysis of case studies and class presentation.
3. Ability to analyze and assess the impact of design and engineering solutions on society and environment.
4. Ability to evaluate economic and feasibility study of a design project in biosystems engineering.
5. Ability to compose engineering problems and alternative solutions and formulate a sound proposal in biosystems engineering project using systematic design process.

References

1. Chang N.B., 2011. Systems Analysis for Sustainable Engineering: Theory and Applications (Green Manufacturing & Systems Engineering).
2. Christianson L. L. and Rohrbach R. P. 1987. Design in Agricultural Engineering. ASAE Textbook.
3. Norton, R. L. 2006. Machine Design: An Integrated Approach, Pearson Education, 3rd Edition.
4. Sharma P. C. and Aggarwal D. K. 2010. Machine Design, S.K Kataria & Sons.
5. Shigley J. E., Mischke, C. R., Brwon Jr. T. H. 2004. Standard Handbook of Machine Design, 3rd Edition, The McGraw-Hill Co. Inc.
6. Walsh R. A., 2007. Handbook of Environmental Engineering Calculations, 2nd Edition, The McGraw-Hill Co. Inc.

ERT 462/3
Biosystems Engineering Design 2

Course Synopsis

This course covers topics on design aspects within related biosystems engineering thematic areas including (but not limited to) automation and emerging technologies, machine systems, postharvest technology, structures and environment, soil and water, information technology, and sustainable agriculture and cutting across several important food and industrial crops. The scope of the class is to design component, equipment, process, plant and systems to meet desired project needs within realistic constraint and to comprehend diverse and fast changing technology and open-end design problems in biosystems engineering and technology fields. The use of modern engineering design practices, tools and product/solution development process, trouble-shooting methodology, learn and utilize a realistic simulation of the real-world design process, engineering analysis and synthesis through their projects. Knowledge integration from other Biosystems Engineering courses is required to identify, solve, and design solution for complex engineering problems.

Course Outcomes

1. Ability to conduct engineering analysis and adeptly apply principles and tools of mathematics and science to solve multi-facetted design project to produce credible conclusions.
2. Ability to formulate and produce solutions that properly address critical issues and assumptions that are conceptually and contextually valid and meet client expectation.
3. Ability to design component, equipment, process, plant and systems in biosystems engineering using engineering tools and design softwares for optimum performance.
4. Ability to display understanding of biosystems engineering project and integrate the design for manufacturability, utility and sustainability.
5. Ability to write project report that conforms to engineering professional standard and to perform verbal presentation on the project.

References

1. Chang N.B., 2011. Systems Analysis for Sustainable Engineering: Theory and Applications (Green Manufacturing & Systems Engineering).
2. Christianson L. L. and Rohrbach R. P. 1987. Design in Agricultural Engineering. ASAE Textbook.
3. Norton, R. L. 2006. Machine Design: An Integrated Approach, Pearson Education, 3rd Edition.
4. Sharma P. C. and Aggarwal D. K 2010. Machine Design, S.K Kataria & Sons.
5. Shigley J. E., Mischke, C. R., Brwon Jr. T. H. 2004. Standard Handbook of Machine Design, 3rd Edition, The McGraw-Hill Co. Inc.
6. Walsh R. A., 2007. Handbook of Environmental Engineering Calculations, 2nd Edition, The McGraw-Hill Co. Inc.

ERT 463/3
Manufacturing and Production of Biological Products

Course Synopsis

The course discusses components and facilities required for manufacturing and production of biological products. The course also covers process development and pilot plant facilities as well as the application of software for modeling and simulating of biological products production process. At the end of the course, student will have the capability to plan, design, simulate and propose scaling-up process for the development and manufacture of biological (food and agricultural) products.

Course Outcomes

1. Ability to identify and distinguish components and facilities required for the production and manufacturing of various food and agricultural products
2. Ability to plan, calculate and design processes for the manufacturing and production of food and agricultural products with emphasize on fermented products.
3. Ability to formulate and propose primary / secondary processing, and up-scaling facilities for bio products manufacturing in accordance with Good Manufacturing Practices (GMP)

References

1. McNeil, B. Practical fermentation technology, John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, England, 2008
2. José M. Aguilera and Peter J. Lillford, Food Materials Science ¸ Springer Science+Business Media, LLC, 2008.
3. Wesselingh, J. A. Design and Development of Biological, Chemical, Food and Pharmaceutical Products, John Wiley & Sons Ltd, West Sussex, England, 2007.
4. Hui., Y.H., Handbook of Food Products Manufacturing, Wiley & Sons, Inc., Hoboken, New Jersey, 2007.
5. Quality assurance of pharmaceuticals: a compendium of guidelines and related materials.Vol. 2, Good manufacturing practices and inspection. – 2nd ed., WHO, 2007.

ERT 464/3
Design of Machine System in Biosystems

Course Synopsis

The course covers study of agricultural and other off-road vehicle with special attention to functional design requirements of various machine operations, cost analysis, machinery selection and testing. Topics also include tillage force analysis, tillage tools, mechanisms for metering and applying seed, fertilizer and pest control chemicals, harvesting methods and machinery, hydraulic and other methods of transmitting power and controlling machines, biomass cleaning, conveying of agricultural materials and crop drying. Interactions of machines with biological systems. 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 and post harvest handling in food (grain, vegetable) and industrial/ tree crops production (fruits, oil palm) systems.

Course Outcomes

1. Ability to analyze specialized components and evaluate mechanized systems for production, handling and processing of biological materials.
2. Ability to design machinery in biosystems engineering
3. Ability to compare machine components in a variety of situations and select machines for specific operations in biosystems engineering.

References

1. Claude Culpin. 2008. Farm Machinery Farm Machinery, 12th Edition, Wiley-Blackwell.
2. Kepner, R. A., Roy Bainer, and Berger, E. L. 2005. Principles of Farm Machinery, The AVI Publishing Inc.
3. Cleghorn, W. L. 2005. *Mechanics of Machines*.
4. Pennock, G. R. 2003. Theory of Machines and Mechanisms, Oxford University Press.
5. Low, K. H. 2003. Mechanics of Mechanisms, Prentice Hall.

Career Opportunities

Graduate from this school has a wide range of employment prospects either in private companies, industry, government departments and statutory bodies. Sectors that offer employment opportunities are as follows;

- Industrial Bioprocess
- Pharmaceutical Industry
- Food Industry
- Consultation and Research Institution such as MARDI, FRIM
- Chemical Industry
- Biotechnology Companies
- Environment Sector
- Public Sector Farming Body (FELDA, Felcra, MADA etc)
- Forestry Sector (Manufacturing & Management)
- Irrigation and Drainage
- Education Sector

School of Environmental Engineering

Programme Offered

- Bachelor of Engineering (Honours) (Environmental Engineering)
- Bachelor of Engineering (Honours) (Building Engineering)
- M.Sc (Environmental Engineering)
- M.Sc (Building Engineering)
- PhD (Environmental Engineering)

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Introduction

The School of Environmental Engineering is the seventh engineering school in UniMAP and was established in January 2006 after approval from the Ministry of Higher Education on the 27th October 2005. The school currently offers three undergraduate programs namely Bachelor of Engineering (Environmental Engineering), Bachelor of Engineering (Building Engineering) and Bachelor of Civil Engineering Technology (Construction). These programs are in line with the Malaysian Education Plan 2001 – 2010 to produce engineers and engineering technologists who are capable of comprehending globalization and k-economy challenges towards achieving a developed nation status.

The Vision and Mission of the School of Environmental Engineering are stated below:

Vision

An internationally recognized academic programme.

Mission

To support national industrial aspiration towards environmental protection.

Brief descriptions of our undergraduate engineering programmes are as follows:

Bachelor of Engineering (Honors) (Environmental Engineering) RK07

This program is accredited by the Board of Engineers Malaysia (BEM) (Ref. No.: BEM/041/0111/M (002)) and recognized by The Institution of Engineers, Malaysia (IEM), Malaysia Qualification Agency (MQA) and the Malaysia Public Services Department (JPA). The programme covers the element of chemical and environmental engineering, laws, safety and health, environmental and project management (80% theory + 20% practical).

Bachelor of Engineering (Honors) (Building Engineering) RK82

This program is accredited by the Board of Engineers Malaysia (BEM) under Civil Engineering disciplines (Ref. No.: BEM/041/0100/M (001)). Students who follow this program will be exposed to various fields of knowledge in Civil Engineering including design building structures, building foundations, concrete and steel; geomatics, building maintenance, building services, construction project management, IBS and materials (80% theory + 20% practical).

The School of Environmental Engineering also offers postgraduate programme to students who wants to continue their studies in higher levels. The school offer full or part-time study via research mode for the following programmes:

- M.Sc (Environmental Engineering)
- M.Sc (Building Engineering)
- PhD (Environmental Engineering)

Facilities

The School of Environmental Engineering is equipped with various research and teaching instruments which can be grouped into two major fields namely chemical/environmental and civil engineering. These instruments are placed in several laboratories as follows:

- Chemical lab
- Air quality lab
- Hydro lab
- Chemical engineering lab
- Heavy and light structure labs
- Geotechnic lab
- Concrete and material lab
- Building services lab

The school is also embarking into consultation and laboratory services to the industries. To fulfil the industrial requirements, out testing and analysis facilities are accredited with MS ISO/IEC 17025 which was granted by the Department of Standard Malaysia (DSM) (Skim Akreditasi Makmal Malaysia, SAMM 581). This achievement is recognized by the Asia Pacific Laboratory Accreditation Cooperation (APLAC) and the services are internationally accepted. The scope of accreditation covering the area of:

- Mechanical (e.g. Concrete cube)
- Chemical (e.g. Waste water, surface water, drinking water, groundwater)

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Bachelor Of Engineering (Honours) (Environmental Engineering)

Programme Objectives (PEO)

PEO 01
Graduates who are leaders in the field of environmental engineering or chosen field as demonstrated through career advancement.

PEO 02
Graduates who are members and contribute to professional society.

PEO 03
Graduates who pursue continuous education opportunities.

PEO 04
Graduates who contribute through research and development.

PEO 05
Graduates who are engineers and demonstrate entrepreneurial skills.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in an environmental engineering discipline.

PO 02
Ability to identify, formulate and solve engineering problems.

PO 03
Ability to design a system, component or process to meet desired needs.

PO 04
Ability to conduct investigation into problems as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
Ability to understanding entrepreneurship, the process of innovation and the need for sustainable development.

PO 08
Understanding of professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively on engineering activities with the engineering community and with society at large.

PO 11
Recognition of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles.

UniMAP

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Environmental Engineering)

YEAR	FIRST			SECOND		THIRD			FOURTH	
SEMESTER	I	II		III	IV	V	VI		VII	VIII
Engineering Core (100)	EET 103/4 Electrical Technology	EKT 120/4 Computer Programming	ECOLOGICAL CAMP	**EAT 213/4 Fluid Mechanics and Hydraulics**	EAT 237/3 Water Supply Engineering	**EAT 301/4 Air Pollution Engineering**	**EAT 342/3 Noise Pollution Engineering**	EIT302/4 INDUSTRIAL TRAINING	EAT XXX/3 Elective I	EAT 433/3 Environmental Engineering Design
	EAT 131/4 Environmental Chemistry	EAT 101/4 Basic Ecology		EAT 231/3 Thermodynamics	EAT 208/3 Environmental Law, Health and Safety	**EAT 303/4 Wastewater Engineering**	EAT 343/3 Public Health and Occupational Hygiene		EAT XXX/3 Elective II	EAT 462/4 Final Year Project II
	EAT 102/4 Mechanics and Material Engineering	**EAT 104/4 Fundamental of Chemical Eng Processes**		EAT 232/3 Fundamental of Environmental Engineering	EAT 235/3 Geo environmental Engineering	EAT 341/3 Solid and Hazardous Waste Engineering	EAT 344/3 Environmental Management System		EAT 441/3 Environmental Remediation	EAT463/3 Project Engineering Management
		ECT 112/3 Eng Skills		**EAT 233/3 Environmental Engineering Skills**		EAT 332/3 Environmental Impact Assessment	EAT 345/3 Hydrology		EAT461/2 Final Year Project I	
							EAT 346/4 Mass Transfer			
Non Engineering (16)	EQT 101/3 Engineering Mathematics I	EQT 102/3 Engineering Mathematics II		EQT203/3 Engineering Mathematics III	EQT271/3 Engineering Statistics					EUT440/2 Engineers in Society
	EUT 122/2 Skills and Technology in Communication									
University Requirements (17)	UUW XXX/1 Co-curriculum	UUW XXX/1 Co-curriculum		EUW 224/2 Engineering Entrepreneurship	EUW 212/2 University English	EUW 233/2 Islamic and Asian Civilizations	EUW 322/2 Thinking Skills		EUW XXX/2 Option Subject	EUW 235/2 Ethnic Relations
					EUW 410/2 University Malay Language	UUW XXX/1 Co-curriculum				
133	18	19		18	16	17	18	4	13	14

Total Units for Graduation is 137

EAT XXX	SUBJECT WITH LABS
EATXXX	SUBJECTS WITHOUT LABS

Electives Courses:

EAT 447/3 Environmental Informatics, EAT 443/3 Built Environment,
EAT 449/3 Environmental Process Control & Instrumentation, EAT 445/3 Remote Sensing

School of Environmental Engineering

Bachelor Of Engineering (Honours) (Building Engineering)

Programme Objectives (PEO)

PEO 01
Graduates are leaders in the field of building engineering or chosen field as demonstrated through career advancement.

PEO 02
Graduates who are members and contribute to professional society.

PEO 03
Graduates pursue continuing education opportunities.

PEO 04
Graduates who contribute through research and development.

PEO 05
Graduates who are engineers and demonstrate entrepreneurial skills.

Programme Outcomes (PO)

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in building engineering discipline.

PO 02
Ability to identify, formulate and solve engineering problems.

PO 03
Ability to design a system, component or process to meet desired needs.

PO 04
Ability to design and conduct experiments, as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 7
In-depth understanding of entrepreneurship, the process of innovation and the need for sustainable development.

PO 08
Understanding of professional and ethical responsibilities and commitment to the community.

PO 9
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively.

PO 11
Recognition of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles

Curriculum Structure 2013/2014

Bachelor Of Engineering (Honours) (Building Engineering)

YEAR	FIRST			SECOND		THIRD			FOURTH	
SEMESTER	I	II		III	IV	V	VI		VII	VIII
Engineering Core (100)	EET 103/4 Electrical Technology	EKT 120/4 Computer Programming	GEOMATIC CAMP	***EAT 251/3 Structural Theory**	**EAT258/3 Building Material Engineering**	**EAT 314/4 Geotechnical Engineering**	EAT 355/3 Highway & Traffic Engineering	EIT 302/4 INDUSTRIAL TRAINING	Elective I EAT XXX/3	EAT 451/4 Integrated Project Design
	***EAT 102/4 Mechanics and Material Engineering**	**EAT 113/4 Mechanics of Materials**		**EAT 252/4 Fluid Mechanics Engineering**	EAT 208/3 Environmental Law, Health and Safety	EAT 351/3 Concrete Building Design I	EAT 354/3 Steel Building Design		EAT461/2 Final Year Project I	EAT 462/4 Final Year Project II
	EAT151/3 Introduction to Building Engineering	**EAT 112/4 Geomatic Engineering**		***EAT 212/4 Soil Mechanics**	EAT 253/3 Structural Analysis I	EAT 353/3 Structural Analysis II	EAT 359/3 Water Resources Engineering		EAT 455/3 Industrialized Building System	Elective II EAT XXX/3
		ECT 112/3 Eng Skills		**EAT 250/3 Building Engineering Skills**	**EAT 257/3 Building Services Engineering**	**EAT 356/4 Water & Wastewater Engineering**	EAT 352/3 Concrete Building Design II			
						EAT 357/3 Construction Management				
Non Engineering (16)	EQT 101/3 Engineering Mathematics I	EQT 102/3 Engineering Mathematics II		EQT 203/3 Engineering Mathematics III	EQT 271/3 Engineering Statistics					EUT XXX/2 Engineers in Society
	UUT 122/2 Skills and Technology in Communication									
University Required (17)	UUW XXX/1 Co-curriculum	UUW XXX/1 Co-curriculum			UUW 223/2 University English	UUW XXX/1 Co-curriculum	UUW 322/2 Thinking Skills		UUW 233/2 Islamic and Asian Civilizations	UUW 235/2 Ethnic Relations
							UUW 114/2 University Malay Language		UUW XXX/2 Option Subject	
									UUW 224/2 Engineering Entrepreneurship	
133	17	19		17	17	18	16	4	14	15
Total Units for Graduation 137										

EAT XXX	SUBJECT WITH LABS
EATXXX	SUBJECTS WITHOUT LABS

Elective Courses:

EAT 411/3 Advanced Concrete Building Design / EAT 413/3 Construction Engineering / EAT 415/3 Advanced Steel Building Design / EAT 452/3 Water Supply Engineering / EAT 453/3 Advanced Structural Analysis / EAT 454/3 Timber and Masonry Design / EAT 456/3 Foundation Engineering / EAT 459/3 Building Automation Systems

School of Environmental Engineering

Course Syllabus

Environmental Engineering Programme (RK07)

EAT101/4
Basic Ecology

Course Synopsis

The study of basic ecology in understanding nature and environment and the relationship between the organism and the 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.

Labs

1. Population Growth (Colony counting)
2. The influence of acidification on ammonification
3. Structure and morphology of bacteria, yeast, fungi, protista.
4. Staining in microscopy: general and specific stains.

Course Outcomes

CO1: Ability to define and describe basic concept of ecology and environment.
CO2: Ability to define and describe the energy flow in ecosystems.
CO3: Ability to define and describe the relationship among the organism in ecosystems.
CO4: Ability to describe the basic concepts of soil composition, biochemistry and metabolism pathways of microorganisms in soil, water and wastewater treatment.

References

1. Smith T.M. and Smith R.L., Elements of Ecology, 6th Edition, Pearson, 2006.
2. Black, J.G., Microbiology, 7th Edition, John Wiley and Sons, Inc.
3. David, E.V., Environmental Biology for Engineer and Scientist, Wiley. 2005.

EAT 102/4
Mechanics and Material Engineering

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 potion. In material engineering portion, the student will be also taught on structure of crystalline solids, imperfection of solid as well as strength of material.

Labs

1. Equilibrium of beam
2. Tensile test
3. Rockwell Hardness Test

Course Outcomes

CO1: Ability to construct free body diagram and ability to solve equilibrium problems using equilibrium theory.
CO2: Ability to determine friction and properties of sections.
CO3: Ability to solve problems which relate to kinematics and kinetics of a particle.
CO4: Ability to explain basic concepts of material strength as well as their mechanic properties.

References

1. Hibbeler, R.C. Engineering Mechanics Statics. 12th Ed., Prentice Hall, 2010.
2. Hibbeler, R.C. Engineering Mechanics Dynamics. 12th Ed., Prentice Hall, 2010.
3. Peter Schiavone, Hibbeler, R.C. Engineering Mechanics Statics Study Pack. 12th Ed. Prentice Hall, 2010.

EAT104/4
Fundamental of Chemical Engineering Processes

Course Synopsis

The aim of this course is to enable the students to understand the fundamental concepts of material balances. Then, energy balances on nonreactive and reactive processes will be covered. Finally, introduction to heat transfer theory, calculation and mechanism will be taught at the end of this course.

Labs

Part I: Chemical Engineering Lab

1. Temperature Measurement
2. Fourier's Law for Steady State Conduction of Heat through Solids
3. Free and Forced Convection
4. Radiation Heat Transfer

Part II: HYSIS Simulation Lab

1. Introduction to HYSIS Simulation
2. Mass Balance (Single Unit Process)
3. Energy Balance (Nonreactive Processes)

Course Outcomes

CO1: Ability to understand, and solve problems related to all engineering calculation.
CO2: Ability to understand, explain and solve problems on material balances.
CO3: Ability to understand, explain the theory and solve calculation on energy balances and heat transfer.

References

1. Felder, R.M. and Rousseau, R.W., Elementary Principles of Chemical Processes, 3rd Edition, Wiley, 2000.
2. Holman, J.P., Heat Transfer, 9th Edition, McGraw Hill.
3. Himmelblau, D.M., and Riggs, J.B., Basic Principles and Calculations in Chemical Engineering, 7th Ed., Prentice Hall.

EAT131/4
Environmental Chemistry

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.

Labs

1. Determination of Alkalinity in Natural Waters.
2. Determination of dissolved oxygen in water using the Winkler method.
3. Determination of the Organic Matter Content of Organic Soil.
4. Precipitation of Metals from Hazardous Waste.
5. Atmospheric Pollutant Chemistry.

Course Outcomes

CO1: Ability to explain basic concepts of fundamental chemistry.
CO2: Ability to define and discuss the chemical principles of water and wastewater pollution or treatment.
CO3: Ability to describe and calculate soil chemistry and chemical reactions involved.
CO4: Ability to discuss the chemistry, photochemistry and cyclic processes in atmospheres.

References

1. Sawyer C.N., Mc Carty P.L. and Perkin G.F. *Chemistry for Environmental Engineering and Science*, 5th Ed., McGraw-Hill, 2003.
2. Manahan, Stanley E. *Environmental Chemistry*, 8th Ed., Boca Raton, Fla.; London: CRC Press, 2005
3. Andrews, J. E. *An Introduction to Environmental Chemistry*, 2nd Ed., Malden, MA, Blackwell Science, 2004.

EAT208/3
Environmental Law, Health and Safety

Course Synopsis

Students will be exposed to Malaysian related laws and regulations on occupational safety and health (e.g. OSHA 1994) and environment (e.g. EQA 1974) and how to interpret the requirements stipulated under these documents. This course will also provide students the necessary information in identifying hazards, assessment and managing the risks that may be harmful to humans in the workplace.

Course Outcomes

CO1: Ability to comprehend and explain the legal requirement of environmental, safety and health laws and regulations.
CO2: Ability to describe and evaluate hazards in the workplace.
CO3: Ability to describe and evaluate the magnitude of risks on humans associated with the hazards in the workplace.
CO4: Ability to outline the management plan in managing the hazards and risks in the work place.

References

1. Goetsch, D.L. (2010) Occupational Safety and Health for Technologist, Engineers and Managers, 7th. Ed. Pearson Prentice Hall.
2. Occupational Safety and Health Act 1994 (Act 514) & Regulations and Orders, 2007 (amended at 5th April), International Law Book Services, Malaysia.
3. Environmental Quality Act & Regulations, 2006 (amended up to April), MDC Publishers Sdn. Bhd., Malaysia.

EAT213/3
Fluids Mechanic and Hydraulics

Course Synopsis

This course presents the study of the mechanics of water. In fluid mechanics, other fluids, including oil and gasses are studied. The student will be taught about properties of fluids, fluid static and kinematics, Bernoulli's equation, momentum equation, analysis of flow in open channel and pipeline system. This course will also cover the transportation and metering of fluids such as pumps and turbines. At the end of the course, students should be able to apply the theory to solve problem related to flow of fluids.

Labs

1. Lab 1(a) - Properties of Fluid
2. Lab 1(b) - Flowmeter measurement apparatus
3. Lab 2 - Bernoulli's theorem demonstration
4. Lab 3 - Impact water jet
5. Lab 4 - Osbourne Reynolds demonstration unit
6. Lab 5 - Friction Loss Apparatus

Course Outcomes

CO1: Ability to define and describe the properties of fluids.
CO2: Ability to identify and analyse some fluid static and fluid dynamic theories and applications.
CO3: Ability to describe and solve problems related to fluid flow in pipeline system.
CO4: Ability to describe and solve problems related to fluid flow in open channel system.

References

1. Mott, R.L., Applied Fluid Mechanics. Prentice Hall. (2006).
2. Young, D.F., Munson, B.R., Okiishi, T.H. & Huebsch, W.W., A Brief Introduction to Fluid Mechanics. Wiley Interscience. (2007).
3. Landau L.D & Lifshitz, E.M., Fluid Mechanics. Elsevier. (2004)

EAT231/3
Thermodynamics

Course Synopsis

Introduction to the concept of energy and the laws governing the transfers and transformations of energy. Emphasis on thermodynamic properties and the first and second law analysis of systems and control volumes. Analysis on exergy for closed systems and control volumes.

Course Outcomes

CO1: Ability to determine pure substance behaviour and its properties at any given states.
CO2: Ability to demonstrate basic principles of thermodynamics, concepts of work interaction and heat transfer.

CO3: Ability to solve engineering problems in thermodynamics involving closed and open systems for both steady state and transient processes.
CO4: Ability to apply second law analysis methods for thermodynamic systems.

References

1. Cengel, Y.A., Boles, M.A. Thermodynamics: An Engineering Approach, McGraw-Hill Higher Education, 2006.
2. Borgnakke, C., Sonntag,R. E. Fundamentals of Thermodynamics, 7th Edition John Wiley & Sons, 2009
3. Rajput, R.K. Engineering Thermodynamics, 3rd Edition, Jones & Bartlett Learning, 2010.

EAT232/3
Fundamental of Environmental Engineering

Course Synopsis

This course focuses on fundamental concepts of environmental engineering. Students will be exposed briefly about the main component in environmental engineering that are water, air, solid waste and noise. The definition, causes, impacts and controls of every pollution (as above) will be described briefly. Furthermore, the Environmental Quality Act (EQA) 1974, limitation and guidelines that have been applied in Malaysia will also be described in this course.

Course Outcomes

CO1: Capability of using a mass balance approach to analyze and solve environmental problems and ability to understand basic water chemistry and to describe the fundamental components of water and wastewater treatment systems in industrial and domestic sewage and related legislation.
CO2: Ability to describe or calculate solid and hazardous waste generations, characteristics and to explain how is managed and related legislation.
CO3: Ability to describe or calculate classification of pollutant and particulate, the effect of pollutants as well as global atmosphere change and related legislation.
CO4: Ability to describe or calculate the physical properties of sound, noise measurement and control and related legislation.

References

1. Mackenzie L.D. and David A.C., (2008) Introduction to Environmental Engineering 4th Edition , McGraw HillDavis M. L. and Masten S.J., Principles of Environmental Engineering. McGraw-Hill, 2004.
2. Peavy H. S., Rowe D.R., Tchobanoglous G., Environmental Engineering. McGraw-Hill, 1985.

EAT233/3
Environmental Engineering Skills

Course Synopsis

Environmental engineering skill playS an important role in environmental engineering desicision making and problem solving. It investigates the growth of the effectiveness and sophisticated techniques in order to offer reliable information for environmental engineering. This includes and promotes in environmental monitoring and surveying, environmental database, information systems as well as Geographical Information System (GIS). Therefore, the students are enabled to perform surveying tasks, utilize GIS as well as AutoCAD drawing and editing for aiding in decision making and problem solving in various environmental engineering disciplines as well as basic plotting using MATLAB. This course also aims to develop basic skills in using current software packages of GIS, AutoCAD and MATLAB.

Labs

1. Lab 1: Levelling
2. Lab 2: Traversing
3. Lab 3: Basic Plotting
4. Lab 4: Engineering Drawing using AutoCAD 1
5. Lab 5: Engineering Drawing using AutoCAD 2

Course Outcomes

CO1: Ability to provide knowledge and perform surveying task and procedure.
CO2: Ability to provide knowledge and practice AutoCAD and MATLAB software package.
CO3: Able to produce mapping using Geographical Information System (GIS).

References

1. Leach, James A, AutoCAD 2008 instructor: a student guide to complete coverage of AutoCAD's commands and features, McGraw-Hill Higher Education
2. Yarwood, A, Introduction to AutoCAD 2008: 2D and 3D Design, Oxford: Elsevier/Newnes, 2007.
3. Kavanagh, B.F, Surveying Principle and Application, 8th edition, Prentice Hall, 2009.

EAT235/3
Geoenvironmental Engineering

Course Synopsis

This course presents the principles of geo-environmental engineering. It covers the chemical and geo-chemistry background of soil, rock classification, groundwater flow and contaminant fate and transport. This course also discusses the sources of contaminants and available remediation technologies which are widely used for groundwater treatment.

Course Outcomes

CO1: Ability to discuss and apply the component, concept and principle available in soil composition and properties.
CO2: Ability to utilizes and apply the knowledge of groundwater flow and transportation process in porous media.
CO3: Ability to discuss and apply the knowledge of the processes affecting the fate and transport of contaminants.
CO4: Ability to identify and utilizes the basic principles and remediation technologies available in subsurface contamination.
CO5: Ability to discuss and illustrate barriers and liner systems for contaminated land.

References

1. Hari D. Sharma and Krishna R. Reddy, Geoenvironmental Engineering, John Wiley & Sons, 2004.
2. Sarsby, R. Environmental Geotechnics, Balkema, Rotterdam, 2000.
3. Kavanagh, B. F, Surveying Principles and Application, 4th Edition, Prentice Hall, 1996

EAT237/3
Water Supply Engineering

Course Synopsis

This course will be focused on water sources and usage, method on estimating water demand, water quality characteristics and legislations, water treatment processes and also water distribution and reticulation system. Special focus will be given on the design of raw water treatment comprising pre-treatment, primary treatment (coagulation, flocculation, sedimentation, filtration, disinfection) and advance water treatment processes. From the course, students will also be exposed to the design guidelines of water supply system which is applied in Malaysia.

Course Outcomes

CO1: Ability to identify water sources, water quality and consumption, and to forecast water demand.
CO2: Ability to identify the technology of water treatment processes.
CO3: Ability to design water treatment unit.
CO4: Ability to describe and analyze water distribution system.

References

1. Qasim, S.R., Motley, E.M. and Zhu, G. Water Works Engineering: Planning, Design, and Operation. Prentice Hall PTR, 2000.

2. Crittenden J.C., Trussell R.R., Hand D.W., Howe K.J., Tchobanoglos G. Water Treatment Principles and Design, 2nd edition, John Wiley & sons, Inc, 2005
3. The Malaysian Water Association. MWA Design Guidelines for Water supply Systems, published by MWA, 2000.

EAT301/4
Air Pollution Engineering

Course Synopsis

This subject discuss in detail about air pollution control. As an introduction, students will be introduced to air pollution control philosophies and regulations which are relate to air pollution control in Malaysia. Meteorological aspects which control the transport of air pollutants are also discussed in this subject. Apart of that, this subject will explain and discuss the general idea on how to control air pollution, modelling the pollutant dispersion as well as designing air pollution control equipments.

Labs

1. Meteorology
2. Air Pollution Control Device – Particulate Matter Meter
3. Air Pollution Control Device – Cyclone
4. Air Pollution Control Device – ESP

Course Outcomes

CO1: Ability to discuss and analyse the behaviour of meteorological condition and their effect on air pollutant dispersion.
CO2: Ability to predict the dispersion of air pollutant/s and suggest mitigation measures.
CO3: Ability to discuss the general ideas in air pollution control.
CO4: Ability to identify and design suitable air pollution control device.

References

1. Noel De Nevers (2000) Air Pollution Control Engineering, International Edition, McGraw Hill.
2. Karl B. Schnelle, Jr., Charles A. Brown. (2002) Air pollution control technology handbook CRCnetBASE, CRC Press.

3. Wayne T. Davis (2000) Air pollution engineering manual / Air & Waste Management Association, Wiley.

EAT303/4
Wastewater Engineering

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.

Labs

1. Lab 1: Chemical Oxygen Demand (COD)
2. Lab 2: Biochemical Oxygen Demand (BOD)

Course Outcomes

CO1: Ability to identify and analyze the preliminary and primary unit processes applied in wastewater treatment.
CO2: Ability to identify and analyze the secondary unit processes applied in wastewater treatment.
CO3: Ability to identify and analyze the tertiary unit processes applied in wastewater treatment.
CO4: Ability to design preliminary, primary, secondary and tertiary unit processes applied in wastewater treatment.

References

1. Mackenzie L. Davis (2011) Water and Wastewater Engineering, Design Principles and Practice, International Edition, McGraw-Hill, Singapore.
2. Metcalf and Eddy, Inc, (2004) Wastewater Engineering, Treatment and Reuse, Fourth Edition, McGraw-Hill, New York Hammer.
3. M.J. Hammer M.J. Jr. (2012) Water and Wastewater Technology, International Edition, Prentice Hall-Pearson, Ohio.

EAT 332/3
Environmental Impact Assessments

Course Synopsis

The aim of the course is to 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 focuses on environmental and societies impacts on the proposed project. In achieving the objectives of this course, students will be engage in lecturers, small working groups in conducting problem based learning and writing an environmental impact assessment statement.

Course Outcomes

CO1: Ability to explain and analyze the EIA process, and compare with legal requirements in Malaysia.
CO2: Ability to outline the terms of reference in conducting Environmental Impact Assessment (EIA) and evaluate the potential impacts to the environment and society.
CO3: Ability to assess the severity of adverse effects and suggest mitigation measures and monitoring plan.
CO4: Ability to comprehend the reporting mechanisms, public participation and auditing process.

References

1. Nick Harvey and Beverley Clarke (2011) Environmental Impact Assessment: Procedures and Practices, Oxford University Press.
2. Charles H. Eccleston (2011) Environmental Impact Assessment: A Guide to Best Professional Practices, CRC Press.
3. Y. Anjaneyulu and Valli Manickam (2011) Environmental Impact Assessment Methodologies, CRC Press.

EAT 341/3
Solid and Hazardous Waste Engineering

Course Synopsis

Students will be introduced to elements of solid waste which is Municipal solid waste characterization, waste handling, generation rate, storage, collection and transport; waste treatment and disposal methods, including biological and chemical treatment, incineration, pyrolysis, landfill and site remediation, waste minimization. Student will also be enriched with characteristic of hazardous waste, handling, storage and collection, treatment and disposal methods, physicochemical and biological methods, stabilization & various ultimate disposal options such as solidification, incineration and secure landfilling. Finally, student will be able to design a landfill with complete understanding of the characteristic of a landfill.

Labs

1. MSW Moisture Content (Weight Measurement).
2. MSW Energy Content (Calorie Measurement).
3. Leachate COD & NH4-N Determination.
4. Determination of Hazardous Waste Metal Content (Chromium & Zinc).

Course Outcomes

CO1: Ability to define and differentiate sources, composition and properties of waste and hazardous waste.
CO2: Ability to design a complete flow of waste management system.
CO3: Ability to decide the final disposal of waste and hazardous waste.
CO4: Ability to design landfill.

References

1. Tchobanoglous, Theisen and Vigil, Integrated Soild Waste Management: Principles & Management Issues,McGraw-Hill, 1993. ISBN: 0070632375
2. LaGrega, Buckingham & Evans, Hazardous Waste Management, 2nd Edition, McGraw-Hill,2001. ISBN: 0070393656.
3. Cheremisinoff and Wu (editor), Hazardous Waste Management Handbook, Technology, Perception and Recycling. PTR Prentice Hall, 1994.

EAT342/3
Noise Pollution Engineering

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

CO1: Ability to differentiate between noise and sound, able to explain and discuss the sources and effects of noise pollution.
CO2: Ability of defining the properties of sound, quantifying the noise levels and decibel as well as to characterize the noise.
CO3: Ability to develop methodologies to control noise pollution and get familiar with the statutory limits related to both ambient noise levels and noise levels at a workspace environment.

References

1. Davis, M.L. and Cornwell, D. A., Introduction to Environmental Engineering, 3rd Editions, McGraw-Hill International Editions, 1998
2. István L. Vér, Leo L. Beranek, Noise and Vibration Control Engineering: Principles and Applications, Second Edition, John Wiley and Sons, 2006
3. Wang, L.K., Pereira, N.C., Hung, Y. T. and Li, K. H., Advanced air and noise pollution control, Handbook of environmental engineering, Humana Press Inc., 2004.

EAT343/3
Public Health and Occupational Hygiene

Course Synopsis

Public health and occupational hygiene are two interrelated studies. This course is divided into two sections that cover 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

CO1: Ability to discuss environmental health in the tropics and relate to water supply, sanitation and social practices
CO2: Ability to asses various pollutants and other hazards in nature and indoors and identify measures to reduce pollution
CO3: Ability to identify, evaluate and control occupational hazards
CO4: Ability to apply OSHA information standards for safety and environmental management

References

1. Mary-Jane Schneider. *"Introduction to Public Health"* 1st edition, Jones & Bartlett Publishers, 2003.
2. Bernard J. Turnock, Public health: what it is and how it works, 4th Edition, Jones and Bartlett, 2009.
3. Bernard J. Turnock, Essentials of public health, Jones and Bartlett, 2007.

EAT 344/3
Environmental Management System

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

CO1: Ability to explain the environmental management and the requirements on ISO 14001 (environmental management system).
CO2: Ability to distinguish and articulate the aspect and impact of a human work processes that may resulted to adverse effect.
CO3: Ability to suggest mitigation measure and establish environmental policy in conserving the environment.
CO4: Ability to carry out environmental reporting.

References

1. Blackburn W.R. (2007) The Sustainability Handbook: the complete management guide to achieving social, economic and environmental responsibility. Earthscan, Washington.
2. Darabaris J. (2007) Corporate Environmental Management, CRC Press.
3. Sheldon, C. and Yoxon, M. (2006) Environmental Management Systems: A Step-by-Step Guide to Implementation and Maintenance. 3rd Edition, Earthscan, Sterling, VA, Earthscan.

EAT 345/3
Hydrology

Course Synopsis

Introduces the fundamental of hydrological process such as hydrologic cycle, atmospheric circulation, precipitation, evaporation, evapotranspiration and infiltration. Students will be introduced to equations to calculate, and equipments 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 stream flow 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. Unit Hydrograph and it's usage and it's derivation will also be included.

Course Outcomes

CO1: Ability to discuss and perform the computation for hydrological process.
CO2: Ability to compute the flood hydrographs using various hydrograph methods
CO3: Ability to analyze and apply the frequency analysis in hydrology.
CO4: Ability to compute the flood routing.

References

1. Bedient, Huber, "Hydrology & Floodplain Analysis 5th Edition". Pearson, 2012.
2. V.T. Chow, David R. Maidment, Larry W. Mays, "Applied Hydrology". McGraw Hill, International Edition 1988.
3. Viessman, Lewis, "Introduction to Hydrology 5th Edition". Prentice Hall, 2003.

EAT346/4
Mass Transfer

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 and understanding of the processes that cause pollutant transport, and to present and apply the mathematical formulas used to calculate the resulting pollutant fluxes.

Labs

1. Lab 1 - Determination of flooding point and loading point in gas absorption system
2. Lab 2 - Absorption of CO2 into water in gas absorption system
3. Lab 3 - Filter press system
4. Lab 4 - Liquid diffusion system
5. Lab 5 - Evaporation system

Course Outcomes

CO1: Ability to utilize the understanding of the processes that cause pollutant transport.
CO2: Ability to utilize the mathematical formulas used to calculate resulting pollutant fluxes.
CO3: Ability to utilize transport processes in the design of emission-control systems.
CO4: Ability to utilize the understanding of the sources, fate and transport, and the impact of chemical substances.

References

1. Louis J. Thibodeaux. Environmental chemodynamics: movement of chemicals in air, water, and soil. 2nd Ed. John Wiley & Sons, 1996.
2. Warren Lee McCabe, Julian Cleveland Smith, Peter Harriott. Unit operations of chemical engineering, 7th Ed.
3. Harold F. Hemond and Elizabeth J. Fechner-Levy. Chemical Fate and Transport in the Environment, 2nd Ed. Academic Press, 1999.

EAT 433/3
Environmental Engineering Design

Course Synopsis

This course will focus on the design of an integrated Environmental Engineering Project. The course will start off with the introduction of basic principle of Engineering design and selection of the design project related to Environmental Engineering. The students are expected to work on selected project to design the unit process and unit operation as well as the economic analysis under the guidance of project supervisor.

Labs

Integrated Environmental Engineering Design

Course Outcomes

CO1: Ability to recognize the design concept and requirement in Environmental Engineering field.
CO2: Ability to apply the design concept and requirement for the selected project in Environmental Engineering field.
CO3: Ability to design and evaluate the specific unit process and unit operation in Environmental Engineering field.
CO4: Ability to conduct economic evaluation of the selected project in Environmental Engineering field.

References

1. Heinsohn, R.J. and Kabel, R.L (1999). *Sources, Control of Air Pollution* . New Jersey: Prentice Hall.
2. Metcalf & Eddy. (1991). *Wastewater Engineering, Treatment, Disposal and Reuse'*, 3rd edition. McGraw Hill.
3. *The Malaysian Water Association. MWA Design Guidelines for Water supply Systems, published by MWA, 2000.*

EAT 441/3
Environmental Remediation

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 behaviour of subsurface contaminants, contaminants tracer study and remediation planning. Student will also be enriched with bioremediation technologies to recover the contaminants.

Course Outcomes

CO1: Ability to illustrate the concepts of bioremediation in soil, groundwater and contaminated site treatment.
CO2: Ability to describe and analyse the characteristics of contaminants.
CO3: Ability to identify and construct appropriate strategies to remediate contaminated soil.
CO4: Ability to identify and construct appropriate strategies to remediate contaminated water.

References

1. Hari D. Sharma and Krishna R. Reddy. Geoenvironmental Engineering. Wiley (2004)
2. Pedro J.J. Alvarez and Walter A. Illman. Bioremediation and natural attenuation. Wiley (2006)
3. Mukesh Doble and Anil Kumar. Bio-treatment of industrial effluents. Elsevier (2005)

EAT 443/3
Built Environment

Course Synopsis

Introduction to knowledge and skills in elements and principles of building design that pervade the built environment and therefore influence sustainable design. This then leads to the undertaking of a detailed and systematic exploration of the designs of energy efficient buildings; incorporating thermal control, thermal dynamics, green architecture, thermal insulation, ventilation, air-conditioning, lighting and acoustics. While mini projects are designed to help students develop a stronger emphasis in considering in more detail the holistic design of a building, its internal environment, and the system necessary to achieve a sustainable building.

Course Outcomes

CO1: Ability to describe and analyze the concepts of thermal control through the building envelope.
CO2: Ability to analyze heat exchange mechanisms and compute the thermal interactions in building.
CO3: Ability to construct skills in designing sustainable building performance with respect to the energy efficiency.
CO4: Ability to select and evaluate the methods of active and passive control and design approaches in a physical building environment.

References

1. Norazian Mohamed Noor et al. (2009) Introduction to Environmental Engineering, 1st Ed., Penerbit UniMAP.
2. Davis M.L. and Cornwell D.A. (2008) Introduction to Environmental Engineering, 4th Ed., McGraw-Hill.
3. Davis M. L. and Masten S.J. (2004) Principles of Environmental Engineering. McGraw-Hill.

EAT 445/3
Remote Sensing

Course Synopsis

Remote sensing is the acquisition of information about an object or phenomenon, without making physical contact with the object. 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, satellite and sensor also its applications. The characteristic of various system embrace passive and active remote sensing also discussed.

Labs

1. Interactive Display Function
2. Classification Method
3. Sea Surface Temperature

Course Outcomes

CO1: Ability to understand basic concept of remote sensing.
CO2: Ability to convert and analyze environmental data by using digital image processing software.
CO3: Ability to characterized and utilizes the various system of remote sensing.

References

1. Lilesand, T.M., Keifer, R.W. & Chipman, J.W, Remote Sensing and Image Interpretation, 6th Edition, John Wiley & Sons, 2007.
2. John R. Jensen, Introductory Digital Image Processing, 2rd edition, Prentice Hall, 1996.
3. Sabins, F., Remote Sensing – Principles and Interpretation, W.H. Freeman and Co., New York, 1997

EAT 447/3
Environmental Informatics

Course Synopsis

Investigation of the development of effective techniques to deliver comprehensive and reliable information for environmental research, management and public awareness. This assimilates expertise and technologies and 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.

Course Outcomes

CO1: To provide knowledge and understanding of concerns of environmental pollutants and monitoring systems
CO2: To provide knowledge on database management and technique to evaluate and collate raw data
CO3: Able to transform environmental data into decision making information by using statistical analysis and simulation modelling tools
CO4: To raise awareness of the students to the existing environmental risk problems.

References

1. Nicholas M. Avouris and Page, Environmental Infromatics: Methodology and Applications of Environmental Infromatics Processing 2008.
2. Lorenz M. Hilty, Environmental informatics, Elsevier, 2006
3. Jorge Marx Gómez, Michael Sonnenschein, Martin Müller, Information Technologies in Environmental Engineering:ITEE 2007 - Third International ICSC Symposium

EAT 449/3
Environmental Process Control & Instrumentation

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.

Labs

1. Review and application of Matlab/ Simulink in Process Control.
2. Solution of Environmental process control study case using Matlab/ Simulink.

Course Outcomes:

CO1: Ability to understand the concept of process control and instrumentation.
CO2: Ability to develop and solve dynamics model of chemical and biological processes related to environmental engineering.
CO3: Ability to analyze and design the control system for chemical and biological processes related to environmental engineering.
CO4: Ability to apply the process control strategies of typical chemical and biological process related to environmental engineering.

References

1. J. B. Riggs and M. N. Karim "Chemical and Bio-Process Control", 3rd edition, Pearson International Edition (2007).
2. Coughanowr & Koppel, "Process System Analysis and Control", McGraw Hill, 1991.
3. Stephanopoulos, G., Chemical Process Control: An Introduction to Theory and Practice, Prentice Hall Inc., New York, 1984

EAT 461/2
Final Year Project I

Course Synopsis

This an individual research project in connection with a special engineering problem and under the guidance of an academic staff. The project undertaken may fall under one of the following areas: Mathematical analysis, experimental tests, computer simulation, hardware and/software development, to their field of interest. At the end of the project, each student prepares an engineering report, presents and demonstrates findings and results of the project work.

Course Outcomes

CO1: Ability to modulate and utilize academic knowledge and practical experience in conducting an academic project.
CO2: Ability to think objectively, analytically and critically in identifying and solving problem in systematic manner. Ability to create innovative/ commercialization
CO3: Ability to work independently in conducting and completing an academic project.
CO4 Ability to present the proposal and final product orally and graphically.

References

1. Donald H. McBurney and Teresa L. White, (2007). Research Methods, 7th Edition, Thompson Wadsworth.
2. Daniel Holtom & Elizaberth Fisher, (1999). Enjoy Writing Your Science Thesis or Disertation, Imperial College Press.
3. Leo Finkelstein, Jr., (2008). Pocket ook og Technical Writing for Engineers and Scientist. 3rd Edition, McGraw Hill.

EAT 462/4
Final Year Project II

Course Synopsis

This subject is the continuity of Final Year Project I. In this subjects students will conduct experimental tasks which has been planned during the Final Year Project I. Students also will completing their thesis report during this subject. In this subject, students will be also exposed to journal writing.

EAT 463/3
Project Engineering Management

Course Synopsis

This course aims to teach students on how to apply the project management skills and economic techniques in evaluating the design and engineering alternatives. The role of engineering economics 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 the current economic scenarios.

Course Outcomes

CO1: Ability to analyse and evaluate the process of project management, develop work plans, do cost estimation and perform project evaluation

CO2: Ability to analyse and evaluate economic scenarios and apply decision making process to engineering project and business venture.

References

1. O'Sullivan / Sheffin, (2001), Economics: Principles and Tools, Prentice Hall.
2. R. Logeswaran, Hairul Azhar, Pau Kiu Nai and Sim Hock Kheng, Engineers in Society, Mc Graw Hill 2nd edition.
3. S. Park Chan, Fundamentals Engineering Economics, 2nd., Prentice-Hall. (2008)

Building Engineering Programme (RK82)

EAT 102/4
Mechanics and Material Engineering

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 potion. In material engineering portion, the student will be also taught on structure of crystalline solids, imperfection of solid as well as strength of material.

Labs

1. Equilibrium of beam
2. Tensile test
3. Rockwell Hardness Test

Course Outcomes

CO1: Ability to construct free body diagram and ability to solve equilibrium problems using equilibrium theory.

CO2: Ability to determine friction and properties of sections.

CO3: Ability to solve problems which relate to kinematics and kinetics of a particle.

CO4: Ability to explain basic concepts of material strength as well as their mechanic properties.

References

1. Hibbeler, R.C. Engineering Mechanics Statics. 12th Ed. , Prentice Hall, 2010.
2. Hibbeler, R.C. Engineering Mechanics Dynamics. 12th Ed. , Prentice Hall, 2010.
3. Peter Schiavone, Hibbeler, R.C. Engineering Mechanics Statics Study Pack. 12th Ed. Prentice Hall, 2010.

EAT112/4
Geomatic Engineering

Course Synopsis

In this course student will be introduce basic surveying involved in engineering. Starting from linear measurement on plane. Student will do leveling after they learn 2 different data logging. With their knowledge in tapping and leveling, they have to do traversing and tachymetry. From all the data they have, student will ask to transform all the data to map using engineering drawing and autoCAD. Lastly, student will be test in real work, in geomatic camp.

Labs

1. Introduction to Distance Measurement and Bearing.
2. Introduction to Levelling Work (Collimation and Rise & Fall Method).

3. Introduction to Geomatic Instruments and Auto Level work (Sg. Batu Pahat).
4. Traversing With Compass and Theodolite.
5. Introduction to Tacheometry.
6. Introduction to Electronic Distance Measurement (EDM) With Total Station.
7. Geomatic Camp.

Course Outcomes

CO1: Ability to understand basic concept of geomatic.

CO2: Ability to perform surveying task and procedures.

CO3: Ability to provide knowledge and practice with the latest geomatic engineering equipments.

References

1. Barry Kavanagh, Surveying Principles and Applications. Pearson. (2009).
2. Ghilani Wolf., Elementary Surveying, An Introduction to Geomatics, Twelfth Edition, Pearson International Edition.
3. Ab. Hamid Mohamed, Asas Ukur Kejuruteraan, Penerbit Universiti Teknologi Malaysia.

EAT113/4
Mechanics Of Materials

Course Synopsis

The aim of this course is to enable students focused on mechanics of material which begins with the concept of stress and strain. The important mechanical properties of materials and separate treatments of axial load, torsion, and bending are also discussed. The transverse shear along with a discussion on the state of stress results from combined loadings will be covered in this course, as well as the concepts for transforming multiaxial states of stress and in similar manner, the methods for strain transformation. For a further summary, student will be taught the applications of beams and shaft that cover on the design and deflection parts. Besides that the buckling of column also will be exposed to the student.

Labs

1. Modulus Young
2. Torsion
3. Bending Moment
4. Strut Buckling

Course Outcomes

CO1: Ability to determine the stresses, strains and deformation of members in simple one-dimensional elastic system.

CO2: Ability to analyze torque-loaded member and evaluate the values and distribution of bending and shear stresses in beam section.

CO3: Ability to apply shear formula in beam or thin-walled and compute stress caused by combined loadings.

CO4: Ability to construct Mohr's Circle to calculate stresses on inclined planes and deduce the buckling load of columns with various types of support.

References

1. R.C Hibbeler' "Mechanics of Materials", 8th Ed, Prentice Hall, 2011
2. Ferdinand P. Beer, E. Russell Johnston Jr., John T. DeWolf.,"Mechanics of Materials". 3rd Edition. McGraw Hill,2004.
3. Megson, T.H.G., "Structural and Stress Analysis", Butterworth: Heinemann,2002.

EAT151/3
Introduction to Building Engineering

Course Synopsis

This course aims to provide a comprehensive introduction to the various aspects of building engineering. It introduced the building engineering terms and evaluates the practical processes and typical methods used in its construction, the building team which implements the processes and the methods used for communicating information. With regard to maintenance and repair of existing buildings, traditional construction procedures will be given. In the beginning, the requirements of a building; appearance, durability, dimensional suitability, strength and stability, whether exclusion, sound control, thermal comfort, fire protection, lighting and ventilating, sanitation and drainage and followed by introducing to building life cycle and its activities. Construction-related authorities, construction standards and activities sequencing will be thought in this course.

Course Outcomes

CO1: Ability to explain the terms that is related to overall building engineering and understanding the building life cycle with emphasize on sustainability.
CO2: Ability to understand the communication path in construction industry and the roles and responsibilities of authorities and overall project personnel.
CO3: Ability to understand an overall building life cycle and the construction sequence and activities involved in building construction.

References

1. Osbourn, D. and Greeno, R., "Introduction to Building", Fourth Edition, Pearson, Prentice-Hall, 2007.
2. David, V. Chadderton ,"Building Services Engineering", Taylor & Francis, REV 5 2007.
3. MS1525:2007 Code Of Practice On Energy Efficiency And Use Of Renewable Energy For Non-Residential Buildings (First Revision)

EAT208/3
Environmental Law, Health And Safety

Course Synopsis

Students will be exposed to Malaysian related laws and regulations on occupational safety and health (e.g. OSHA 1994) and environment (e.g. EQA 1974) and how to interpret the requirements stipulated under these documents. This course will also provide students the necessary information in identifying hazards, assessment and managing the risks that may be harmful to humans in the workplace.

Course Outcomes

CO1: Ability to comprehend and explain the legal requirement of environmental, safety and health laws and regulations.
CO2: Ability to describe and evaluate hazards in the workplace.
CO3: Ability to describe and evaluate the magnitude of risks on humans associated with the hazards in the workplace.
CO4: Ability to outline the management plan in managing the hazards and risks in the work place.

References

1. Goetsch, D.L. (2010) Occupational Safety and Health for Technologist, Engineers and Managers, 7th. Ed. Pearson Prentice Hall.
2. Occupational Safety and Health Act 1994 (Act 514) & Regulations and Orders, 2007 (amended at 5th April), International Law Book Services, Malaysia.
3. Environmental Quality Act & Regulations, 2006 (amended up to April), MDC Publishers Sdn. Bhd., Malaysia.

EAT212/4
Soil Mechanics

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.

Labs

1. Rock Identifications
2. Sieve and Hydrometer Analysis
3. Liquid Limit and Plastic Limit Test
4. Constant Head Permeability Test
5. Standard Proctor Compaction Test

Course Outcomes

CO1: Ability to identify, classify and differentiate the different types of soil and rock including their properties.
CO2: Ability to discuss the seepage and permeability concept and solve problem involving flow nets.
CO3: Ability to solve calculation problem using mechanics involving physical properties, compaction and effective stress.

CO4: Ability to employ the shear strength theory to determine shear strength parameters of soils.

CO5: Ability to explain the process of consolidation and solving problems using one-dimensional consolidation theory.

References

1. R. F. Craig, 'Soil Mechanics' , E & FN Spon, 1997
2. M. Budhu, 'Soil Mechanics & Foundations', Wiley, 1999.
3. J.H Atkinson, 'An introduction to the mechanics of soils and foundation, through critical state soil mechanics', McGraw Hill, 1993

EAT 250/3
Building Engineering Drawing

Course Synopsis

The course equips students with the basic computer-aided drawing skill for general engineering drawing, and especially the drawing for Building engineering profession. This includes the structural plan, cross section drawing and structural detailing. Through lectures, students will learn the basic characteristics of professional civil engineering drawing and computer-aided drawing program. Through hands-on sessions using drawing software packages, this course enables the students to have first hand practice on the drawing for some idealized and actual projects. Mini project cover several disciplines of building engineering profession will be integrated through a series of these hand-on sessions. Moreover, students will learn about bill of quantity through drawing from industry.

Labs

Studio works

1. Introductions to basics engineering drawing.
2. Electrical Installation Symbols.
3. Water Installation Symbols and Layout.
4. Sanitary Installation Symbols and Layout.
5. Introduction to Computer Aided Drafting.
6. Civil and Structural Drawing.
7. Road and Drainage Drawing.
8. Construct a Simple Building using CAD software.
9. Mini Project include drawing and bill of quantity.

Course Outcomes

CO1: Ability to convey with sketching, manual and computer-aid-drawing application.

CO2: Ability to interpret architectural drawing and construct into structural drawing propose; to identify structural layout.

CO3: Ability to relate the basic engineering drafting to the actual construction via graphical presentation.

CO4: Ability to calculate bill of quantity that used in tendering in construction industry.

References

1. Gary R Bertoline, Eric N Wiebe, "Technical Graphics Communication", 3rd ed., McGraw-Hill, 2003.
2. Zurflieh, Thomas P, AutoCAD 2004: 3D drawing and solid modeling, Prentice Hall, 2005
3. Shawna Lockhart, A tutorial Guide to AutoCAD 2005, Prentice Hall, 2005

EAT251/3
Structural Theory

Course Synopsis

This course provides students with a clear and through 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. Beside that, It also introduces deflections using geometrical method for the beams and also virtual work method for trusses, beams, and frames. Cables and arches also will be discussed at the end of this course.

Labs

1. Force in truss
2. Portal frame
3. Deflection of frame
4. Two Hinged Arch

Course Outcomes

CO1: Ability to identify the statically determinate and indeterminate structures.
CO2: Ability to analyze and illustrate the support and internal loading developed in determinate structure.
CO3: Ability to analyze the internal forces in cable and arch.
CO4: Ability to determine the deformation of determinate structure.

References

1. Hibbeler, R.C., "Structural Analysis", Seventh Edition, Prentice-Hall, 2009.
2. Kassimali, A. "Structural Analysis", Second Edition, PWS, 1999
3. Hibbeler, R.C., Reddy C.S., "Mechanics of Material", Prentice-Hall, 2005.

EAT252/4
Fluid Mechanics Engineering

Course Synopsis

This course provide 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. In this subject, student will be introduced to the Darcy-Weisbach equation, Moody diagram, Energy losses in pipelines, Minor losses, Multiple pipe systems.

Labs

1. Properties of Fluid
2. Flowmeter measurement apparatus
3. Bernoulli's theorem demonstration
4. Impact water jet
5. Osbourne Reynolds demonstration unit
6. Friction Loss Apparatus

Course Outcomes

CO1: Ability to understand and analyze the basic characteristics of fluid mechanics and fluid statics.
CO2: Ability to analyze the hydrostatics and basic hydrodynamics in fluid.
CO3: Ability to analyze the flow in pipe and flow in open channels.

CO4: Ability to analyze Darcy-Weisbach equation, Moody diagram, Energy losses in pipelines, Minor losses, Multiple pipe systems.

References

1. Duncan, W.J., Thom, A.S. & A.D. Young. 1970. Mechanic of fluids, 2nd Edition. London.
2. Fatimah, M.N., Faridah, J.S. dan G.K. Goh. 1991. Mekanik Bendalir untuk Kejuruteraan Awam. UTM, Johor: Unit Penerbitan Akademik.
3. Robertson, J.A. and C.T.Crowe. 1985. Engineering Fluid Mechanics. 3rd Edition. New York: Houghton Mifflin.

EAT253/3
Structural Analysis I

This course provides student with understanding of influence lines for statically determinate structures and approximate analysis of statically indeterminate structures. Student also will be introduce with beam, trusses and plane frame analysis using slope deflection and moment distribution methods. This course requires pre-requisites EAT 251/3 – Structural Theory.

Course Outcomes

CO1: Ability to analyze of statically determine structures for beam, trusses and frame using influence line method.
CO2: Ability to analyze of statically indeterminate structures for beam, trusses and frame using approximate analysis.
CO3: Ability to analyze structures using the displacement method of analysis by developing the slope deflection equation.
CO4: Ability to analyze structures using the displacement method of analysis by applying the method of moment distribution.

References

1. Hibbeler, R.C., "Structural Analysis", Seventh Edition, Prentice-Hall, 2009.
2. Kenneth, M. Leet., "Fundamentals of Structural Analysis". Third Edition. McGraw-Hill., 2008.

3. Reddy C.S., “Basic Structural Analysis”, Tata McGraw Hill Publishing Co., 1996

EAT257/3
Building Services Engineering

Course Synopsis

This course is designed to provide students with an understanding of specification, design, installation and management of all the building engineering services associated with the built environment. With the growing complexity of engineering services in modern buildings and the significance of energy conservation and pollution control, the role of the building services engineer is becoming increasingly important. In addition, the need to provide an internal environment that balances the comfort needs of the occupants with the functional requirements of the building calls for engineers with a wide range of knowledge and skills. Student will be able to highlight the importance of Mechanical & Electrical system in modern buildings.

Labs

1. Refrigeration trainer
2. Air – Conditional trainer
3. Heating Trainer
4. Elevator Trainer

Course Outcomes

CO1: Ability to describe and discuss the importance of building services in their buildings’ designs with respect to sustainability.
CO2: Ability to evaluate the choice of building services components for better buildings’ design and long term building operational sustainability
CO3: Ability to evaluate the Mechanical & Electrical distribution systems in modern buildings and problems related to design, operation and maintenance.

References

1. Chadderton, David V., Building Services Engineering, Hardback, April 2007, Publisher Taylor & Francis Ltd.
2. David, V. Chadderton,“Building Services Engineering”, Taylor & Francis, 2000.
3. John J. McGowan, C.E.M., “Direct Digital Control: A Guide To Distributed Building Automation”, The Fairmont Press, Inc. 1995.

EAT258/3
Building Materials Engineering

Course Synopsis

This course exposes students to different types of construction materials in building engineering. It covers type and function of cement, function of aggregates in concrete, water, admixtures, properties of fresh and hardened concrete, concrete mix design, manufacturing concrete on site. Properties and application of timbers, types and characteristics of bricks and blocks, ferrous and non-ferrous metals, and other current materials in the construction industry are also discussed.

Course Outcomes

CO1: Ability to identify and differentiate the different types of engineering material.
CO2: Ability to explain the basic science and engineering fundamentals pertaining to characteristic of the constituents of concrete and its influence to fresh and hardened concrete properties.
CO3: Ability to analyze the basic science and engineering fundamentals pertaining to other construction material namely steel, timber, bricks and bitumen and differentiate its influence to their properties
CO4: Ability to apply the knowledge gain above for various application related to civil engineering work and discuss the innovations, new applications and new construction material for sustainable development.

References

1. Edward Ellen and Joseph Iano. “Fundamental of Building Construction: Materials and Methods”, Fourth Edition. Wiley. 2008.

2. Bjorn Berge. "Ecology of Building Materials". Second Edition. Architectural Press. 2009
3. H. Zhang. "Building Materials in Civil Engineering". Wood head Publishing Limited. 2010

EAT 314/4
Geotechnical Engineering

Course Synopsis

This course provides further discussion and explanation related to soil 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 theory and practical to solve problem related to geotechnical engineering.

Labs

1. JKR / McKintosh Probe Test.
2. One dimensional Consolidation test.
3. Triaxial test.
4. Direct Shear test.

Course Outcomes

CO1: Ability to discuss issues in geotechnical engineering and explain site investigation methods.
CO2: Ability to analyze soil bearing capacity and design for shallow foundations and pile foundations.
CO3: Ability to analyze active and passive pressure according to Rankine's and Coulomb's theories.
CO4 Ability to analyze the stability of the slope in term of factor of safety.

References

1. Das, B.M. 'Principles of Geotechnical Engineering', Cengage Learning, 2010.
2. Das, B.M. 'Principles of Geotechnical Engineering', Thomson, 2007.
3. Das, B.M. 'Principles of Foundation Engineering', Thomson, 2004.

EAT351/3
Concrete Building Design I

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 and design a column. The syllabus is cover ultimate and serviceability limit state. Design resistance typical structural element and detailing.

Course Outcomes

CO1: Ability to calculate limit state design concept and analysis of sections for bending.
CO2: Ability to design and predict reinforcement bar for simply supported and continuous beam and illustrate beam detailing.
CO3: Ability to design reinforced concrete slab for one way and two way slab and illustrate slab detailing.
CO4: Ability to design reinforced concrete column and illustrate column detailing.

References

1. Mosley, W.H. Bungey, J.H. and Hulse, R. *Reinforced Concrete Design to Eurocode 2.* 6th Ed., Palgrave Macmillan, 2007.
2. W.M.C. McKenzie, *Design of Structural Elements*. Palgrave Macmillan, 2004.
3. IStructE. *Manual for the Design of Reinforced Concrete Building Structures*. The Institution of Structural Engineer. 1985.

EAT352/3
Concrete Building Design II

Course Synopsis

This course is designed to provide the student with ability to analyze and design advanced 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. Calculation for design includes staircase, foundation, retaining wall, reinforce concrete frame and prestressed concrete.

Course Outcomes

CO1: Ability to design staircase and illustrate staircase detailing.
CO2: Ability to design and predict reinforcement bar for foundation and illustrate foundation detailing.
CO3: Ability to design retaining wall and illustrate retaining wall detailing.
CO4: Ability to design reinforced concrete frame and prestressed concrete and illustrate the detailing.

References

1. Mosley, W.H. Bungey, J.H. and Hulse, R. *Reinforced Concrete Design to Eurocode 2.* 6th Ed., Palgrave Macmillan, 2007.
2. W.M.C. McKenzie, *Design of Structural Elements*. Palgrave Macmillan, 2004.
3. IStructE. *Manual for the Design of Reinforced Concrete Building Structures*. The Institution of Structural Engineer. 1985

EAT353/3
Structural Analysis II

Course Synopsis

This course provides student with understanding of matrix analysis for statically indeterminate structures using flexibility and stiffness methods. Non prismatic members are also included in the analysis. Student also will be introduced with the structural modeling using finite element method. Structural modeling and analysis using commercial structural analysis software are emphasized.

Course Outcomes

CO1: Ability to analyze the statically indeterminate beam, trusses and frame by applying the force or flexibility method
CO2: Ability to analyze and solve indeterminate structural problems for prismatic and non- prismatic members.
CO3: Ability to analyze the statically indeterminate beam, trusses and frame by using the stiffness method.
CO4: Ability to derive the finite elements equation and apply in analysis of structures.

References

1. Hibbeler, R.C., "Structural Analysis", Seventh Edition, Prentice-Hall, 2009.
2. *Liu, G.R. and Quek S.S. The Finite Element Method: A Practical Course, Butterworth-Heinemann, 2003*
3. Kenneth, M. Leet., "Fundamentals of Structural Analysis". Third Edition. McGraw-Hill., 2008.

EAT354/3
Steel Building Design

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 and 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

CO1: Ability to describe basic concept of steel members, connections and structures behavior.
CO2: Ability to apply the steel design concept.
CO3: Ability to design steel structures elements.

References

1. Trahair, N.S., Bradford, M.A., Nethercot, D.A., and Gardner, L., "The Behaviour and Design of Steel Structures to EC3", Taylor & Francis, 2008.
2. Martin, L.H., and Purkiss, J.A, "Structural Design of Steelwork to EN 1993 and EN 1994" 3rd Edition, Butterworth-Heinemann, 2008.
3. Nethercot, D.A., and Gardner, L., "Designers' Guide to EN 1993-1-1, Eurocode 3: Design of steel structures general rules and rules for buildings" Thomas Telford, 2005.

EAT 355/3
Highway & Traffic Engineering

Course Synopsis

The goal of this course is to give knowledge, understanding and synthesis in highway engineering which covers topics on traffic, road and highway. The sub-topics discussed are characteristics of drivers, pedestrians, vehicles and road, fundamentals of traffic flow, including volume, speed and density, traffic engineering studies, geometric design of road, two and multi-lanes highway. Students will be taught briefly on materials related to asphalt, bitumen and concrete, flexible and rigid pavements.

Course Outcomes

CO1: Ability to understand traffic flow fundamentals and relationship between volume, speed and density.
CO2: Ability to understand the transportation planning process, forecast travel demand and design highway drainage structures.
CO3: Ability to understand soil bearing test, material used in pavement, and design flexible pavement.

CO4: Ability to design rigid pavement.

References

1. Traffic and Highway Engineering, Fourth Edition, Nicholas J. Garber and Lester A. Hoel, 2009 Cengage Learning.
2. Traffic Engineering Design, Principles and Practice, Second edition, 2005, Elsevier Butterworth-Heinemann.
3. AASHTO Guide For Design Of Pavement Structures, 1993, American Association Of State Highway And Transportation Officials.

EAT356/4
Water & Wastewater Engineering

Course Synopsis

This course is an overview of engineering approaches to protecting water quality with an emphasis on fundamental principles. Theory and conceptual design of systems for treating municipal wastewater and drinking water are discussed, as well as reactor theory, process kinetics, and models. Physical and biological processes are presented, including sedimentation, filtration, biological treatment and disinfection. Finally, there is discussion of engineered and natural processes for wastewater treatment.

Labs

1. Jar test
2. Hardness test
3. COD
4. BOD5

Course Outcomes

CO1: Ability to describe and analyse the theory and concept in water processing, and solve the problems related to the process involved.
CO2: Ability to analyse and design the process/systems process of drinking water processing.
CO3: Ability to describe and analyse the theory and concept in wastewater treatment and solve the problems related to the treatment involved.

CO4: Ability to analyse and design the process/ systems of wastewater treatment.

References

1. Mark J. Hammer, Mark J. Hammer, Jr. Water and Wastewater Technology. Prentice Hall. 2005.
2. Mackenzie Davis. Water and Wastewater Engineering: Design Principles and Practice. McGraw Hill. 2011.
3. Metcalf and Eddy. Wastewater Engineering: Treatment and Reuse. McGraw Hill. 2005.

EAT 357/3
Construction Management

Course Synopsis

This course is designed to provide students with the knowledge of subject area; ability to apply tools in a project environment; demonstrate competence in learning and evidence generating to sustain competency. The syllabus comprises scope management including project authorization, scope definition, control and finalization. Cost management including project costing, resource planning, budgeting and controlling financial completion are also emphasized. In addition, this course will also expose students to the time management including activity sequencing, duration estimating, scheduling, progress control, monitoring and forecasting.

Course Outcomes

CO1: Ability to discuss and describe the general project management principles of construction industry.
CO2: Ability to describe three major components in project management (planning, execution and project evaluation).
CO3: Ability to use project planning and scheduling technique available in construction management.
CO4: Ability to analyze the project cash flow requirements, project monitoring, and control.

References

1. Kraig K., Clifford J. S., Christine M. F., & Richard E. M., “Construction Management Fundamentals”, Second Edition, McGraw Hill Construction, 2009.
2. Gido & Clements., “Successful Project Management”, Second Edition. Thomson, South-Western, 2003.
3. Jack R. Meredith & Samuel J. Mantel, Jr., “Project Management: A Managerial Approach”, Fourth Edition. John Wiley. 2000.

EAT 359/3
Water Resources Engineering

Course Synopsis

This course is designed to expose students the engineering principles involved in analyzing and managing the quantity and quality of water in natural and developed systems. The student is exposed to the different phases in Water Resources viz planning, collection of relevant data on water resources and also on National Water Policy. Reservoir planning, management and economic analysis aspects are covered in detail.

Course Outcomes

CO1: Ability to evaluate and develop on water resources systems utilizing the basic principles of the hydrologic cycle and the watershed.
CO2: Ability to compute the flood hydrographs using various hydrograph methods.
CO3: Ability evaluate surface water and groundwater flow for applications in water well development .
CO4: Ability to evaluate the design of stormwater management and pollutant loads for watershed and water quality analysis.

References

1. Larry W. Mays. “Water Resources Engineering”. John Wiley & Sons. 2005.
2. Linsley R.K. and Franzini J.B, “Water Resources Engineering”, McGraw-Hill Inc, 2000.
3. Douglas J.L. and Lee R.R., “Economics of Water Resources Planning”, Tata McGraw-Hill

EAT 411/3
Advanced Concrete Building Design

Course Synopsis

This course provides additional knowledge on the aspect of reinforced concrete structural elements. As a continuation to the Concrete Building Design 1 and 2, the topics discussed include analysis and design of ribbed, waffle and flat slabs, water retaining structures, walls, corbel and Nibs. Methods of deflection calculation, design of elements for torsion and analysis and design of raft foundation are also covered.

Course Outcomes

CO1: Ability to analysis and design ribbed, waffle or flat slabs
CO2: Ability to analyze and design torsion members.
CO3: Ability to analyze and design water retaining structures
CO4: Ability to analyze and design raft foundation and deflections checking.

References

1. Hibbeler, R.C., “Structural Analysis”, Seventh Edition, Prentice-Hall, 2009.
2. *Liu, G.R. and Quek S.S. The Finite Element Method: A Practical Course, Butterworth-Heinemann, 2003*
3. Kenneth, M. Leet., “Fundamentals of Structural Analysis”. Third Edition. McGraw-Hill., 2008.

EAT 413/3
Construction Engineering

Course Synopsis

The construction sector is a major part of the total civil engineering and building industry. Construction projects range in size from the small to the very large (such as the construction of a hydro electric power scheme or a freeway system). However, all projects share the common factors of utilizing workers, machines and materials, and of requiring organization and control. The graduate engineer must, therefore, be familiar with the range of construction equipment and techniques in common use, and must be able to plan and direct construction works. The course covers the areas of construction techniques, construction management and concrete technology.

Course Outcomes

CO1: Ability to discuss and describe the general project construction principles.
CO2: Ability to describe major components in project Construction.
CO3: Ability to describe of the techniques of construction operations, planning and management.
CO4: Ability to understanding & describe of the design, construction and maintenance of buildings and built facilities and the management techniques used for these processes.

References

1. Peurifoy, RL, Schexnayder, CJ & Shapira, A 2006, Construction planning, equipment and methods, 7th edn, McGraw Hill, Boston.
2. Gido & Clements., “Successful Project Management”, Second Edition. Thomson, South-Western, 2003.
3. Brand, RE 1975, Falsework and access scaffolds in tubular steel, McGraw Hill, London.

EAT 415/3
Advanced Steel Building Design

Course Synopsis

This course provides additional knowledge on the aspect of steel structural elements. As a continuation to the Steel Building Design, the topics discussed include design of plated structures and composite structures. Portal Frame analysis and design also covered. And also design consideration and design concept of cold-formed steel structures.

Course Outcomes

CO1: Ability to analyze and design plated structures.
CO2: Ability to analyze and design composite structures.
CO3: Ability to analyze and design portal frame.
CO4: Ability to analyze and design cold-formed steel structures.

References

1. Martin,L, Purkiss,J . Structural Design of Steelwork to EN 1993 and EN 1994, Third Edition, Butterworth 2008.
2. Trahair, NS, Bradford, MA, Nethercot, DA, Gardner L. The Behaviour and Design of Steel Structures to EC3. Fourth Edition. Taylor & Francais 2008.
3. Lam, D, Ang, TC, Chiew, SP. Structural Steelwork. Design to limit state theory. Third Edition. Elsevier. 2004.

EAT 451/3
Integrated Project Design

Course Synopsis

The building engineering capstone senior design course involves all seniors in their last semester before graduation and is titled "Integrated Project Design." It is illustrate in the course as analysis, design and planning of a building engineering design project; an integrated and realistic group project involving as much as possible all major aspects of the building engineering (civil engineering) profession." This course is the culminating activity in the building engineering program.

Course Outcomes

CO1: Ability to analyze and illustrate design of super structures.
CO2: Ability to analyze and illustrate design of earthwork and sub-structures.
CO3: Ability to analyze and illustrate design of infrastructure (road and drainage).
CO4: Ability to compute the cost and determine construction method.

References

1. Merritt, F. S., and Ricketts, J.T. "Building design and construction handbook", Sixth Edition, McGraw-Hill, 2001.
2. Chen, W.F., and Richard Liew, J.Y. "Civil Engineering Handbook", CRC Press, 2003
3. Reynolds, C.E. and Steedman J.C., and Threlfall, A.J. "Reinforced Concrete Designer's Handbook". 11^{th} Ed., E & FN Spoon, 2008.

EAT 452/3
Water Supply Engineering

Course Synopsis

This course will be focused on water sources and usage, method on estimating water demand, water quality characteristics and legislations, water treatment processes and also water distribution and reticulation system. Special focus will be given on the design of raw water treatment comprising pre-treatment, primary treatment (coagulation, flocculation, sedimentation, filtration, disinfection) and advance water treatment processes. From the course, students will also be exposed to the design guidelines of water supply system which is applied in Malaysia.

Course Outcomes

CO1: Ability to identify water sources, water quality and consumption, and to forecast water demand.
CO2: Ability to identify the technology of water treatment processes.
CO3: Ability to design water treatment unit.
CO4: Ability to describe, analyze and design water distribution system.

References

1. Qasim, S.R., Motley, E.M. and Zhu, G. Water Works Engineering: Planning, Design, and Operation. Prentice Hall PTR, 2000.
2. Crittenden J.C., Trussell R.R., Hand D.W., Howe K.J., Tchobanoglos G. Water Treatment Principles and Design, 2^{nnd} edition, John Wiley & sons, Inc, 2005
3. The Malaysian Water Association. MWA Design Guidelines for Water supply Systems, published by MWA, 2000.

EAT 453/3
Advanced Structural Analysis

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 analyzed 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

CO1: Ability to derive finite element equation.
CO2: Ability to analyze the 2 dimensional solid model using finite element method.
CO3: Ability to analyze moment capacity for the structural member.
CO4: Ability to derive the equation of motion for single degree of freedom system.

References

1. G.R. Liu and S.S. Quek, "The Finite Element Method: A practical course". 1st edition. Butterworth-Heinemann, 2003
2. K. Chopra. "Dynamics of Structures", Pearson Prentice Hall. 2007.
3. James G MacGregor and James K Wight, "Reinforced Concrete Mechanics and Design" 4th Edition, Pearson Prentice Hall, 2005.

EAT 454/3
Timber and Masonry Design

Course Synopsis

This course provide student knowledge in engineering material(timber and masonry). Emphasis of this course is to introduce students to timber and masonry as structural member. Student will be able to design timber joint using nail and other mechanical fasteners, design unreinforced and reinforced masonry structural elements and structures and will be able to analyze serviceability and ultimate capacity design; seismic response; resistance and design.

Course Outcomes

CO1: Ability to design wood columns and bending members.
CO2: Ability to design timber joint using nail and other mechanical fasteners.
CO3: Ability to design unreinforced and reinforced masonry structural elements and structures.
CO4: Ability to analyze serviceability and ultimate capacity design; seismic response; resistance and design.

References

1. Dayaratnam, P., "Brick and Reinforced Brick Structures", Oxford & IBH Publishing House, 1997.
2. Abdy Kermani, 'Structural Timber Design' Wiley-Blackwell, 1999 - Technology & Engineering.
3. Jack Porteous, Abdy Kermani, 'Structural Timber Design', John Wiley And Sons, 2007.

EAT 455/3
Industrialised Building System

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 buildibility. Joints and tolerances will also be discussed. Enhancement through mini project and hands-on will be done to further strengthen their knowledge on subject matter.

Course Outcomes

CO1: Ability to classify the concept of IBS modern construction technology.
CO2: Ability to evaluate the Principle of Score calculation and its submissions.
CO3: Ability to decide Concept of Modular Coordination in IBS, Joints and Tolerances.
CO4: Ability to discusss precast concrete building design.

References

1. Sarja. "Open and Industrialized Building". Taylor & Francis. 2010.

2. Abraham Warzaski. “Industrialised and Automated Building Systems: A Managerial Approach”. Second Edition. Tylor & Francis Group. 2005.
3. Albert G. H. Dietz. “Industrialized Building Systems for Housing”. The MIT Press. 1971.

EAT 456/3
Foundation Engineering

Course Synopsis

This course provides 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 problem related to foundation engineering.

Course Outcomes

CO1: Ability to calculate soil bearing capacity and design for mat and drilled-shaft foundations.
CO2: Ability to analyze the stability and design of retaining walls .
CO3: Ability to discuss and analyze foundations on difficult soils for collapsible and expansive soils.
CO4: Explain soil improvement method.

References

1. Das, B.M. ‘Principles of Foundation Engineering’, Cengage Learning, 2011.
2. Das, B.M. ‘Principles of Geotechnical Engineering’, Thomson, 2007.
3. Das, B.M. ‘Principles of Foundation Engineering’, Thomson, 2004.

EAT 459/3
Building Automation System

Course Synopsis

This course will introduce student to building management system which is used to refer to a wide range of computerized building control systems. Through this course, student will be able to learn about BAS communication standards, internet technologies and their applications in BASs, control and optimization of air- conditioning systems, control and optimization of central chilling systems and lighting-control systems security and safety control systems. At the end of the course, the students should be able to analyze and evaluate BASs systems.

Course Outcomes

CO1: Ability to analyze building automation system communication standards
CO2: Ability to evaluate internet technologies and their applications in BAS
CO3: Ability to evaluate control and optimization of air- conditioning systems control and optimization of central chilling systems
CO4: Ability to design and evaluate lighting- control systems and security and safety control systems.

References

1. Shengwei W., “Intelligent System And Building Automation”, Spon Press, 2010
2. Ogata, K., “Modern Control Engineering”, 4th Ed. Prentice Hall, 2002.
3. Gopal, M., “Control Systems: Principles and Design”, 2nd Ed. Tata McGraw-Hill, 2002.

EAT 461/2
Final Year Project I

Course Synopsis

This an individual research project in connection with a special engineering problem and under the guidance of an academic staff. The project undertaken may fall under one of the following areas: Mathematical analysis, experimental tests, computer simulation, hardware and/software development, to their field of interest. At the end of the project, each student prepares an engineering report, presents and demonstrates findings and results of the project work.

Course Outcomes

CO1: Ability to modulate and utilize academic knowledge and practical experience in conducting an academic project.
CO2: Ability to think objectively, analytically and critically in identifying and solving

problem in systematic manner. Ability to create innovative/ commercialization

CO3: Ability to work independently in conducting and completing an academic project.

CO4: Ability to present the proposal and final product orally and graphically.

References

1. Donald H. McBurney and Teresa L. White, (2007). Research Methods, 7th Edition, Thompson Wadsworth.
2. Daniel Holtom & Elizabeth Fisher, (1999). Enjoy Writing Your Science Thesis or Disertation, Imperial College Press.
3. Leo Finkelstein, Jr., (2008). Pocket ook og Technical Writing for Engineers and Scientist. 3rd Edition, McGraw Hill.

EAT 462/4
Final Year Project II

Course Synopsis

This subject is the continuity of Final Year Project I. In this subjects students will conduct experimental tasks which has been planned during the Final Year Project I. Students also will completing their thesis report during this subject. In this subject, students will be also exposed to journal writing.

Career Opportunities

Employment prospects and the career of the graduates are broad because they are trained by multi discipline which involves microbiology study, chemistry and ecology. The graduates with Environmental Engineering Degree and graduates from Building Engineering Bachelor have employment prospects that increasingly widespread in the public sector and private. The sectors that offer the careers are:

- Commodity
- Petrochemical industry
- Chemical industry
- Water treatment industry, waste water, solid waste, hazardous waste
- Processing industry and manufacturing
- Research institutes & development and education
- Environmental consultation institution
- Government departments such as Jabatan Alam Sekitar, JPS and JKR
- Municipal Council
- Statutory Bodies such as MARDI, PORIM, SEDC, NIOSH and others
- NGO environment internally and outside the country
- Construction
- Research and development (R&D) and academic institution
- Negotiator institution and contractor
- NGOs

Main career to this programme graduate were as follows:

- Engineer / Environmental Officer
- Engineer / Health Officer, Security and Environment
- Health ranger and Security
- Environment Enforcement Official
- Engineer / Executive Risk
- Engineer / Security Officer
- Environment Research Officer
- Remediation Engineer Site
- Process Engineer
- Supply Engineer and Sources of Water
- Public Health Engineer
- Pollution Control Engineer
- Sustainable Development Executive
- Environment Contractor (technical)

Centre for Communication Technology and Human Development (PTKPI)

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Introduction

Centre for Communication Technology and Human Development or Pusat Teknologi Komunikasi dan Pembangunan Insan (PTKPI), formerly known as Centre for Communication Skills and Entrepreneurship (PKKK) is a centre that serves all other graduates programs in UniMAP. Instead of offering academic programmes, PTKPI provides multiple courses that channel the knowledge of social and humanities that compliments the engineering and business knowledge that is present in all UniMAP acadermic programmes. The philosophy held by PTKPI is to enhance students' generic and soft skills which include communication, languages, ICT and socio-humanities in facing the dynamic of global challenges.

PTKPI hopes to create graduates who are holistically developed in entrepreneurial skills and technical expert, are self-reliant, committed to the field they undertake and possess high competitiveness to face the challenges in this present era of globalization.

Vision

Committed to be the center of the development of science communication and soft competitive international arena

Mission

Form of intellectual humanity , personality, superior, creative and innovative, competitive and competent through the observation of knowledge and soft skills through quality education, rooted in the aspirations of the university.

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Compulsory Courses

EUW224/UUW224/2
Engineering Entrepreneurship

Course Synopsis

The objective of this course is to expose students to the basic knowledge of entrepreneurship and basic business management. It consists of the characteristic of entrepreneurship, the model to develop business, development of business proposal, economic analysis, sources of funding and the management of entrepreneurship technology.

References

1. Kathleen Allen, 'Entrepreneurship for Scientists and Engineers', International Edition, Pearson, 2010.
2. Mohani Abdul, Kamarulzaman Ismail, Zainal Abidin Mohamed and Abdul Jumaat Mahajar, 'Pembudayaan Keusahawanan', Prentice Hall, 2008.
3. Peggy A, Lambing and Charles R. Kuehl, 'Entrepreneurship', 4th Edition, Pearson, 2007.
4. Rosli Mahmood, et. all , 'Prinsip-prinsip Keusahawanan: Pendekatan Gunaan', 2nd Edition, Cengage Learning, 2010.
5. William G. Sullivan, Elin M. Wicks and James T. Luxhoj, 'Engineering Economics', 13th Edition, Pearson, 2006.

Offering Schedule

Semester	Year 1	Year 2
Semester 1	PPIPT (International Business)	PPK Bioproses PPK Alam Sekitar PPK Mikro-Elektronik PPK Mekatronik
Semester 2	PPIPT (Engineering Entrepreneurship)	PPK Bahan PPK Sistem Elektrik PPK Komputer & Perhubungan PPK Pembuatan

* 1 class : 60 students

EUW233/UUW233/2
Islamic & Asian Civilisations

Course Synopsis

This course discusses the basic concepts of knowledge civilization. In addition students are also exposed to the universal Islamic values as a result of a clash of Asia civilizations. It also creates a Malaysian society that respects for religion belief and also cultural system are practiced.

References

1. Shuhairimi Abdullah, Abdul Jalil Ramli, Noor Salwani Hussin, Siti Aisyah Mohd Nor, Maskor Bajuri, Mohd Mizan Mohammad Aslam, Ku Halim Ku Ariffin. (2011). Tamadun Islam dan Tamadun Asia, Pearson Malaysia Sdn Bhd, Selangor.
2. Azizan Baharuddin, Osman Bakar, Zaid Ahmad. (2009). *Modul Pengajian Tamadun Islam & Tamadun Asia*, Penerbit Universiti Malaya: Kuala Lumpur.
3. Azizan Baharuddin, (2005). *Peradaban menurut Perspektif Islam*. Kuala Lumpur: Pusat Dialog Peradaban, Universiti Malaya.
4. Bertrond Fort. (2005). *One Year of Culture and Civilizations Dialogue 2003/2004*. Singapore Asia-Europe Foundation.
5. Zaid Ahmad. (2005) *"Ibnu Khaldun's Approach in Civilizational Studies in Massino Companini, Studies on Ibn Khaldun, Corso Milano Italy :* Polimetrica International Scientific Publisher.

EUW235/UUW235/ 2
Ethnic Relations

Course Synopsis

This course focuses on discussion of basic concepts of ethnic relations and emphasis is given to the plural society in Malaysia. This course will guide students to evaluate and discuss issues related to ethnic relations around them (living on campus) and ethnic relations in Malaysia.

References

1. A. Aziz Deraman (2005), *Masyarakat dan Kebudayaan Malaysia* , Kuala Lumpur: Dewan Bahasa dan Pustaka
2. Abdul Aziz Bari. (2000). Perlembagaan Malaysia: Asas-asas dan Masalah. Kuala Lumpur: Dewan Bahasa dan Pustaka.

3. Azmi Aziz & Shamsul AB. (2004). The relegious, the plural, the secular and the modern: a brief critical survey on Islam in Malaysia. Inter-Asia cultural studies. Volume 5. Number 3. December.
4. Wan Mohd Nor Wan Daud. (2001). Pembangunan di Malaysia. Kuala Lumpur ISTAC
5. Zaid Ahmad, Ho Hui Ling, Sarjit Singh Gill, Ahmad Tarmizi Talib, Ku Halim Ku Ariffin, Lee Yok Fee, Nazri Muslim & Ruslan Zainuddin,(2006). Hubungan Etnik Di Malaysia. Oxford Fajar

EUW322/ UUW322/2
Thinking Skills

Course Synopsis

The aim of this course is to develop and enhance students' thinking skills in helping them make decision and resolve issues. Generally, there are two main ideas of thinking skills which are mostly acquired. They are creative thinking and critical thinking. The introduction the soft skills of the main idea in thinking skill concepts such as logical thinking, creative thinking, critical thinking; it is hoped that students can acquire creative and innovative ways with better judgement in resolving issues, especially pertaining to career and self development.

References

1. Butterworth & Thwaite.,'Thinking Skills. 4th ed. UK', Cambridge University Press, 2005.
2. Chong Hoe, Lok.,'Pemikiran Kritis dan Logik. Pulau Pinang', Universiti Sains Malaysia Printing, 2003.
3. De Bono, Edward,'Pemikiran Lateral untuk Pengurusan. Kuala Lumpur', Golden Book Sdn. Bhd, 2001.
4. Mohd, Ainon & Hassan, Abdullah.,' Belajar Berfikir'. Pahang: PTS Publication, 2003.
5. Wright, Larry.,' Critical Thinking: An Introduction to Analytical Reading and Reasoning'. USA: Oxford University Press, 2001.

Core Courses

EUT122/ UUT122/ BUW122/2
Skills and Technology in Communication
(For Engineering and Business Students)

Course Synopsis

The purpose of this course is to expose students to communication and information technology. This course introduces students to the basic aspects of human. Students are introduced to motivation, knowledge and skills as tools for competent communication. The first part of the course discusses the basic process in effective communication such as perception, verbal and non-verbal communication, listening skills, basic communication models and information acquisition. The second part deals with competency in communication in the contexts of interpersonal communication, communication in organisation, small group communication, internet communication, basic skills for presentation and intercultural communication.

References

1. Devito, J.A.,' Human Communication: The Basic Course'. 9th Ed', Pearson Education Inc, 2003.
2. Devito, J.A.,'The Interpersonal Communication Book'. 12th Edition, Pearson Education Inc, 2009.
3. Pearson, J. Nelson, p. Titsworth, S. Harter, L.,' Human Communication 2nd Edition',New York: McGraw Hill, 2006.
4. Wood, J.T., 'Communication Mosaics: An introduction to the field of communication. 3rd Ed. Wadsworth', Thomson Learning, 2004.
5. LaBerta, C., 'Computers Are Your Future Complete'. 11th Edition, Pearson Education Inc, 2011.
6. Pearson, Compiled by Nor'izah Ahmad, Mohammad Rezal Hamzah & Aida Sharmila Wati Wahab, 2011.

Offering Schedule

Semester	Year 1
Semester 1	PPIPT (Engineering Entrepreneurship) PPK Alam Sekitar PPK Bahan PPK Komputer & Perhubungan PPK Mekatronik
Semester 2	PPIPT (International Business) PPK Bioproses PPK Mikro-elektronik PPK Sistem Elektrik PPK Pembuatan

*1 class : 60 students

BUW 123/3
Business Communication
(For Business Students Only)

Course Synopsis

This course applies the communication tools and analysis to business management issues. It also focuses on developing students' ability in problem solving, by using negotiation concepts and communication elements in business environment. The module emphasizes on the patterns and principles of business communication, multicultural and global communication management, communication technology and its trends in business settings, organizational and managerial communication as well as preparation in the formal writing and oral presentation.

References

1. Bovee, C. and V. Thill, J., 'Business Communication Essentials', (4th Edition,) Prentice Hall; 4th Edition, 2009.
2. Krizan, Merrier, Logan, Williams,'Business Communication'. Thomson - South Western, 2009.
3. Locker, K. and Kaczmarek, S., 'Business Communication: Building Critical Skills', McGraw-Hill/Irwin; 4th Edition, 2008.
4. Marry Ellen Guffey, Bertha Du-Babcock, 'Essentials of Business Communication', Thomson Publishing. 2007
5. Marry Ellen Guffey, 'Business Communication: Process and Product', South-Western College Pub; 6th Edition, 2007.

Offering Schedule

Semester	Year 1	Year 2
Semester 2	PPIPT (Engineering Entrepreneurship)	
Semester 1		PPIPT (International Business)

EUT440/3
Engineers In Society
(For Engineering Students Only)

Course Synopsis

This course aims to explain the main concept in engineering ethics, risk management and occupational safety and health as well as to expose the student to the basics of law in the engineering context. The materials will be of introductory nature to enable engineers to appreciate factors that has to be taken into consideration 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 requirement related to engineering field.

References

1. Charles B. Fledderman, Engineering Ethics, E Source Prentice Hall 3rd Edition
2. Lee Mei Pheng, 'General Principles Of Malaysian Law, Third Edition', Penerbit Fajar Bakti, Shah Alam, 1998.
3. Mike W. Martin, Roland Schinzinger, 'Ethics In Engineering', Mc Graw Hill, 2005.
4. Registration Of Engineering Act 1976 and Registration Of Engineer Regulation, 1990.
5. R. Logeswaran, Hairul Azhar, Pau Kiu Nai and Sim Hock Kheng, 'Engineers In Society', Mc Graw Hill 2nd Edition.

EUT443/2
Engineering Management
(For Engineering Students Only)

Course Synopsis

This course aims to teach students on how to apply project management skills, economic techniques in evaluating the design and engineering alternatives. The role of engineering economics 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, student will be able to identify and discuss issues and challenges faced by engineers relating to project management in the current economic scenarios.

References

1. C M Chang, ‘Engineering Management: Challenges in the New Millennium’, Prentice Hall, 2004.
2. O’ Sullivan / Sheffin, ‘Economics: Principles And Tools’, Prentice Hall, 2001.
3. R. Logeswaran, Hairul Azhar, Pau Kiu Nai and Sim Hock Kheng, ‘Engineers In Society’, Mc Graw Hill 2nd edition.
4. S. Park Chan, ‘Fundamentals Engineering Economics, 2nd.’, Prentice Hall, 2008.
5. Stanley E.P Samuel J.M., Jack R.M, Scot M.S, Margaret M. Sutton, ‘Project Management: Planning, Scheduling, And Controlling Project’, John Wiley & Sons Inc. USA, 2008.

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Introduction

The Centre for International Languages (CIL) or Pusat Bahasa Antarabangsa, is formerly known as the Department of International Languages (DIL). Established on March 1, 2013, the Centre focuses on providing students and staff of Universiti Malaysia Perlis, and the community within its vicinity, with great opportunities to learn languages.

CIL currently provides language courses which are a requirement for students enrolled in all UniMAP programmes, at both diploma and undergraduate degree levels. It caters to the needs of the ever-growing number of students who seek to be proficient not only in Bahasa Melayu and English, but also in a third language of their choice. Apart from Bahasa Melayu and English, other languages offered at CIL are Arabic, German, Japanese, Korean, Mandarin, Russian and Thai.

CIL places priority in equipping UniMAP students with language skills and competencies which are imperative in this era of knowledge and innovation-based economy. In addition, through our language courses, we sharpen 21st century skills in our students and clients, in supporting and nurturing them to be enterprising individuals who will be able to contribute positively in the world of work. Amongst others, the skills include being creative and innovative, adaptable, being able to work in a team, being effective communicators and are good in problem solving. The team at CIL also support students' learning through the provision of language advisory services, and are ever willing to serve in ensuring that our students and clients get the best from what we have to offer.

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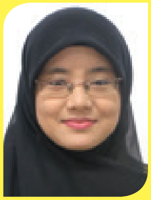

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Compulsory Courses

EUW/ UUW 212/2
University English

Course Synopsis

This course is designed to prepare students to achieve confidence in extracting, evaluating and synthesizing information with a view to write good technical documents. Various theories of technical communication will be introduced throughout this course. Students will learn how to prepare technical documents as well as on how to write clearly and concisely. Students will also be exposed to primary and secondary research, techniques of analyzing and interpreting different information and applying functional organization in report writing. At the end of the semester, students are required to formally present their research report orally.

References

1. Blicq, R., & Moretto. (2004). Technically Write (6th Ed.). Upper Saddle River, New Jersey: Pearson.
2. Ingre, D. (2003). Survivor's guide to technical writing. Mason, OH: South Western.
3. Lannon, J. M., & Gurak, L. J. (2011). Technical Communication (12th Ed.). United States: Pearson.
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7. Cik Masturah Sabri
8. Cik Wan Safuraa Wan Osman

EUW/ UUW 410/2
University Malay Language

Course Synopsis

The objective of the course is to expose students to the four language skills: listening, speaking, reading and writing. The listening and speaking skills are merged, and focus is given not only on forms and functions, but also on pronunciation. The reading and writing skills; on the other hand, emphasize on accuracy and grammar, structure and semantics (meaning). Topics for essay writing provide opportunity for students to explore analysis processes, syntax and elaboration.

References

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5. Nik Safiah Karim, Farid M.Onn, Hashim Hj.Musa & Abdul Hamid Mahmood. (2006). Tatabahasa Dewan (edisi baharu). Kuala Lumpur: Dewan Bahasa dan Pustaka.
6. Samsudin Wahab. (2008). Surat, minit mesyuarat, dokumen perniagaan dan laporan. Kuala Lumpur: PTS Professional Publishing Sdn.Bhd.
7. Sulaiman Masri, Abdullah Yusof & Mohd Ra'in Shaari. (2007). Bahasa Melayu: Dimensi pengajaran dan pembelajaran. Kuala Lumpur: Utusan Publications & Distributors Sdn Bhd.

Lecturers

1. Pn. Siti Nurul Jannah Fital
2. Dr. Junaini Kasdan
3. Pn. Suhaidah Said
4. Pn. Nor Suhaila Che Pa
5. Cik Juliana Ahmad

6. En. Mohd Syamril Aklmar Chek Kassim
7. En. Mohamad Zaki Abdul Halim

EUW/ UUW 110 /2
Basic Malay Language
(For International Students Only)

Course Synopsis

The aim of this course is to develop students' ability to use the language effectively for purposes of practical communication. The course is based on the linked language skills of listening, reading, speaking and writing, and these are built on as students progress through their studies. The syllabus also aims to offer insights into the culture and civilisation of countries where the language is spoken, thus encouraging positive attitudes towards language learning.

References

1. Hawkins, Joyce M. (Ed). (2006). Kamus dwibahasa Oxford Fajar Inggeris –Melayu Melayu – Inggeris (edisi keempat). Selangor: Oxford Fajar Sdn. Bhd.
2. Noor Asliza Abdul Rahim, Abdul Jalil Ramli, Zuhairah Idrus & Suhaidah Said (2009). Modul bahasa Melayu asas. Perlis: Universiti Malaysia Perlis.
3. Othman Puteh, Talib Abdullah & L. Shirley (2009). Kamus bergambar (edisi kelima). Selangor: Oxford Fajar Sdn. Bhd.
4. Suhaidah Said, Nor Suhaila Che Pa, Noor Asliza Abdul Rahim, Zuhairah Idrus & Abdul Jalil Ramli (2012). Modul bahasa Melayu asas (edisi kedua). Perlis : Unit Penerbitan UniMAP.
5. Zarina Othman, Roosfa Hashim & Rusdi Abdullah (2012). Modul komunikasi bahasa Melayu antarabangsa. Bangi: Penerbit Universiti Kebangsaan Malaysia.

Lecturer

1. Pn. Suhaidah Said
2. Cik Juliana Ahmad

Optional Courses

EUW/ UUW112 /2
Foundation English

Course Synopsis

This course covers the major aspects of reading, writing, speaking and listening competence and it also includes sub-skills of grammar and dictionary skill. This course is designed to enhance students' English language proficiency and communicative ability. This course will adopt a learner-centred approach to help students attain good command of the English language.

References

1. Class Module (Foundation English Workbook)
2. Azar, B.S. (2003) Fundamentals of English grammar (3rd Edition). Englewood Cliffs, N.J.: Prentice Hall.
3. Elder, J. (2008). Exercise your college reading skills. New York: McGraw Hill.
4. Fuchs, M., Bonner, M., & Westheimer, M. (2000). Focus on grammar: An intermediate course reference and practice. (2nd Edition). New York: Longman.
5. Langan, J. (2008). College writing skills (7th Edition). Singapore: McGraw Hill.
6. Macmillan English dictionary for advanced learners. (2011) (2nd ed.). Oxford, United Kingdom: Macmillan Publishers Limited. (Original work published 2002).
7. Reid, J. M. (2000). The process of composition (3rd Edition). New York: Longman.

Lecturers

1. Pn. Yuziana Yasin
2. Cik Rongdara Rochanahasadin
3. En. Wan Nor Haizar Harun
4. Cik Nur Farhinaa Othman
5. Cik Fadhlina Che Arshad
6. Cik Faten Khalida Khalid
7. Cik Clarissa Callista Chandra Tjeng

EUW/ UUW 115 /2
Thai Language 1

Course Synopsis

This course is designed for students who have no background in Thai language. The course will cover listening, speaking, reading and writing in spoken and written Thai. The students will be introduced to Thai phonetic transcriptions which will help them to pronounce with the correct tone, read and understand short and simple sentences. Students will be able to write simple words and sentences in Thai script. They will also learn short and simple daily expressions.

References

1. Becker, B. P. (2003). Thai for beginners. Bangkok: Paiboon Publishing.
2. Becker, B.P. (2003). Improving your Thai pronounciation. Bangkok: Paiboon Publishing.
3. Ponmanee, S, (2000), Learn to Read Thai. Chiangmai: Thaigreat.
4. Tontraseney, W. (1981). Bahasa Thai, Kuala Lumpur: Universiti Malaya.
5. Wiworn Kasavatana-Dohrs. (2007).Everyday Thai for beginners. Silkworn Book.

Lecturer

1. Pn. Sareepa Jearwae

EUW/ UUW 215 /2
Thai Language 2

Course Synopsis

At this level, students will be introduced to simple use of the grammar. Students will learn to read and understand longer sentences and conversations about daily activities. They will learn to write longer sentences with the help of phonetic transcription. Throughout the course, students will have more understanding about Thai culture and practices.

References

1. Becker, B. P.(2003).Thai for Beginners. Bangkok: Paiboon Publishing.
2. Ponmanee, S, (2000), Learn to Read Thai. Chiangmai: Thaigreat.
3. Becker, B.P, (2003), Improving Your Thai Pronunciation. Bangkok: Paiboon Publishing.
4. Wiworn Kasavatana-Dohrs(2007) Everyday Thai for beginners. Silkworn Book.
5. Tontraseney, W, (1981), Bahasa Thai. Kuala Lumpur: Universiti Malaya.

Lecturer

1. Pn. Sareepa Jearwae

EUW/ UUW 315 /2
Thai Language 3

Course Synopsis

This course will expand the use of vocabulary relating to social contexts and introduce its use in business contexts .student will be able to read longer dialogues and paragraphs relating to social and simple business contexts. Students will learn to write complex sentences to produce dialogues relating to topics learned. At this level the phonetic transcription will be used only when necessary.

References

1. Becker, B. P.(2003).Thai for Beginners. Bangkok: Paiboon Publishing.
2. Ponmanee, S, (2000), Learn to Read Thai. Chiangmai: Thaigreat.
3. Becker, B.P, (2003), Improving Your Thai Pronunciation. Bangkok: Paiboon Publishing.
4. Wiworn Kasavatana-Dohrs(2007) Everyday Thai for beginners. Silkworn Book.
5. Tontraseney, W, (1981), Bahasa Thai. Kuala Lumpur: Universiti Malaya.

Lecturer

1. Pn. Sareepa Jearwae

EUW/UUW 415 /2
Thai Language 4

Course Synopsis

At this level, students are exposed to vocabulary closely related to business contexts. The topics covered will provide students with practice using Thai language in business contexts. Students will be able to read and write longer dialogues and short paragraphs with the correct use of grammar without the help of phonetic transcription. Students should be able to hold a conversation in Thai especially for business purposes.

References

1. Becker, B. P.(2003). Thai for Beginners. Bangkok: Paiboon Publishing.
2. Ponmanee, S. (2000). Learn to Read Thai. Chiangmai: Thaigreat.
3. Becker, B.P, (2003). Improving Your Thai Pronounciation. Bangkok: Paiboon Publishing.
4. Tontraseney, W, (1981). Bahasa Thai. Kuala Lumpur: Universiti Malaya.
5. Wiworn Kasavatana-Dohrs.(2007). Everyday Thai for beginners. Silkworn Book.

Lecturer

1. Pn. Sareepa Jearwae

EUW/ UUW 113/2
Arabic Language 1

Course Synopsis

Arabic Language 1 provides students with active training in their ability to understand and use Arabic in various contexts and to read and write texts of a varying nature, in which grammar is practised. Written and oral proficiency, writing skills and reading comprehension are considered as important. The course focuses on further developing the students' ability to communicate in simple everyday situations.

References

1. Abdullah Sulaiman Al-Jarbuk, Tammam Hassan Umar, Mahmud Kamil al-Naqah, Abdullah Kamil Al-Abadi, Ali Muhammad Al-Fiqqi & Rusydi Ahmad Taimah (1984). Taklimu al-Lughah al-Arabiyyah Lighairi al-Natiqin Biha, Al-Mamlakah al-Arabiyyah al-Saudiyyah. Jamiah Ummu al-Quran.
2. Muhammad Roihan Hasbullah M.A (Hj.) (2002). Perbualan bahasa Arab untuk peringkat rendah dan menengah. Kuala Lumpur: Pustaka Syuhada.
3. Sekumpulan guru-guru Bahasa Arab (1987). Al-Jadid al-Lughati al-Araabiyyah Li al-Sanah al-Ula al-Ikdadiyah. Gombak Utara Selangor: Pustaka Markiland.
4. Bahasa Arab 1 (2002). Bahagian Bahasa Arab, Universiti Sains Malaysia (Pusat Bahasa & Terjemahan).
5. Zaid Al-Hamid (2001). Pelajaran bahasa Arab untuk semua. Kuala lumpur: Speedy Self Study System.
6. Fuad Ifram al-Bustaniy (1986). Al-Munjid Al-Tullab. Beirut, Lubnan: Darul Syarq.
7. Lingua Phone (2000). London: Lingua Phone Institut Limited.

Lecturer

1. Dato' Alim Panglima Hj. Mat Jahya Bin Hj. Hussin

EUW/ UUW 213/2
Arabic Language 2

Course Synopsis

Arabic Language 2 provides the students with active training in their ability to understand and use Arabic in various contexts and to read and write texts of a varying nature, in which grammar is practised. Written and oral proficiency, writing skills and reading comprehension are considered as important as is translation from and to Arabic. The course focuses on further developing the students' ability to communicate in moderate everyday situations.

References

1. H. Ridlo. Masduki (Prof.Dr.), H.Chatibul Umam (Prof. Dr.) H. Moh. Matsna (Dr.) (2000). العربية لطلاب الجامعة. Kuala Lumpur: Darul Ulum Press.
2. Nuhammad Akram Saaduddin (at all), (1990). : العربية الفصيحةالقلم للناطقين بغير ها وبها . Kuala Lumpur: Fajar Ulung Sdn. Bhd. L.B.C. Publishers International Book Centre.
3. Ishak Mohd. Rejab (Prof. Madya Dr.) (1987). Kursus bahasa Arab (Bahagian 11). Kuala Lumpur: Yayasan Dakwah Islamiah Malaysia (YADIM).
4. Ali al-Jarim, Mustafa Amin (1966), النحو الواضح فى قواعد اللغة العربية , Mesir.
5. Elias A. Elias & Ed. E. Elias (n.d.) , القاموس العصري , عربى - انكليزي Mesir.

6. Institut Agama Islam Negeri (IAIN), Sharif Hidayatullah, Jakarta, (1977), العربية بالنماذج . Jakarta, Indonesia: Bulan Bintang , (Penerbit dan Penyebar buku-buku Teks).
7. Lingua Phone (2000). London: Lingua Phone Institut Limited.
8. Sono Cairo Audio, VIDEO CD, (t.t.), تعليم اللغة العربية للمتحدثين بالانجليزية , Cairo Egypt.
9. Syed Umar al-Sagaf, Muhamad Khalil Hj. Ahmad dan Mohd. Abdul Rahim , Mohd. Abdul Rahman (2000), اللغة العربية الاتصالية, Kuala Lumpur: Dewan Bahasa dan Pustaka.
10. Universiti Putra Malaysia (t.t.), مذكرة اللغة العربية للمستوى الثالث , Fakulti Bahasa Moden dan Komunikasi.
11. Mustaffa Abdullah (terjemahan oleh Siti Rohaya Sarnap & Siti Sujinah Sarnap (2000). Cara mudah belajar bahasa Arab. Sinagpore: JAHABERSA & CD.
12. Al-said Muhmmad Badawi (Dr.), (1983), تعليم اللغة العربية لغير الناطقين بها , Tunisia.
13. Hassan Bin Hj. Arshad (2000), BAHASA ARAB (al-Qawaid dan al-Maqalah) Universiti Sains Malaysia (Pusat Bahasa & Terjemahan).

Lecturer

1. En Hassan Bin Hj Arshad

EUW/ UUW 313/2
Arabic Language 3

Course Synopsis

This course covers eight (8) topics of Arabic grammar, eight (8) topics of essays and eight (8) topics of Balaghah The course focuses on the development of the four language skills, namely listening, speaking, reading and writing

References

1. Mahmud Ismail As-sini(Dr.) (1993). العربية للناشئين : منهج متكامل لغير الناطقين بالعربية. Arab Saudi: Darul Ma'arif Mamlakah.
2. Nuhammad Akram Saaduddin (et al.) (1990). : العربية الفصيحةالقلم للناطقين بغير ها وبها . Kuala Lumpur: Fajar Ulung Sdn. Bhd. L.B.C. Publishers International Book Centre.
3. Ishak Mohd. Rejab (Prof. Madya Dr.). (1987). Kursus Bahasa Arab (Bahagian 11). Kuala Lumpur: Yayasan Dakwah Islamiah Malaysia (YADIM).
4. Ali al-Jarim, Mustafa Amin (1966). النحو الواضح فى قواعد اللغة العربية . Mesir.
5. Linguaphone: Rakaman kaset dan buku panduan (1990). London: Linguaphone Institute Limited, St. Giles House.
6. Sohair Abdul Moneim Sery (1997). Kursus Bahasa Arab (Arabtone). Selangor: Anglophone (Malaysia). Sdn. Bhd.
7. Penterjemah: Siti Rohani (2000). Cara mudah belajar Bahasa Arab. Malaysia: Jahabersa Sdn. Bhd.

Lecturer

1. En Hassan Bin Hj Arshad

EUW/ UUW 413/2
Arabic Language 4

Course Synopsis

Arabic Language 4 provides the students with active training in their ability to understand and use Arabic in various contexts and to read and write texts of a varying nature, in which grammar is practiced. Written and oral proficiency, writing skills and reading comprehension are considered as important as is translation from and to Arabic. The course focuses on further developing the students' ability to communicate in moderately difficult everyday situations.

References

1. Ahmad Hassan Ziyat (n.d.).تاريخ الأدب العربي, Darul Kutub Misriyyah, Mesir.
2. Batras Al-Bustaniy (1989). أدباء العرب. بيروت : دار النذير, Darul Nazir, Beirut
3. Abdul Rahman Al-Barquni (1979). Darul Kitab, Beirut .شرح ديوان المتنبي بيروت : دار الكتاب
4. Syauqi Dhaif (n.d.). البارودى رائد الشعر الحديث , Darul Ma'arif, Kaherah, Mesir.
5. Subhi Soleh (1960). دراسات فى فقه اللغة Darul 'Ilmi Malayin, Beirut.
6. Ali Abdul Wahid Wafi (1945). فقه اللغة Darul Nahdhah, Mesir.

7. Imil Badi' Ya'kub (1982).العربية وخصائصها فقه اللغة Darul 'Ilmi Malayin, Beirut.

Lecturer

1. En Hassan Bin Hj Arshad

EUW/ UUW 114/2
Mandarin Language 1

Course Synopsis

This course is designed to introduce students to Mandarin language. The course will cover listening, speaking, reading and writing in spoken and written Mandarin. The students will be introduced to Pin Yin which will help them to pronounce accurately. They will be able to read and understand short and simple sentences and able to write simple Chinese characters with the help of Pin Yin. Students will also learn short and simple common daily expressions.

References

1. Lo, J. & Yih,E. (2009). Go! Chinese. Singapore: Cengage Learning Asia Pre Ltd.
2. Lai, S. Y. & Lim, Y. L. (2010). Shenghuo Huayu! An Introductory Course to the Chinese Language. Singapore: Cengage Leaning Asia Pre Ltd.
3. Qin, H. (2011). A Dictionary of Everyday English Metaphors (English-Chinese). Beijing: Peking University Press.
4. Zhou, X. K. (2009). Dr.Zhou's Rhymes For Learning Chinese-Book1, Beijing: Peking University Press.
5. Xu, J. L. (2008). Jia You! Chinese for the Global Communication, Vol.1. Singapore: Cengage Learning Asia Pre Ltd.

Lecturer

1. Cik Habiba Abing
2. Pn. Chuthamas Chittithaworn

EUW/ UUW 214/2
Mandarin Language 2

Course Synopsis

At this level students of Mandarin Language 2 will be introduced to simple use of grammar. Students will able to read and understand longer sentences and conversations. They will learn to write longer sentences with the help of Pin Yin. Students will be introduced to different social contexts through the topics covered as well as introduced to shorts Mandarin songs.

References

1. Lo, J. & Yih, E. (2009). Go! Chinese. Singapore: Cengage Learning Asia Pre Ltd.
2. Lai, S. Y. &Lim, Y. L., (2010). Shenghuo Huayu! An introductory course to the Chinese Language. Singapore: Cengage Leaning Asia Pre Ltd.
3. Qin, H. (2011). A dictionary of everyday English metaphors (English-Chinese). Beijing: Peking University Press.
4. Zhu, X. K. (2009). Dr.Zhou's rhymes for learning Chinese-Book2, Beijing: Peking University Press.
5. Xu, J. L., (2008). Jia You! Chinese for the global communication, Vol.1. Singapore: Cengage Learning Asia Pre Ltd.

Lecturer

1. Cik Habiba Abing
2. Pn. Chuthamas Chittithaworn

EUW/ UUW 314/2
Mandarin Language 3

Course Synopsis

At this level, students of Mandarin Language 3 will be introduced to basic business Mandarin language used in business. Students will be able to read short paragraphs with the help of Pin Yin and able to respond to questions from short paragraphs. Students will also able to write longer sentences with the appropriate Chinese stroke order.

References

1. Lo, J., & Yih, E. (2009). Go! Chinese, Singapore: Cengage Learning Asia Pre Ltd.
2. Lai, S. Y.& Lim, Y. L. (2010). Shenghuo Huayu! An introductory course to the Chinese Language. Singapore: Cengage Leaning Asia Pre Ltd.

3. Liu, M. (2007). BBC basic business Chinese. Beijing: Peking University Press.
4. Qin, H. (2011). A dictionary of everyday English metaphors (English-Chinese). Beijing: Peking University Press.
5. Xu, J. L. (2008). Jia You! Chinese for the global communication (Vol.2). Singapore : Cengage Learning Asia Pre Ltd.

Lecturer

1. Cik Habiba Abing
2. Pn. Chuthamas Chittithaworn

EUW/ UUW 414/2
Mandarin Language 4

Course Synopsis

At this level, students of Mandarin Language 4 are expected to gain more vocabulary from what they have learned from Mandarin III. The topics covered will expose students to practise Mandarin language in business contexts. Students will be able to read and write longer sentences with appropriate grammar and Chinese stroke order without the help of Pin Yin. Students should also be able to hold a conversation in Mandarin especially for business purposes.

References

1. Lo, J. & Yih, E. (2009). Go! Chinese, Singapore: Cengage Learning Asia Pre Ltd.
2. Lai, S. Y. & Lim, Y. L. (2010), Shenghuo Huayu! An Introductory Course to the Chinese Language. Singapore: Cengage Leaning Asia Pre Ltd.
3. Liu, M. (2007). BBC Basic Business Chinese. Beijing: Peking University Press.
4. Qin, H., (2011). A Dictionary of Everyday English Metaphors (English-Chinese). Beijing: Peking University Press.
5. Xu, J. L., (2008). Jia You! Chinese for the Global Communication, Vol2. Singapore: Cengage Learning Asia Pre Ltd.

Lecturer

1. Cik Habiba Abing
2. Pn. Chuthamas Chittithaworn

EUW/ UUW 117/2
Japanese Language I

Course Synopsis

Designed for beginners with no prior knowledge of Japanese Language, this course covers listening, speaking, reading and writing skills. Students will learn to write 2 types of Japanese Writing System, Hiragana and Katakana. Students will be engaged to classroom interactions, practising daily greetings and simple conversations. Students will be introduced to basic elements of the Japanese culture through the topics covered.

References

1. Ku Mohd Nabil. (2010). Modul Bahasa Jepun II. Pusat Kemahiran Komunikasi dan Keusahawanan, Universiti Malaysia Perlis.
2. The Association For Overseas Technical Scholarships.(1998). Minnna no Nihongo 1, Tokyo: 3A Corporation.
3. The Association For Overseas Technical Schorlarships.(1997). Shin Nihongo no Kiso1 (Asian Edition).
4. Hirai, E.& Miwa, S.(2000).Minna no Nihongo 1 BunkeiRenshuuTyou, Tokyou: 3A Corporation.
5. Miyagi, S. & Mitsui, A.(1997). Everyday listening in 50 days: Tokyo: Bonjinsha CorporationThe Association For Overseas Technical Scholarship(Aots),'Shin Nihongo-No Kiso 1',Standard Question, 3a Corpration, 1993.

Lecturer

1. Dr. Ku Mohd Nabil Bin Ku Hamid @ Ku Ismail
2. Pn. Zaleha Binti Mat Aman

EUW/ UUW 217/2
Japanese Language 2

Students will be exposed to new vocabulary and will begin to use simple sentences in spoken and written Japanese. They will be introduced to simple grammatical and sentence structures. Students will learn how to read and write short sentences. Basic elements of the Japanese culture will be also taught in the topics covered throughout the course.

References

1. Ku Mohd Nabil.(2010).Modul Bahasa Jepun II. Pusat Kemahiran Komunikasi dan Keusahawanan, Universiti Malaysia Perlis.
2. Hirai, E. & Miwa, S.(2000).Minna no Nihongo 1BunkeiRenshuuTyou, Tokyo: 3A Corporation.
3. The Association For Overseas Technical Scholarships.(1998). Minnna no Nihongo 1,Tokyo:3A Corporation.
4. The Association For Overseas Technical Schorlarships.(1997). Shin Nihongo no Kiso 1 (Asian Edition).
5. Miyagi, S. & Mitsui, A.(1997). Everyday Listening in 50 days: Tokyo: Bonjinsha Corporation

Lecturers

1. Dr. Ku Mohd Nabil Bin Ku Hamid @ Ku Ismail
2. Pn. Zaleha Binti Mat Aman

EUW/ UUW 317/2
Japanese Language 3

Students will be exposed to expanded vocabulary and higher level grammar, particles and sentence structure. Students will learn reading, writing and speaking longer sentences and dialogues. Throughout the course, students will also learn the elements of Japanese culture in the topics covered.

References

1. Ku Mohd Nabil.(2010).Modul Bahasa Jepun II. Pusat Kemahiran Komunikasi dan Keusahawanan, Universiti Malaysia Perlis.
2. The Association For Overseas Technical Scholarships.(1998). Minnna no Nihongo 1,Tokyo:3A Corporation.
3. The Association For Overseas Technical Schorlarships.(1997). Shin Nihongo no Kiso 1 (Asian Edition).
4. Hirai, E. & Miwa, S.(2000).Minna no Nihongo 1BunkeiRenshuuTyou, Tokyo: 3A Corporation.
5. Miyagi, S. & Mitsui, A.(1997). Everyday Listening in 50 days: Tokyo: Bonjinsha Corporation

Lecturers

1. Dr. Ku Mohd Nabil Bin Ku Hamid @ Ku Ismail
2. Pn. Zaleha Binti Mat Aman

EUW/ UUW 417/2
Japanese Language 4

At this level, students will use expanded vocabulary and focus on producing longer and grammatically correct sentences. They will also use the correct particles in both written and spoken Japanese. Students will be engaged in higher level communicative practice. Basic Chinese Characters (Kanji) will be introduced and students will learn more of Japanese culture elements through the topics covered.

References

1. Ku Mohd Nabil.(2010).Modul Bahasa Jepun II. Pusat Kemahiran Komunikasi dan Keusahawanan, Universiti Malaysia Perlis.
2. The Association For Overseas Technical Scholarships.(1998). Minnna no Nihongo 1,Tokyo:3A Corporation.
3. The Association For Overseas Technical Schorlarships.(1997). Shin Nihongo no Kiso 1 (Asian Edition).
4. Hirai, E. & Miwa, S.(2000).Minna no Nihongo 1BunkeiRenshuuTyou, Tokyo:3A Corporation.
5. Miyagi, S. & Mitsui, A.(1997). Everyday Listening in 50 days: Tokyo: Bonjinsha Corporation

Lecturers

1. Dr. Ku Mohd Nabil Bin Ku Hamid @ Ku Ismail
2. Pn. Zaleha Binti Mat Aman

EUW/ UUW 118/2
German Language I

Course Synopsis

The objective of this course is to expose students to German language. Students will gain listening, speaking, reading and writing skills in standard spoken and written German language. Students will recognize the basic elements and structures of the language with an understanding of the culture in which the language is spoken. Students will be able to construct 4-5 word sentences for the purpose of communication. Students will also be able to read and comprehend short simple texts.

References

1. Gudrun Gotz, Eveline Schwarz. (2011),AussichtenA1.Deutsch als Fremdsprache für Erwachsene. Stuttgart,Ernst Klett GmbH.
2. Julia Guess.(2009),Deutsch Aktiv.Berlin und München Langenscheidt KG.
3. Dieter Maenner. (2006),Eurolingua Deutsch 1,Berlin, Cornelsen Verlag.
4. Ulrike Albrecht, Dorothea Dane. (2005), Passwort Deutsch 1 & 2,Stuttgart, Ernst Klett International GmbH.
5. Hanns-Josef Ortheil. (2010),Deutsch zum Ausprobieren, München, Sprachinstitut Treffpunkt.

Lecturer

1. En. Alex Iskandar Rutowski

UUW 119/2
Korean Language I

Course Synopsis

This course is designed for beginners with no prior knowledge of Korean. It introduces students to the Korean language and covers reading and writing of the Hangul script as well as pronunciation. Starting with greetings, the course proceeds to develop communication through basic grammar, vocabulary and reading skills for simple sentences. Students will develop the four skills of listening, speaking, reading and writing in an interactive and integrated manner through theme-based activities that relate to daily life.

References

1. 47 Korean pronunciation for foreigners. (2009). Seoul University, Korea: Language Education Centre.
2. Easy to learn Korean. (2011). Korea, Seoul: Sungkyun Language Institute.
3. Kim, J. S., Bang, S. W., Lee, Y., Seo, H. J., & Ahn, M. (2004). Exploring Korean workbook (Beginner's I). Korea, Seoul: Kyung Hee University Press and the Institute of international Education.
4. Kim, D. G., Park, Y. H., Oh, S. A., Yu, J. Y., & Lee, H. W. (2005). Korean grammar for foreigners. Korea, Seoul: The National Institute of the Korean Language.
5. Lee, Z. C. (2007). Queen' Korean. (2007). Peking, China: Peking University Press.

Lecturer

1. Cik Wang Jing

UUW 219/2
Korean Language 2

Course Synopsis

In this course, students will become more familiar with the morphology of spoken and written Korean. Students will further develop their proficiency in the skills of listening, speaking, reading and writing. These skills will be taught in an interactive and integrated manner through theme-based activities related to everyday life. The course will also enable students to acquire more accurate pronunciation and articulation of Korean words and sentence patterns. By the end of the course, they will have a better understanding of Korean lifestyle and culture and they will be able to use Korean in a variety of social contexts.

References

1. 47 Korean pronunciation for foreigners. (2009). Seoul University, Korea: Language Education Centre.
2. Easy to learn Korean. (2011). Korea, Seoul: Sungkyun Language Institute.
3. Kim, J. S., Bang, S. W., Lee, Y., Seo, H. J., & Ahn, M. (2004). Exploring Korean workbook (Beginner's I). Korea, Seoul: Kyung Hee University Press and the Institute of international Education.

5. Kim, D. G., Park, Y. H., Oh, S. A., Yu, J. Y., & Lee, H. W. (2005). Korean grammar for foreigners. Korea, Seoul: The National Institute of the Korean Language.
6. Lee, Z. C. (2007). Queen' Korean. (2007). Peking, China: Peking University Press.

Lecturer

1. Cik Wang Jing


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Engineering Centre

Address

ENGINEERING CENTRE
University Malaysia Perlis
Level 1, Administration Building
Pauh Putra Main Campus
02600 Arau, Perlis.
Tel : +604-988 5712
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Introduction

The Engineering Centre is located within Main Campus of UniMAP. It was established to manage laboratories and workshops which are vitally needed for various engineering programs offered by UniMAP. The teaching learning approach practiced in UniMAP is essentially based on practical-oriented; hence the use of labs cannot be overemphasized.

Objectives

Besides managing laboratories and workshop, the Engineering Centre also supports research and development activities in UniMAP. It also aspires to be a centre for designing and creating innovative engineering products. The Engineering Centre offers facilities for courses which require training and technical skills, parallel to industry standard. It also offers 'teaching factory' that is based on industries advanced technology, facilities and conducive environment for research and development activities and training for students and members of staff.

Courses Offered by Engineering Centre

There are two core courses offered by Engineering Centre for undergraduate's level:

- Engineering Skills (ECT111/ ECT112/PCT111)

And also a core course:

- Basic Engineering Skill (DCT100)

Engineering Skills (ECT111/ECT112/PCT111)

- AutoCAD Software Module consist of drawing and editing, layer control and properties modification, hatching, and dimensioning, text and template drawing
- Technical Drawing consists of geometric construction, lettering, tolerance, sectional view and symbols
- MATLAB Software Module consists of M- Files, Projection format, Matrix, vector, scalar and plotting
- Mechanical workshop consists of basic measurement, machining, welding, fitting, sheet metal
- PCB Fabrication process
- PCB design by using OrCAD Software.
- Electrical domestic wiring.
- Mechanical workshop- machining
- PLC - Programmable Logic Control.

Basic Engineering Skill (DCT 100)

- Basic knowledge of computer
- Construction and measurement of electronic circuit
- Basic knowledge of electrical wiring
- An exposure to measurement techniques, fitting and sheet metal process
- Experience to the welding techniques and handling of mechanical machine

Lab Facilities

Pcb Fabrication Lab

- Introduction to advance Printed Circuit Board process development including single sided and double sided PCB production. We also can produce multi layer PCB process up to 6 layers.

Plc Lab

- PLC application in automation

CAD/CAM Lab and Computer Lab

- Introducing software of AUTOCAD, MATLAB and ORCAD.

Electrical Wiring Workshop

- Domestic wiring, installation of surface wiring, PVC conduit and steel conduit wiring systems.

Mechanical Workshop

- Basic mechanical measurements, sheet metal process, fitting, welding, and machining.

Basic Computer Lab

- Hardware assembly and software installation.

Teaching Factory

- Injection moulding, CNC turning, CNC milling, wave solder machine, Rapid Prototyping machine, Rotional machine, Vacum casting, powder metalogy, EDM wire cut .

Technical Drawing Studio

- Basic technical drawing equipment.

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Course Syllabus

ECT111/PCT111
Engineering Skills

Synopsis

This subject is 100% practical coursework and carried out 3 units credit hours. This course contains six modules which are Basic Workshop, Machining, Wiring, PCB Design, PLC, AutoCAD and Technical Drawing that specifically planned for electronic based programs.

Course Outcomes

- Ability to apply and construct a basic skills and standard practiced of mechanical machines and equipments
- Ability to apply and construct the basic skills and standard practiced of domestic wiring.
- Ability to apply and construct a logic system using common controller tool (PLC).
- Ability to apply construct a standard practiced of manual technical drawing and able to design a product using common software (AutoCAD)
- Ability to apply and construct the basic skills and standard practiced of PCB layout design and fabrication process.

Course Syllabus

Technical Drawing
- DRAW, DISCUSS and APPLY the engineering practice to deliver an accurate technical drawing.

Software: AutoCAD
- DEFINE, DISCUSS and USE the engineering software (AutoCAD) as a tool to create 2D and 3D product.

Basic Workshop
- DEFINE and DEMOSTRATE the functions of metrology equipments. DESCRIBE and APPLY the techniques of fitting, sheet metal forming and metal joining (welding).

Machining
- DISCUSS and USE a standard mechanical engineering machines such as Milling, Lathe and Grinding Machine to produce general component.

Domestic Wiring
- DISCUSS, DEMOSTRATE and APPLY the techniques of domestic wiring such as surface and conduit (PVC and GI) techniques.

Programmable Logic Control
- DEFINE, DISCUSS and USE of common logic controller which involves with programming, PLC structure and application.

PCB Design & Fabrication
- DEFINE, DISCUSS and USE the engineering software (OrCAD) as a tool to design PCB layout. DISCUSS a process of PCB fabrication and USE common machines to produce PCB.

References

1. Timothy Sean Sykes. (2002). *AutoCAD 2002 One Step at A Time*. Prentice Hall.
2. Ralph Grabowski. (2002). *Using AutoCAD 2002*. Thompson Learning.
3. Mohd Ramzan Mainal, Badri Abdul Ghani, Yahya Samian. (2000). *Lukisan Kejuruteraan Asas*. UTM,

ECT112
Engineering Skills

Synopsis

This subject is 100% practical coursework and carried out 3 units credit hours. This course contains six modules which are Basic Workshop Machining, Wiring, Basic Electronics, Matlab, AutoCAD and Technical Drawing that specifically planned for non-electronic based programs.

Course Outcomes

- Ability to apply and construct a basic skills and standard practiced of mechanical machines and equipments

- Ability to apply and construct a basic skills and standard practiced of domestic wiring.
- Ability to apply and construct a mathematical analysis using Matlab software.
- Ability to apply and construct a basic skills and standard practiced of manual technical drawing and able to design a product using common software (AutoCAD)
- Ability to apply and construct a basic skill of electronics and its applications.

Syllabus

Technical Drawing
- DRAW, DISCUSS and APPLY the engineering practice to deliver an accurate technical drawing

Software: AutoCAD
- DEFINE, DISCUSS and USE the engineering software (AutoCAD) as a tool to create 1D and 3D product.

Basic Workshop
- DEFINE and DEMONSTRATE the function metrology equipments. DESCRIBE and APPLY the techniques of fitting, sheet metal forming and metal joining (welding).

Machining
- DISCUSS and USE a standard mechanical engineering machines such as Milling, Lathe and Grinding Machine to produce general component.

Domestic Wiring
- DISCUSS, DEMOSTRATE and APPLY the techniques of domestic wiring such as surface and conduit (PVC and GI) techniques.

Matlab
- DEFINE, DISCUSS and USE of common mathematical analysis software (MATLAB) to calculate matrix, differential, integration, graph, and other mathematical formulas.

Basic Electronics
- DEFINE, DISCUSS and USE of basic electronic devices, electronic components, soldering techniques, testing techniques, measurement techniques and its application.

References

1. Timothy Sean Sykes. (2002). *AutoCAD 2002 One Step at A Time*. Prentice Hall.
2. Ralph Grabowski. (2002). *Using AutoCAD 2002*. Thompson Learning.
3. William J. Palm III. (2001). *MATLAB for Engineering Students*. McGraw Hill.
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COMPUTER

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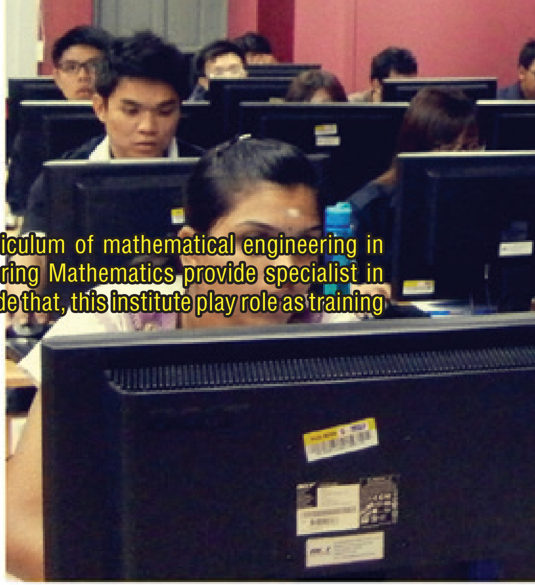
Introduction

Institute of Engineering Mathematics is a centre of planning and monitoring the curriculum of mathematical engineering in UniMAP. Instead of research centre in mathematical engineering Institute of Engineering Mathematics provide specialist in method of mathematical research, simulations, statistics and operational research. Beside that, this institute play role as training centre for UniMAP society and others in related field of mathematics.



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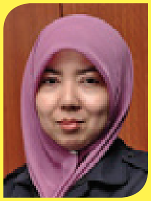

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Master of Science (Engineering Mathematics) by Research Mode
Master of Science (Engineering Mathematics) by Mixed Mode

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DQT101/3	Mathematics I
DQT102/3	Mathematics II
DQT203/3	Mathematics III

Degree Courses

EQT101/3	Engineeering Mathematics I
EQT102/3	Engineering Mathematics II
BQT133/3	Business Mathematics
BQT173/3	Business Statistics
EQT203/3	Engineering Mathematics III
EQT221/3	Discrete Mathematics & Linear Algebra
EQT241/3	Intermediate Mathematics
EQT271/3	Engineering Statistics
EQT272/3	Probability And Statistics
EQT373/4	Statistics for Engineers
PQT111/3	Mathematics for Engineering Technology I
PQT112/3	Mathematics for Engineering Technology II
PQT213/3	Mathematics for Engineering Technology III

Programme Outcomes [PO]

PO 01
Ability to acquire and apply knowledge of mathematics, science, engineering and an in-depth technical competence in a engineering discipline.

PO 02
Ability to identify, formulate and solve engineering problems.

PO 03
Ability to design a system, component or process to meet desired needs.

PO 04
Ability to design and conduct experiments, as well as to analyze and interpret data.

PO 05
Ability to use techniques, skills and modern engineering tools necessary for engineering practices so as to be easily adaptable to industrial needs.

PO 06
Understanding of the social, cultural, global and environmental responsibilities of a professional engineer.

PO 07
In-depth understanding of entrepreneurship, the process of innovation and the need for sustainable development.

PO 08
Understanding of professional and ethical responsibilities and commitment to the community.

PO 09
Ability to function on multi-disciplinary teams.

PO 10
Ability to communicate effectively.

PO 11
Recognition of the need for, and an ability to engage in life-long learning.

PO 12
Demonstrate understanding of project management and finance principles

Course Syllabus

EQT101/3
Engineering Mathematics I

Course Synopsis

This course will introduce the fundamental principles and concepts in linear algebra and calculus. The topics that will be discussed in this course are complex numbers, matrices, vectors, and differentiation & integration and partial differential equations also topic of Partial Derivatives.

Course Outcomes

1. Ability to relate relevant concepts and methods in algebra.
2. Ability to relate concepts and methods in calculus.
3. Ability to evaluate solutions of engineering problems using relevant concepts and methods.

References

1. Fundamental Mathematics McGraw Hill.
2. James, G et.al. (2007): Modern Engineering Mathematics. Pearson Education, 4th edition.
3. Stroud, K.A. (2007): Engineering Mathematics. Industrial Press Inc, 6th edition.
4. Peter V. O'Niel (2006): *Advanced Engineering Mathematics*, 6th edition, CL Engineering.
5. Lawrence H.T. Chang and Radzuan Razali (2002): *Asas Metematik Kejuruteraan*, Prentice Hall.

EQT102/3
Engineering Mathematics Ii

Course Synopsis

This course will introduce to students to differential equations. Initially differential equations covered the methods to solve differential equations including first and second order differential equations and its applications. Next, the course will introduce to the separation of variables method to solve partial differential equations problem. Then, Laplace transform will be discussed as a method to solve differential equations. At the end of study, Fourier Series will be discussed to the students.

Cources Outcomes

1. Ability to solve differential equations which covered first and second order ordinary differential equations and partial differential equation.
2. Ability to apply the Laplace transforms method to solve and analyze certain differential equations problems theoretically and physically.
3. Ability to apply the fundamental understanding of Fourier series and able to express Fourier series and Fourier series expansions to any given function.
4. Ability to relate the differential equations and analyze certain physical problems.

Prerequisite

EQT 101 Engineering Mathematics I result must be **D+** and above

References

1. Introduction To Ordinary Differential Equation (2010), Penerbit UniMAP.
2. W. E. Boyce (2009): Elementary Differential Equations and Boundary Value Problems: International Student Version.John Wiley & Sons Inc., 9th edition.
3. B.R. Hunt, L.J. Lardy ,R.L. Lipsman, J.E. Osborn, J.Rosenberg (2008):Differential Equations with Maple Wiley, 3rd edition.
4. R. K. Nagle, E. B. Saff and A.D. Snider (2008).Fundamentals of Differential Equations and Boundary Value Problems. Addison-Wesley, 5th edition.
5. D. G. Zill and M.R. Cullen (2008): Differential Equations with Boundary-Value Problems. Brooks Cole, 7th edition.
6. D.G. Zill (2008). A First Course in Differential Equations. Brooks Cole, 9th edition.

BQT133/3
Business Mathematics

Course Synopsis

The purpose of the course is to provide the student with mathematical techniques to help them to make better decisions in the business problems.

Topics include: Matrix Algebra, Financial Mathematics, Differential Calculus and Integral Calculus.

Cources Outcomes

1. Ability to identify and apply the knowledge of matrix algebra in business models.
2. Ability to apply the knowledge in mathematics to solve the financial problems
3. Ability to relate concepts and methods in calculus and select suitable methods to solve the business problems.

References

1. Marek Capiski and Tomasz Zastawniak (2010) *Mathematics for Finance An Introduction to Financial Engineering* (Second Edition), Springer.
2. Laurence D Hoffmann; Gerald L Bradley (2010) *Calculus for business, economics, and the social and life sciences*, McGraw-Hill.
3. Brechner, Robert (2008) *Contemporary Mathematics for Business and Consumers*, South-Western College Pub.
4. Raymond A. Barnett, Michael R. Ziegler, Karl E. Byleen (2008), *Finite mathematics for business, economics, life sciences, and social sciences,* Pearson/Prentice Hall.
5. Zulkarnain Zakaria (2000), *Matematik Perniagaan*, UTM Press.

BQT173/3
Business Statistics

Course Synopsis

This course covers topics on data and statistics, descriptive statistics (tabular, graphical presentation and numerical measures), introduction to random variable, discrete and continuous probability distributions, sampling and sampling distributions, estimation, hypothesis tests, regression and correlation, and introduction to multiple regression.

Cources Outcomes

1. Ability to apply the basic concept of statistics for statistical analysis and summarizing data.
2. Ability to differentiate between discrete and continuous random variables and solve probability distribution.
3. Ability to identify and decide the suitable statistical inference and regression in decision making

References

1. Abdull Halim Abdul, Norazrita Amin, Biliana Bidin, Nor Fashihah Mohd Noor (2010) *Statistics*, Mc Graw Hill.
2. G C Beri (2010) *Business statistics*, McGraw-Hill.
3. Ronald M Weiers; J Brian Gray; Lawrence H Peters (2008) *Introduction to business statistics*, Thomson/South-Western.
4. Mark, L.B., Levine, D. M. & Krehbiel, T.C. (2008) *Basic Business Statistics*, 11 edition, Prentice Hall.
5. Bowerman, O. & Orris, P. (2008). *Essentials of Business Statistics*, 2nd edition, McGraw Hill/Irwin.
6. Weiers, R.M. (2007). *Introduction to Business Statistics*. Duxbury Press. An International Thompson Publishing Company.

EQT203/3
Engineering Mathematics III

Course Synopsis

This course introduces the definition and concepts in 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's, divergence and Stokes's theorems. In numerical methods topic, several numerical techniques will be introduced to solve nonlinear equations, interpolation, curve fitting, differentiation, intergration and also differential equations. The introduction of finite element method also will be exposed in this course.

Cources Outcomes

1. Ability to apply vector calculus concepts to solve single, double or triple integrals

2. Ability to apply the concept of differentiation and integration in vector calculus to solve classical theorems in vector calculus.
3. Ability to select appropriate numerical methods to solve the mathematical problems

References

1. Undergraduate Mathematics for Engineering Student. McGraw Hill.
2. Erwin Kreyszig (2006): *Advanced Engineering Mathematics*, 9th edition, John Wiley & Sons, Inc.
3. Peter V. O'Niel (2006): *Advanced Engineering Mathematics*, 6th edition, CL Engineering.
4. Lawrence H.T. Chang and Radzuan Razali (2002): *Asas Metematik Kejuruteraan*, Prentice Hall.
5. K.A. Stroud (2001): *Engineering Mathematics*, 6th edition, Palgrave.
6. K.A. Stroud (2003): *Further Engineering Mathematics*, 3rd edition, Palgrave.
7. Harman, T.L., Dabney, J. and Richert, N. (1997): *Advance Engineering Mathematics using MATLAB V.4*, Boston: PWS Publishing Company.

EQT221/3
Discrete Mathematics
& Linear Algebra

Course Synopsis

This course introduces the definition and concepts in discrete mathematics and linear algebra which is an essential tools in almost all subareas of computer science and communication systems. The topics discuss includes sets and functions, logic, theory number and cryptography, matrices and linear transformation, vector spaces and inner product spaces.

Cources Outcomes

1. Ability to identify and choose the suitable concepts of discrete mathematics in solving engineering problems.
2. Ability to apply the concept of linear algebra in solving engineering problems.
3. Ability to relate and solve engineering problems using discrete mathematics and linear algebra.

References

1. Rosen, H. Kenneth. 2007. Discrete Mathematics and Its Application (6th Edition).McGraw-Hill, New York.
2. Ross, A. Kenneth & Wright, R. B. Charles. 1999. Discrete Mathematics (4th Edition). Prentice Hall, Inc, New Jersey
3. Kolman, Bernard & Hill, R. David. 2004. Elementery Linear Algebra (8th Edition). Pearson Education, Inc. New Jersey
4. Buchmann, J.A. 2004. Introduction to Cryptography (2nd Edition). Springer-Verlag, New York.
5. Kolblizt, N. 1994. A course in Number Theory and Crytpgraphy (2nd Edition). Springer-Verlag, New York.
6. Ma Siu Lun, Victor Tan. 2006. Linear Algebra I. Pearson Prentice Hall, Inc, New Jersey.
7. Larson, R & Falvo, D. 2010. Elementary Linear Algebra, Brooks/Cole Cengage Learning.

EQT241/3
Intermediate Mathematics

Course Synopsis

This course introduces the definition and concepts in vector calculus and numerical methods. Three important concepts related to scalar and vector fields. The topics discuss also includes numerical differentiation and numerical integration, numerical solution of differential equations and finite difference method.

Cources Outcomes

1. Ability to define the vector integrals and evaluate the line, volume and surface integral using Green, Guass and Stoke theorem.
2. Ability to find the numerical solution of the equation and use the suitable numerical methods to solve the problems.
3. Ability to relate the relevant concept of vector calculus and numerical methods to solve engineering problems.

References

1. Erwin Kreyszig (2006): *Advanced Engineering Mathematics*, 9th edition, John Wiley & Sons, Inc.
2. Undergraduate Mathematics for Engineering Student. McGraw Hill.
3. Peter V. O'Niel (2006): *Advanced Engineering Mathematics*, 6th edition, CL Engineering.
4. Lawrence H.T. Chang and Radzuan Razali (2002): *Asas Metematik Kejuruteraan*, Prentice Hall.
5. K.A. Stroud (2001): *Engineering Mathematics*, 6th edition, Palgrave.
6. K.A. Stroud (2003): *Further Engineering Mathematics*, 3rd edition, Palgrave.
7. Harman, T.L., Dabney, J. and Richert, N. (1997): *Advance Engineering Mathematics using MATLAB V.4*, Boston: PWS Publishing Company.

EQT271/3
Engineering Statistics

Course Synopsis

This course introduces the fundamental concepts in statistics. The definition of statistics and basic concepts of statistics such as collection of data, data summary and presentation, probability distribution and sampling distribution will be introduced to the students in topic basic statistics. This course also teaches the students on how to make a statistical inference which are estimation and hypothesis testing. Apart from that, students will learn on how to run statistical test and analyze the results obtained. These skills will be taught in topic introductory linear regression (Simple linear regression, Least squares method, Test for linearity of regression and Pearson product moment correlation coefficient), analysis of variance (one-way and two-way ANOVA) and nonparametric statistics (The χ^2 test, Sign test, Mann-Whitney test, Kruskal Wallis test, Wilcoxon-signed rank test and Spearman rank correlation).

Cources Outcomes

1. Ability to understand, apply and explain the basic concepts of statistics.
2. Ability to solve problems using suitable statistical inference.
3. Ability to construct the model and analyze the result from ANOVA table and simple linear regression.
4. Ability to apply the basic methodology of nonparametric statistics to solve engineering problems.

References

1. Walpole, R., Myers, R., Myers, S. and Keying Ye (2006): *Probability & Statistics for Engineers & Scientist, 8th edition,* Pearson.
2. Ledolter, J. and Hogg, R. (2009): *Applied Statistics for engineers and Physical Scientists*, Pearson.
3. Mendenhall, W. and Sincich, T. (2006): *Statistics for engineering and the sciences, 5th edition,* Pearson.
4. McClave, J., Sincich, T. and Mendenhall, W. (2008): *Statistics, 11rd edition,* Pearson.
5. David, S.M., George, P.M. and Bruce, C. (2008): *Introduction to the Practise of Statistics, 6th edition, Palgrave.*
6. David, S.M. (2008): *The Basic Practise of Statistics, 5th edition,* Palgrave.

EQT272/3
Probability & Statistics

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 is including estimation and hypothesis testing and finally the regression concept.

Cources Outcomes

1. Ability to apply the theory of probability and solve discrete and continuous random variables.
2. Ability to understand and apply the concepts of probability distribution.
3. Ability to apply hypothesis testing and simple linear regression model to solve engineering problems.

References

1. Richard J. Larsen and Morris L. Marx, (2001): *An Introduction to Mathematical Statistics and Its Applications*, 3rd edition, Prentice Hall.
2. Peter V. O'Niel (2006): *Advanced Engineering Mathematics*, 6th edition, CL Engineering.
3. Lawrence H.T. Chang and Radzuan Razali (2002): *Asas Metematik Kejuruteraan*, Prentice Hall.
4. K.A. Stroud (2001): *Engineering Mathematics*, 6th edition, Palgrave.
5. K.A. Stroud (2003): *Further Engineering Mathematics*, 3rd edition, Palgrave.
6. Harman, T.L., Dabney, J. and Richert, N. (1997): *Advance Engineering Mathematics using MATLAB V.4*, Boston: PWS Publishing Company.

EQT373/4:
Statistics For Engineers

Course Synopsis

Topics to be covered will include collection and summarization of data, measures of central tendency and dispersion, random variables, discrete and continuous probability distributions, sampling distribution, estimation, hypothesis testing, introductory linear regression, analysis of variance, introductory design of experiments and statistical process control (introduction to control charts).

Cources Outcomes

1. Ability to apply fundamental concepts of probability distributions and statistics.
2. Ability to apply knowledge of statistics in analyze and interpret data.
3. Ability to apply knowledge of statistics for decision making and to solve engineering problems.
4. Ability to apply knowledge of statistics for designing the engineering experiment.
5. Ability to relate relevant concepts and practices of statistic process control in the manufacturing processes.

References

1. Jay L.Devore. (2007).*Probability and Statistics for Engineering and the Sciences*. 7th Edition. Duxbury Press, Belmont.
2. Willian Navidi. (2006). *Statistics for Engineers and Scientists.* McGraw Hill, New York.
3. Douglas C. Montgomery, George C. Runger. Norma F. Hubele. John Wiley (2001). *Engineering Statistics*. 2nd Edition. New York.
4. Robert V. Hogg, Johannes Ledolter (1992). *Applied Statistics for Engineers and Physical Scientist.* 2nd Edition. Macmillan. New York.
5. Ronald E. W. , Raymond H. M, Sharon. L. M, Keying Ye (2002), Probability & Statistic for Engineers & Scientist, Prentice Hall.

PQT111/3
Mathematics for Engineering Technology I

Course Synopsis

This course will introduce the fundamental principles and concepts in algebra, calculus and statistics. The topics that will be discussed in this course are complex numbers, matrices, vectors, differentiation & integration and statistics.

Cources Outcomes

1. Ability to solve mathematical problems using basic concepts of algebra (complex numbers, matrices and vectors).
2. Ability to solve mathematical problems using basic concepts of calculus (differentiation and integration).
3. Ability to solve statistical problems using data analysis.

References

1. Fundamental Mathematics, McGraw Hill
2. James, G et.al. (2007): Modern Engineering Mathematics. Pearson Education, 4th edition.
3. Stroud, K.A. (2007): Engineering Mathematics. Industrial Press Inc, 6th edition.
4. Mario F. Triola.(2009). Elementary Statistics Using Excel. Addison-Wesley. 4th Edition.

5. Beverly Dretzke.(2008).Statistics With Microsoft Excell. Prentice Hall. 4th Edition.
6. Devore, J.L. (2007): Probability and Statistics for Engineering and the Sciences. Duxbury Press, 7th edition.
7. Montgomery, D.C. (2006): *Applied Statistics and Probability for Engineers*. Wiley, 4th edition.

PQT112/3
Mathematics for Engineering Technology II

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 to the Laplace transform method to solve differential equations and at the end of topic, Fourier Series expansion of a function will be discussed to the students.

Cources Outcomes

1. Able to solve differential equations involving the first and second order differential equation by selecting appropriate techniques and able to relate and analyze the certain physical problems to differential equations.
2. Ability to apply the Laplace transforms method to solve and analyze certain differential equations problems.
3. Ability to apply the fundamental understanding of Fourier series and able to express Fourier series and Fourier series expansions to any given function.

Prerequisite

PQT 111 Mathematics for Engineering Technology I result must be **D+** and above

References

1. Introduction To Ordinary Differential Equation (2010), Penerbit UniMAP
2. W. E. Boyce (2009): Elementary Differential Equations and Boundary Value Problems: International Student Version.John Wiley & Sons Inc, 9th edition.
3. B.R. Hunt, L.J. Lardy ,R.L. Lipsman, J.E. Osborn, J.Rosenberg (2008):Differential Equations with Maple Wiley, 3rd edition.
4. R. K. Nagle, E. B. Saff and A.D. Snider (2008). Fundamentals of Differential Equations and Boundary Value Problems. Addison-Wesley, 5th edition.
5. D. G. Zill and M.R. Cullen (2008): Differential Equations with Boundary-Value Problems. Brooks Cole, 7th edition.
6. D.G. Zill (2008). A First Course in Differential Equations. Brooks Cole, 9th edition.

PQT213/3
Mathematics for Engineering Technology III

Course Synopsis

This course will introduce the definition and concepts of partial derivatives and vector calculus. An introduction to some theorems in vector calculus topic will be exposed for students. At the end of study, this course also discusses the topic of numerical methods that introduce several methods in solving mathematical problems.

Cources Outcomes

1. Ability to apply the concepts of partial derivatives and able to evaluate solutions of mathematical problems using suitable methods.
2. Ability to apply vector calculus concepts and able to differentiate and solve single, double or triple integrals
3. Ability to solve numerical problems by selecting suitable numerical methods.

References

1. Undergraduate Mathematics for Engineering Student. McGraw Hill.

2. Erwin Kreyszig (2006): *Advanced Engineering Mathematics*, 9th edition, John Wiley & Sons, Inc.
3. Peter V. O'Niel (2006): *Advanced Engineering Mathematics*, 6th edition, CL Engineering.

4. Lawrence H.T. Chang and Radzuan Razali (2002): *Asas Metematik Kejuruteraan*, Prentice Hall.
5. K.A. Stroud (2001): *Engineering Mathematics*, 6th edition, Palgrave.
6. K.A. Stroud (2003): *Further Engineering Mathematics*, 3rd edition, Palgrave.

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Introduction

The Centre for Industrial Collaboration (CIC) serves as the link between the university and industries in carrying out various R&D activities and academic programmes. The centre also represents the diversity of academic offerings and events based on participation and commitment from the industries. CIC consists of several main units, namely Graduate Employability, Industrial Training, Industrial Networking, ICT & Publicity, Administration (Finance & Projects) and Integration Industry (Kulim). Among the programmes conducted with the involvement from industries are Industrial Exposure (IndEx), Industrial Entrepreneur (IndEnt), Industrial Training (InTra), Forums, Seminars with Industries, Job Camps, Graduate Trainee Programs, Degree++ Programs, MoU/MoA with Industries and Industry Centre of Excellence (ICoE).

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Course Offered

EIT 302/4
Industrial Training
[Degree In Engineering Programme]

Syllabus

The course will expose students to the technical and application aspects as well as other organizational aspects such as company organization structure, company operation, department function, work procedure, safety procedure, management, communication, technical skills, project management and presentation. The students are also required to submit their logbook and report at the end of the Industrial Training. Overall, the course is a practical-based course.

Course Outcomes

CO1: Ability to display good work performance and adapt to the working environment during training period.
CO2: Ability to demonstrate good communication skills, leadership and work ethics during training period.
CO3: Ability to perform assigned task given by host company.

References

1. UniMAP Industrial Training Guideline (Revision April 2012)
2. UniMAP Industrial Training Log Book

BIT190/3
Industrial Training 1

BIT290/3
Industrial Training 2
[Degree In Business (International Business) Programme]

Syllabus

The course will expose students to the technical and application aspects as well as other organizational aspects such as company organization structure, company operation, department function, work procedure, safety procedure, management, communication, technical skills, project management and presentation. The students are also required to submit their logbook and report at the end of the Industrial Training. Overall, the course is a practical-based course.

Course Outcomes

CO1: Ability to display good work performance and adapt to the working environment during training period.
CO2: Ability to demonstrate good communication skills, leadership and work ethics during training period.
CO3: Ability to perform assigned task given by host company.

Reference

1. UniMAP Industrial Training Log Book

BIT291/6
Incubator Programme
[Degree In Business (Engineering Entrepreneurship) Programme]

Syllabus

This course gives students direct exposure to the real entrepreneurship and business world. Students will be stationed in business incubators, generally assigned to one of the startup companies. Students will go through the experience of starting up a company / business including being exposed to the company procedures, banking activities, development of new product, business networking, management of the company and so on. Students will also get exposure communicating in actual business world and this will develop their skills in fostering an entrepreneurial network.

Course Outcomes

CO1: Ability to display good work performance and adapt to the working environment during training period.
CO2: Ability to demonstrate good communication skills, leadership and work ethics during training period.
CO3: Ability to perform assigned task given by host company.

Reference

1. UniMAP Industrial Training Log Book


KORIDOR UTARA
SILTERRA
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CATCHER

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Introduction

The Department of Higher Education through a letter dated August 3rd, 2008 had instructed Co-curriculum Centres to be established at all Malaysian Public Institutions of Higher Education. The aim is to achieve the goal that had been outlined in the Country Higher Education Strategic Plan which is to strengthen the 'learning outcomes' through co-curriculum activities.

UniMAP Co-curriculum Unit was established in the year 2002 and was placed under the Centre for Communication Skills and Entrepreneurship. Then, on the 8th of June 2010 the Co-curriculum Centre had moved out from the Centre for Communication Skills and Entrepreneurship, and started operating at a new location at Taman Jejawi Utara. On the 29th of July 2010, the establishment of Co-curriculum Centre was officially launched by the Honourable Dato' Vice Chancellor of UniMAP.

The Co-curriculum Centre offers a lot of co-curriculum and uniformed bodies courses. All degree students are compulsory to take 1 @ 2 course or 3 unit. Co-curriculum Centre currently offers up to 44 co-curriculum courses for degree students regardless of their academic programmes.

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Co-Curriculum Courses Offered by Co-Curriculum Centre

During their study, all the degree students must take 3 unit from the courses that had been offered by the following divisions below:

BIL	SENARAI KURSUS	KOD KURSUS	UNIT	TERAS	PRA- SYARAT
1	Golf *[Golf]*	UZW101	1	**Sukan** ***(Sport)*** **Sukan** ***(Sport)***	Ditawarkan Secara Tunggal *(Offered in Single)*
2	Besbal *[Baseball]*	UZW102	1		
3	Woodball *[Woodball]*	UZW103	1		
4	Bola Sepak *[Football]*	UZW104	1		
5	Bola Jaring *[Netball]*	UZW105	1		
6	Tenis *[Tennis]*	UZW106	1		
7	Ekuestrian *[Equestrian]*	UZW107	1		
8	Angkat Berat *[Weightlifting]*	UZW108	1		
9	Lawan Pedang *[Fencing]*	UZW174	1		
10	Boling Padang *[Lawn Bowl]*	UZW181	1		
11	Petanque *[Petanque]*	UZW182	1		
12	Kayak *[Canoe]*	UZW183	1		
13	Badminton *[Badminton]*	UZW184	1		
14	Hoki *[Hockey]*	UZW185	1		
15	Sepak Takraw [*Sepak Takraw]*	UZW186	1		
16	Ragbi *[Rugby]*	UZW187	1		
17	Memanah *[Archery]*	UZW188	1		
18	Ping Pong *[Table Tennis]*	UZW189	1		
19	Seni Silat Cekak I *[Seni Silat Cekak I]*	UZW171	1		Kursus Berpakej - (Pelajar Harus Mengikuti Dari Peringkat 1 – 3 Untuk Memperolehi 3 Unit) * Tahun 1 - 2 (3 Semester) *Packaged Courses – (Students should Following From Stage 1 -3 To Acquire 3 Units)* ** Years 1 - 2 (3 Semesters)*
	Seni Silat Cekak II *[Seni Silat Cekak II]*	UZW271	1		
	Seni Silat Cekak III *[Seni Silat Cekak III]*	UZW371	1		
20	Taekwon-Do GTF I *[Taekwon-Do GTF I]*	UZW172	1		
	Taekwon-Do GTF II *[Taekwon-Do GTF II]*	UZW272	1		
	Taekwon-Do GTF III *[Taekwon-Do GTF III]*	UZW372	1		
21	Karate-Do *[Karate-Do]*	UZW173	1		
	Karate-Do II *[Karate-Do II]*	UZW273	1		
	Karate-Do III *[Karate-Do III]*	UZW373	1		

22	Renang I *[Swimming I]*	UZW180	1	**Sukan** ***(Sport)***	Ditawarkan Secara Berperingkat *(Gradual Offered)*
	Renang II *[Swimming II]*	UZW280	1		
	Renang III *[Swimming III]*	UZW380	1		
23	Seni Pergerakan Kreatif *[Arts of Creative Movement]*	UZW155	1	**Kebudayaan** ***(Culture)***	Ditawarkan Secara Tunggal *(Offered in Single)*
24	Drama, Pementasan & Seni Lakon *[Drama, Playwright & Acting]*	UZW156	1		
25	Brasben I *[Brass Band I]*	UZW153	1		Kursus Berpakej - (Pelajar Harus Mengikuti Dari Peringkat 1 – 3 Untuk Memperolehi 3 Unit) * Tahun 1 - 2 (3 Semester) *Packaged Courses – (Students should Following From Stage 1 -3 To Acquire 3 Units) * Years 1 - 2 (3 Semesters)*
	Brasben II *[Brass Band II]*	UZW253	1		
	Brasben III *[Brass Band III]*	UZW353	1		
26	Asas Gamelan *[Foundations of Gamelan]*	UZW151	1		Ditawarkan Secara Berperingkat *(Gradual Offered)*
	Gamelan II *[Gamelan II]*	UZW251	1		
	Gamelan III *[Gamelan III]*	UZW351	1		
27	Kumpulan Jazz I *[Jazz Band I]*	UZW152	1		
	Kumpulan Jazz II *[Jazz Band II]*	UZW252	1		
	Kumpulan Jazz III *[Jazz Band III]*	UZW352	1		
28	Angklung I *[Angklung I]*	UZW154	1		
	Angklung II *[Angklung II]*	UZW254	1		
	Angklung III *[Angklung III]*	UZW354	1		

29	Khidmat Masyarakat *[Community Services]*	UZW191	1	**Kidmat Komuniti *(Community Services)***	Ditawarkan Secara Tunggal *(Offered in Single)*
30	Tajwid *[Tajwid]*	UZW193	1	**Kepemimpinan *(Leadership)***	
31	Pidato *[Elocution]*	UZW194	1	**Pengucapan Awam *(Public Speaking)***	
32	Radio Kampus *[Campus Radio]*	UZW195	1		
33	Daya Usaha & Inovasi *[Initiative & Innovation]*	UZW192	1	**Daya Usaha & Inovasi *(Initiative & Innovation)***	
34	Student In-Free Enterprise (SIFE) *[Student In-Free Enterprise (SIFE)]*	UZW196	1	**Keusahawanan *(Entrepreneurship)***	
35	Briged Bomba I *[Fire And Rescue Briged I]*	UZW120	1	**Kesukarelawanan *(Volunteerism)* Kesukarelawanan *(Volunteerism)***	Kursus Berpakej – (Pelajar Harus Mengikuti Dari Peringkat 1 – 2 Untuk Memperolehi 2 Unit) * Tahun 1 (2 Semester) *Packaged Courses – (Students should Following From Stage 1 -2 To Acquire 2 Units)* ** Years 1 (2 Semesters)*
	Briged Bomba II *[Fire And Rescue Briged II]*	UZW121	1		
36	Pandu Puteri Siswi I (PPS I) *[Girl Guide I (PPS I)]*	UZW122	1		
	Pandu Puteri Siswi II (PPS II) *[Girl Guide II (PPS II)]*	UZW123	1		
37	St. John Ambulans Malaysia I *[Malaysian St. John Ambulance I]*	UZW124	1		
	St. John Ambulans Malaysia II *[Malaysian St. John Ambulance II]*	UZW125	1		
38	Kumpulan Latihan Kelanasiswa Malaysia I *[Malaysian University Rover Training Group I]*	UZW126	1		
	Kumpulan Latihan Kelanasiswa Malaysia II *[Malaysian University Rover Training Group II]*	UZW127	1		
39	Kumpulan Latihan Kelanasiswa Malaysia (Laut) I *[Malaysian University Rover Training Group I (Sea)]*	UZW128	1		
	Kumpulan Latihan Kelanasiswa Malaysia II (Laut) *[Malaysian University Rover Training Group II (Sea)]*	UZW129	1		

40	Kursus Persijilan Persatuan Bulan Sabit Merah Malaysia I *[The Malaysian Red Crescent Societies Certification Course I]*	UZW164	1	**Kesukarelawanan** ***(Volunteerism)***	Kursus Berpakej – (Pelajar Harus Mengikuti Dari Peringkat 1 – 3 Untuk Memperolehi 3 Unit) * Tahun 1 - 2 (3 Semester) *Packaged Courses – (Students should Following From Stage 1 -3 To Acquire 3 Units)* ** Years 1 - 2* *(3 Semesters)*
	Kursus Persijilan Persatuan Bulan Sabit Merah Malaysia II *[The Malaysian Red Crescent Societies Certification Course II]*	UZW165	1		
	Kursus Persijilan Persatuan Bulan Sabit Merah Malaysia III *[The Malaysian Red Crescent Societies Certification Course III]*	UZW264	1		
41	Kor Siswa Siswi Pertahanan Awam I (Kor SISPA I) *[Malaysia Civil Defense Department I]*	UZW162	1		Kursus Berpakej – (Pelajar Harus Mengikuti Dari Peringkat 1 – 5 Untuk Memperolehi 5 Unit) * Tahun 1 – 3 (5 Semester) *Packaged Courses – (Students should Following From Stage 1 -5 To Acquire 5 Units)* ** Years 1 - 3* *(5 Semesters)*
	Kor Siswa Siswi Pertahanan Awam II (Kor SISPA II) *[Malaysia Civil Defense Department II]*	UZW163	1		
	Kor Siswa Siswi Pertahanan Awam III (Kor SISPA III) *[Malaysia Civil Defense Department III]*	UZW262	1		
	Kor Siswa Siswi Pertahanan Awam IV (Kor SISPA IV) *[Malaysia Civil Defense Department IV]*	UZW263	1		
	Kor Siswa Siswi Pertahanan Awam V (Kor SISPA V) *[Malaysia Civil Defense Department V]*	UZW362	1		
42	Palapes Darat I *[ROTU Army I]*	UZW160	1		Kursus Berpakej – (Pelajar Harus Mengikuti Dari Peringkat 1 – 6 Untuk Memperolehi 6 Unit) * Tahun 1 – 3 (6 Semester) *Packaged Courses – (Students should Following From Stage 1 -6 To Acquire 6 Units)* ** Years 1 - 3* *(6 Semesters)*
	Palapes Darat II *[ROTU Army II]*	UZW161	1		
	Palapes Darat III *[ROTU Army III]*	UZW260	1		
	Palapes Darat IV *[ROTU Army IV]*	UZW261	1		
	Palapes Darat V *[ROTU Army V]*	UZW360	1		
	Palapes Darat VI *[ROTU Army VI]*	UZW361	1		

43	SUKSIS-I @ Kor Sukarelawan Polis Siswa/ Siswa *[SVPC- I @ Students Voluntary Police Corp]*	UZW166	1	**Kesukarelawanan** ***(Volunteerism)***	Kursus Berpakej – (Pelajar Harus Mengikuti Dari Peringkat 1 – 6 Untuk Memperolehi 6 Unit) * Tahun 1 – 3 (6 Semester) *Packaged Courses – (Students should Following From Stage 1 -6 To Acquire 6 Units)* ** Years 1 - 3 (6 Semesters)*
	SUKSIS-2 @ Kor Sukarelawan Polis Siswa/ Siswa *[SVPC- 2 @ Students Voluntary Police Corp]*	UZW167	1		
	SUKSIS-3 @ Kor Sukarelawan Polis Siswa/ Siswa *[SVPC- 3 @ Students Voluntary Police Corp]*	UZW266	1		
	SUKSIS-4 @ Kor Sukarelawan Polis Siswa/ Siswa *[SVPC- 4 @ Students Voluntary Police Corp]*	UZW267	1		
	SUKSIS-5 @ Kor Sukarelawan Polis Siswa/ Siswa *[SVPC- 5 @ Students Voluntary Police Corp]*	UZW366	1		
	SUKSIS-6 @ Kor Sukarelawan Polis Siswa/ Siswa *[SVPC- 6 @ Students Voluntary Police Corp]*	UZW367	1		
44	Briged RELA Siswa Siswi (RELASIS) I *[Malaysian People's Volunteer corps I]*	UZW168	1		
	Briged RELA Siswa Siswi (RELASIS) II *[Malaysian People's Volunteer corps II]*	UZW169	1		
	Briged RELA Siswa Siswi (RELASIS) III *[Malaysian People's Volunteer corps III]*	UZW268	1		
	Briged RELA Siswa Siswi (RELASIS) IV *[Malaysian People's Volunteer corps IV]*	UZW269	1		
	Briged RELA Siswa Siswi (RELASIS) V *[Malaysian People's Volunteer corps V]*	UZW368	1		
	Briged RELA Siswa Siswi (RELASIS) IV *[Malaysian People's Volunteer corps IV]*	UZW369	1		

Co-Curriculum Courses

UZW101
Golf

Course Synopsis

The Golf Co-Curriculum course aims to expose the students to the science of the game of golf in both theoretical and technical skills. The theoretical aspect of the course covers the history, background, terminology, self-management and other related aspects of golf, while the technical portion focuses on the practical training i.e. skills in playing golf.

References

1. James, L. and Moore, T., 'Golf's Three Noble Truths: The Fine Art of Playing Awake', New World Library, 2010.
2. Lumb, N., 'A Beginner's Guide to Golf' Smithmark Publishers, 1989.
3. McCord, Gary., 'Golf For Dummies by', Wiley Publishing, 2006.
4. Parks, P., 'How to improve at Golf', Tunbridge Wells Ticktock, 2007.
5. Smith, A., 'Andrew's Essential Guide to Beginners Golf', Andrew's Book Company, 2009.

UZW102
Baseball

Course Synopsis

The Baseball Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of the baseball game. The theoretical aspect of the course covers the history, background, terminology, self-management and other related aspects of baseball, while the technical portion focuses on the practical training i.e. skills in playing baseball.

References

1. Eckart, E., 'I Can Play Baseball (Welcome Books)', Children's Press (CT), 2002.
2. Freeman, S. H., 'Basic Baseball Strategy: An Introduction for Coaches and Players', McGraw-Hill, 2006.
3. Morgan, J., 'Baseball for Dummies', For Dummies, 2005.
4. Wallace, J., 'Baseball: 365 Days', New York Abrams, 2008.
5. Wark, L., 'Baseball (Basics for Beginners)', Kids Can Press, 1994.

UZW103
Woodball

Course Synopsis

The Woodball Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of the woodball game. The theoretical aspect of the course covers the history, background, terminology, self-management and other related aspects of woodball, while the technical portion focuses on the practical training i.e. skills in playing woodball.

References

1. Rules of Beach Woodball (International Woodball Federation), Revolution Publication, 1996.
2. http://www.iwbf-woodball.org/ Woodball Rules
3. http://www.woodball.org/

UZW104
Football

Course Synopsis

The Soccer/Football Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of the soccer/football game. The theoretical aspect of the course covers the history, background, terminology, self-management and other related aspects of soccer/football, while the technical portion focuses on the practical training i.e. skills in playing soccer.

References

1. Carr, D., and Metzler, M.W., 'Soccer: Mastering the Basics with the Personalized Sports Instruction System (A Workbook Approach)', Benjamin Cummings, 2000.
2. Drewett, J., 'How to improve at football', Tunbridge Well Ticktock Media, 2005.
3. Lewis, M. and Lalas, A., 'Soccer for Dummies', Inc. LASTUnited States Soccer Federation, 2000.

4. Negoesco, S., 'Soccer', McGraw-Hill, 1992.
5. Wark, L. and Ritchie, S., 'Soccer (Basics for Beginners)', Kids Can Press, 1994.

UZW105
Netball

Course Synopsis

The Netball Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of the netball game. The theoretical aspect of the course covers the history, background, terminology, self-management and other related aspects of netball, while the technical portion focuses on the practical training i.e. skills in playing netball.

References

1. Galsworthy, B., 'Netball: The Skills of the Game', Crowood Press, 1996.
2. Mullan, N., Netball (Successful Sports)', Heinemann Library, 1997.
3. Navin, A., 'Netball: Skills Techniques Tactics (Crowood Sports Guides)', Crowood Press, 2008.
4. Shakespear, W., 'Netball: Steps to Success - 2nd Edition (Steps to Success Activity Series)', Human Kinetics, 2009.
5. Woodlands, J., 'The Netball Handbook', Human Kinetics, 2006.

UZW106
Tennis

Course Synopsis

The Tennis Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of the tennis game. The theoretical aspect of the course covers the history, background, terminology, self-management and other related aspects of tennis, while the technical portion focuses on the practical training i.e. skills in playing tennis.

References

1. Claxton, D., 'Tennis', McGraw-Hill, 1998.
2. Kumar, N., 'Complete Book of Lawn Tennis', New Delhi India Anmol Publication, 2006.
3. Metzler, M., 'Tennis: Mastering the Basics with the Personalized Sports Instruction System (A Workbook Approach)', Benjamin Cummings, 2000.
4. O'Meara, D.J., and Murray, T.J., 'Tennis Unlimited (The Basic Elements of Sports Series)', ICS Books, 1997.
5. Patrick McEnroe, P., 'Tennis for Dummies', For Dummies, 1998.

UZW107
Equestrian

Course Synopsis

This course aims to train the students in mastering the basic skills of horses handling and management. In addition, it exposes students to the knowledge on horses grooming, installation of equipment and riding techniques. Equestrian sports provide the opportunities for students to interact, foster the spirit of sportsmanship, cooperation, responsibility, and are able to develop positive personality among students.

References

1. Black, D., 'Horses and Owner's Guide', Greenwich Editions, 2001.
2. Draper, J., 'The Ultimate Book of the Horse and Rider' LB, 2000.
3. Foster, C., 'Basic Jumping (Crowood Equestrian Guides)', Crowood Press, 1991.
4. Foster, C., 'Basic Riding (Crowood Equestrian Guides)', Crowood Press, 1991.
5. Ripman, B., 'Basic Training (Crowood Equestrian Guides)', Crowood Press (UK), 1992.

UZW108
Weightlifting

Course Synopsis

This course emphasizes on the identification, regulatory and basic refereeing system of weightlifting sports. Systematic planning in the weightlifting sport is able to develop students' performance to the optimum fitness level. Mastery of basic skills in bio-mechanics allows students to practice weightlifting skills safely. Economical energy coupled with high degree of self confidence in this sport lead to excellence in the weightlifting sport.

References

1. Buku kejurulatihan angkat berat pilot tahap 1 (P.A.B.M) & MSN
2. El-Hewie, M.F., 'Essentials of Weightlifting and Strength Training', Shaymaa Publishing Corporation, 2006.
3. Everett, G., 'Olympic Weightlifting: A Complete Guide for Athletes & Coaches', Catalyst Athletics, 2009.
4. Drechsler, A.J., 'The Weightlifting Encyclopedia: A Guide to World Class Performance', A is A Communications, 1998.
5. Kinetics, H. and Sandler, D., 'Weight Training Fundamentals (Sports Fundamentals Series)', Human Kinetics, 2003.

UZW171
Seni Silat Cekak I

Course Synopsis

Martial Arts Fight Co-Curriculum course aims to expose students to the knowledge of martial arts self defence fight in terms of theoretical skills and technical. In terms of theory, this course is more focused on the history, background back, terminology, self-management and other related to Martial arts. While technically, this course focused on practical training (practical) skills in terms of hands and feet that are being practice from time to time.

References

1. Malay, 'Silat Cekak Hanafi - Peneraju Warisan Mutlak', 2005.
2. Pengenalan kepada Persatuan Seni Silat Cekak Malaysia, Persatuan Seni Silat Cekak Perlis, Perlis.
3. Talib, A., 'Silat: A perspective on the Malay Martial Arts', Amiruddin Dato Seri Paduka Haji Talib Talib, 2009.
4. www.silatcekak.org.my, 2010.
5. www.silatcekakhanafi.org, 2010.

UZW271
Seni Silat Cekak II

Course Synopsis

Martial Arts Fight II Co-Curriculum course aims to expose the students the knowledge of martial arts self defence fight in terms of theoretical skills and technical. In terms of theory, this course is more focused on the history, background back, terminology, self-management and other related to Martial arts. While technically, this course focused on practical training (practical) skills in terms of hands and feet that are being practice from time to time.

References

1. Malay, 'Silat Cekak Hanafi - Peneraju Warisan Mutlak', 2005.
2. Pengenalan kepada Persatuan Seni Silat Cekak Malaysia, Persatuan Seni Silat Cekak Perlis, Perlis.
3. Talib, A., 'Silat: A perspective on the Malay Martial Arts', Amiruddin Dato Seri Paduka Haji Talib Talib, 2009.
4. www.silatcekak.org.my, 2010.
5. www.silatcekakhanafi.org, 2010.

UZW371
Seni Silat Cekak III

Course Synopsis

Martial Arts Fight III Co-Curriculum course aims to expose the students the knowledge of martial arts self defense fight in terms of theoretical skills and technical. In terms of theory, this course is more focused on the history, background back, terminology, self-management and other related to Martial arts. While technically, this course focused on practical training (practical) skills in terms of hands and feet that are being practice from time to time.

References

1. Malay, 'Silat Cekak Hanafi - Peneraju Warisan Mutlak', 2005.
2. Pengenalan kepada Persatuan Seni Silat Cekak Malaysia, Persatuan Seni Silat Cekak Perlis, Perlis.

3. Talib, A., 'Silat: A perspective on the Malay Martial Arts', Amiruddin Dato Seri Paduka Haji Talib Talib, 2009.
4. www.silatcekak.org.my, 2010.
5. www.silatcekakhanafi.org, 2010.

UZW172
Taekwon – Do GTF I

Course Synopsis

Taekwon-Do I (GTF) Co-Curriculum course aims to expose the students to the knowledge of martial arts that is Taekwon-Do (GTF) in terms of theoretical and technical skills. In terms of theory, this course is focused on historical background, terminology, self-management and other related with Taekwon-Do. While technical, this course is more focused on practical training (practical) skills in terms of hands and feet that are being practice from time to time.

References

1. Hi, C., 'Encyclopedia of Taekwon-Do', 1972.
2. Huraisen Masri, A.R., 'Modul Ko-Kurikulum Taekwon-Do (GTF)', UniMAP, 2003.
3. Legacy, 'Taekwon-Do VCD, The Complete Pattern Black Belt Series', 2000.
4. Wai Meng, L., 'Taekwon-Do, The Complete Syllabus & Grading Manual', 1992.
5. Whang S.C., Whang, J.C., Lee, D.S., and Saltz, B., 'Taekwondo: The State of the Art', Broadway, 1999.

UZW272
Taekwon – Do GTF II

Course Synopsis

Course Co-Curriculum II Taekwon-Do (GTF) is an extension of Taekwon-Do I (GTF). Through this course, emphasis is given to the technical aspects related to each stage of belts. Among the aspects to be covered include the philosophy, theory, and etc. In addition, the students are exposed to the theory of how to manage a tournament or competition.

References

1. Hi, C., 'Encyclopedia of Taekwon-Do', 1972.
2. Huraisen Masri, A.R., 'Modul Ko-Kurikulum Taekwon-Do (GTF)', UniMAP, 2003.
3. Legacy, 'Taekwon-Do VCD, The Complete Pattern Black Belt Series', 2000.
4. Wai Meng, L., 'Taekwon-Do, The Complete Syllabus & Grading Manual', 1992.
5. Whang S.C., Whang, J.C., Lee, D.S., and Saltz, B., 'Taekwondo: The State of the Art', Broadway, 1999.

UZW372
Taekwon – Do GTF III

Course Synopsis

Course Co-Curriculum Taekwon-Do III (GTF) is an extension of Taekwon-Do II (GTF). This course is the last course in a series of courses Taekwon-Do (GTF). Theoretical and technical knowledge learned in previous courses will be practiced through discussion, presentation, practice, practices by students and by increasing the test belts. In addition, the students will be exposed to theory and practice of the method of Taekwon-Do class management and coaching.

References

1. Hi, C., 'Encyclopedia of Taekwon-Do', 1972.
2. Huraisen Masri, A.R., 'Modul Ko-Kurikulum Taekwon-Do (GTF)', UniMAP, 2003.
3. Legacy, 'Taekwon-Do VCD, The Complete Pattern Black Belt Series', 2000.
4. Wai Meng, L., 'Taekwon-Do, The Complete Syllabus & Grading Manual', 1992.
5. Whang S.C., Whang, J.C., Lee, D.S., and Saltz, B., 'Taekwondo: The State of the Art', Broadway, 1999.

UZW173
Karate-Do

Course Synopsis

The karate-do co-curriculum course exposes the students to the knowledge of martial arts karate-do in terms of theoretical and technical skills. In terms of theory, this course is more focused on the history, background, terminology, management of oneself and other associated with the art of karate-do. While technically, this course is focused on practical training (practical) skills in the art of karate-do.

References

1. Frost, B., 'Koei-Kan Karate-Do: Practice and Precept', Frog Books, 1998.
2. Funakoshi, G., 'Karate-Do Kyohan: The Master Text', Kodansha International, 1973.
3. Funakoshi, G., 'Karate-Do Nyumon: The Master Introductory Text', Kodansha International, 1994.
4. Funakoshi, G., 'The Twenty Guiding Principles of Karate: The Spiritual Legacy of the Master', Kodansha International, 2003.
5. Healy, K., 'Karate A Step By Step Guide to Shotokan Karate', New Delhi Health Harmony, 2002

UZW174
Fencing

Course Synopsis

The fencing co-curriculum course aims to expose the students to the science of fencing sports theory and technical skills. In terms of theory, this course is more focused on the history, background, terminology, the skills of defence of oneself and other related aspects of fencing sports. While technically, this course is more focused on skills in practical training (practical).

References

1. Cheris, E., 'Fencing: Step to Success', Champaign IL Human Kinetics, 2002.
2. Evangelista, N., 'The Art and Science of Fencing', McGraw-Hill; 1st Edition, 1999.
3. Evangelista, N., 'The Inner Game of Fencing: Excellence in Form, Technique, Strategy and Spirit', McGraw-Hill; 1st Edition, 2000.
4. Pitman, B., 'Fencing: Techniques of Foil, Epee and Sabre', Crowood Press, 1988.
5. Price, R. G., 'The Ultimate Guide to Weight Training for Fencing (Ultimate Guide to Weight Training…)', Sportsworkout.com; 2nd Edition, 2009

UZW180
Swimming I

Course Synopsis

The swimming co-curriculum course aims to expose the students to the science of swim in the theoretical and technical skills. In terms of theory, this course is more focused on the history, background, terminology and other related aspects of swimming activities. While technical, this course is more focused on the practical training in terms of swimming skills.

References

1. Brems, M., 'The Fit Swimmer: 120 Workouts & Training Tips', Mc-Graw Hill; 1st Edition, 1984.
2. Keegan, N., 'Swimming (Vintage Contemporaries)', Vintage, 2010.
3. Kumar, N., 'Complete Book of Swimming', New Delhi: India Anmall Publication, 2006.
4. Mason, P., 'How to Improve at Swimming', Tumbrigde Wells Ticktock Media, 2005.
5. Thomas, D., 'Swimming: Steps to Success – 3rd Edition (Steps to Success Sports Series)', Human Kinetics; 3rd Edition, 2005.

UZW280
Swimming II

Course Synopsis

The swimming II co-curriculum course aims to enhance the students' knowledge and skills on the techniques of swimming. In terms of theory, this course is more focused on the history, background, terminology and other related aspects of swimming activities. While technical, this course is more focused on the practical training (practical) in terms of swimming skills.

References

1. Brems, M., 'The Fit Swimmer: 120 Workouts & Training Tips', Mc-Graw Hill; 1st Edition, 1984.
2. Keegan, N., 'Swimming (Vintage Contemporaries)', Vintage, 2010.
3. Kumar, N., 'Complete Book of Swimming', New Delhi: India Anmall Publication, 2006.
4. Mason, P., 'How to Improve at Swimming', Tumbrigde Wells Ticktock Media, 2005.
5. Thomas, D., 'Swimming: Steps to Success – 3rd Edition (Steps to Success Sports Series)', Human Kinetics; 3rd Edition, 2005.

UZW380
Swimming III

Course Synopsis

The swimming III Co-Curriculum course aims to enhance and sustain the students' knowledge and skills on the techniques of swimming. In terms of theory, this course is more focused on the history, background, terminology and other related aspects of swimming activities. While technical, this course is more focused on the practical training (practical) in terms of swimming skills.

References:

1. Brems, M., 'The Fit Swimmer: 120 Workouts & Training Tips', Mc-Graw Hill; 1st Edition, 1984.
2. Keegan, N., 'Swimming (Vintage Contemporaries)', Vintage, 2010.
3. Kumar, N., 'Complete Book of Swimming', New Delhi: India Anmall Publication, 2006.
4. Mason, P., 'How to Improve at Swimming', Tumbrigde Wells Ticktock Media, 2005.
5. Thomas, D., 'Swimming: Steps to Success – 3rd Edition (Steps to Success Sports Series)', Human Kinetics; 3rd Edition, 2005.

UZW181
Lawn Bowl

Course Synopsis

The lawn bowl co-curriculum courses aims to expose the students to the knowledge of lawn sports in the theory and technical skills. In terms of theory, this course is more focused on the history, background, terminology, management of oneself and other related aspects of lawn sports. While technically, this course is more focused on the practical training (practical) skills in lawn bowls.

References

1. Bell, J., 'Bowls: Skills, Techniques, Tactics (Crowood Sports Guides)', Crowood Press; illustrated Edition, 2007.
2. Dobbie, J., 'Successful Lawn Bowls', John Wiley & Sons Australia Ltd; Revised Edition, 1987.
3. Marshall, B. L. G., ' Lawn Bowls Champions Secrets', Lulu.com, 2008.
4. Newton, A., 'Fundamental of Lawn Bowls', Angus & Robertson; 2nd Edition, 1993.
5. Taylor, T. & Esch, H. L., 'Lawn Bowling Handbook', Harold L. Esach, 1948.

UZW182
Petanque

Course Synopsis

The petanque co-curriculum courses aims to expose the students to the knowledge of petanque sports in theory and technical skills. In terms of theory, this course is more focused on the history, background, terminology, management of oneself and other aspects associated with petanque sports. While technically, this course is more focused on practical training (practical) skills in petanque.
References

1. Durbin, M. 'From Gutterballs to Strikes', McGraw-Hill; 1st Edition, 1998.
2. Fieux, P., 'La Petanque de Competition', Les Presses du Midi, 2002.
3. Fieux, P., 'Dictionary de la Petanque', Presses du Midi, 2003.

4. Freeman, G., 'Petanque: The French Game of Boules', Hyperion Books, 1987.
5. Philpott, P., 'The Art of Wrist-Spin Bowling', Crowood Press, 1997.

UZW183
Canoe

Course Synopsis

The canoeing co-curriculum course aims to expose the students to the sports science of canoeing theory and technical skills. In terms of theory, this course is more focused on the history, background, terminology, management of oneself and other related aspects associated with canoeing. While technically, this course is more focused on the practical training (practical) skills in canoeing.

References

1. Evans, J and Mattos, B., 'The Ilustrated Handbook of Kayaking, Canoeing and Sailing', 2007.
2. Harrison, D., 'Whitewater Kayaking (Canoe & Kayak Techniques)', Stackpole Books; 1st Edition, 1998.
3. Harrison, D. & Morser, B., 'Canoeing: Canoe & Kayak Techniques', Stackpole Books; 1st Edition, 1998.
4. Johson, S., 'The Complete Sea Kayaker's Handbook', International Marine/Ragged Mountain Press; 1st Edition, 2001.
5. Mattos, B. & Evans, J., 'The Ilustrated Handbook of Kayaking', Canoeing and Sailing, 2007.

UZW184
Badminton

Course Synopsis

The badminton co-curriculum course aims to expose the students to the knowledge of badminton in terms of theoretical and technical skills. In terms of theory, this course is more focused on the history, background, terminology, management of oneself and other related aspects associated with badminton. While technically, this course is more focused on the practical training (practical) skills in playing badminton.

References

1. Chen, G. & Chen, Carol, 'Coaching Badminton 101', Coaches Choice, 2009.
2. Davis, P. 'Badminton (Play the Game)', Ward Lock Limited; 3rd Edition, 1998.
3. Golds, M., 'Badminton: Skills of the Game', Crowood Press, 2002.
4. Grice, T., 'Badminton: Steps to Success – 2nd Edition (Steps to Success Activity Series)', Human Kinetics; 2nd Edition, 2007.
5. Metzlar, M., 'Badminton: Mastering the Basic with the Personalized Sports Instructions System', Boston Allyn & Bacon, 2001.

UZW185
Hockey

Course Synopsis

The hockey ho-curriculum course aims to expose the students to the sport science of hockey in terms of theoretical and technical skills. In terms of theory, this course is more focused on the history, background, terminology, management of oneself and other related aspects associated with hockey. While technically, this course is more focused on the practical training (practical) in terms of skills in playing hockey.

References

1. Andershttp://www.amazon.com/Field-Hockey-Steps-Success-Sports/dp/0736068376/ref=pd_cp_b_2, E., 'Field Hockey: Steps to Success', Human Kinetics; 2nd edition, 2008.
2. Barth, K. and Nordmann, L., 'Learning Field Hockey', Meyer & Meyer, 2007.
3. Complete Book of Hockey (Anupam Sharma) New Delhi India: Anmol Publication 2006.
4. French, L., http://www.amazon.com/How-Play-Hockey-Step---Step/dp/0711704902/ref=sr_1_5?s=books&ie=UTF8&qid=1279557235&sr=1-5'How to Play Hockey: A Step-By-Step Guide', Jarrold Sports, Jarrold Publishing, 1993.

5. Mitchell-Taverner, C., http://www.amazon.com/Hockey-Techniques-Tactics-Claire-Mitchell-Taverner/dp/0736054375/ref=sr_1_2?s=books&ie=UTF8&qid=1279557235&sr=1-2'Field Hockey Techniques & Tactics', Human Kinetics; 2nd edition, 2004).

UZW186
Sepak Takraw

Course Synopsis

The sepak takraw co-curriculum course aims to expose the students to the science of sepak takraw sports, theoretically and technically. In terms of theory, this course is more focused on the history, background, terminology, management of oneself and other related aspects associated with sepak takraw. While technically, this course is more focused on the practical training (practical) in terms of skills in playing sepak takraw.

References

1. Books LLC, 'Sport in Southeast Asia: Sepak Takraw', Books LLC, 2010.
2. Dunsmore, S., 'Sepak Raga (Takraw) The South East Asian Ball Game', Sarawak Museum, 1983.
3. Lorna Fe P. Lopez, 'Physical education, health and music (sepak takraw)', Rex Book Store. Inc, Philippine Copyright, 2000.

UZW187
Rugby

Course Synopsis

The rugby co-curriculum course aims to expose the students to the knowledge of rugby in terms of theory and technical skills. In terms of theory, this course is more focused on the history, background, terminology, management of oneself and other aspects associated with rugby. While technically, this course is more focused on the practical training (practical) skills in playing rugby.

References

1. Biscombe, T. and Drewett, P., 'Rugby: Steps to Success', Human Kinetics; 2nd edition, 2009.
2. Brown, M., Guthrie, P. and Growden, G., 'Rugby For Dummies', For Dummies; 2nd edition, 2007.
3. Richardshttp://www.amazon.com/Game-Hooligans-History-Rugby-Union/dp/1845962559/ref=sr_1_2?s = books&ie= UTF8&qid= 1279559168&sr= 1-2, H., 'A Game for Hooligans: The History of Rugby Union', Mainstream Publishing, 2007.
4. Williams, T. and Bunce, F., 'Rugby Skills, Tactics and Rules', Firefly Books; Revised edition, 2008.
5. http://www.irlfunds.org/newzealand/news.html

UZW188
Archery

Course Synopsis

The archery co-curriculum course aims to expose the students to archery, shooting sports science in terms of theoretical and technical skills. In terms of theory, this course is more focused on the history, background, terminology, management of oneself and other related aspects concerning shooting. While technically, this course is more focused on the practical training (practical) skills in archery.

References

1. Axford, R., 'Archery Anatomy: An Introduction to Techniques for Improved Performance', Souvenir Press, 1996.
2. Engh, D., 'Archery Fundamentals (Sports Fundamentals Series)', Human Kinetics; 1st edition, 2004.
3. Haywood, M. and Lewis, C., 'Archery: Step to Success', Champaign IL Kinetics, 2006.
4. Ruis, S. and Stevenson, C., 'Precision Archery', Human Kinetics; 1st edition, 2003.
5. Sorrells, B., 'Beginner's Guide to Traditional Archery', Stackpole Books; 1st edition, 2004.

UZW189
Table Tennis

Course Synopsis

The table tennis co-curriculum course aims to expose the students to the knowledge of ping pong sports in terms of theoretical and technical skills. In terms of theory, this course is more focused on the history, background, terminology, management of oneself and other related aspects associated with ping-pong. While technically, this course is more focused on the practical training (practical) skills in playing ping-pong.

References

1. Heaton, J., ‘Table Tennis: Skills, Techniques, Tactics (Crowood Sports Guides)’, Crowood Press, 2009.
2. Hodges, L., ‘Table Tennis: Step to Success’, Champaign IL Human Kinetic, 1993.
3. McAfee, R., ‘Table Tennis: Steps to Success (Steps to Success Activity Series)’, Human Kinetics; 1st edition, 2009.
4. Roetert, P. and Ellenbecker, T., ‘Complete Conditioning for Tennis (Complete Conditioning for Sports Series)’, Human Kinetics; 2007.
5. Seemiller, D. and Holowchak, M., “Winning Table Tennis: Skills, Drills, and Strategies’, Human Kinetics, 1996.

UZW151
Foundations of Gamelan

Course Synopsis

The Basic Gamelan Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of the traditional art of gamelan. The theoretical aspect of the course covers the history, background, terminology, self-management and other related aspects of traditional art of gamelan, while the technical portion focuses on the practical training i.e. the skills in playing gamelan.

References

1. Ahmad, A., ‘Lagu- lagu Gamelan: Buku 1‘, UM, 1997.
2. Nasarudin, M.G., ‘Buku Muzik Tradisional Malaysia Edisi Baharu’, DBP, 2003.
3. Pickvance, R., ‘A Gamelan Manual: A player’s guide to the central Javanese gamelan’, Jaman Mas Books, 2006.
4. Sutton,R.A., ‘Traditions of Gamelan Music in Java: Musical Pluralism and Regional Identity (Cambridge Studies in Ethnomusicology)’, Cambridge University Press, 2008.
5. Tenzer, M., ‘Balinese Music’, Periplus Editions, 1998.

UZW251
Gamelan II

Course Synopsis

The Gamelan II Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of the traditional art of gamelan. The theoretical aspect of the course covers the history, background, terminology, self-management and other related aspects of traditional art of gamelan, while the technical portion focuses on the practical training i.e. theskills in playing gamelan.

References

1. Ahmad, A., ‘Lagu- lagu Gamelan: Buku 1‘, UM, 1997.
2. Nasarudin, M.G., ‘Buku Muzik Tradisional Malaysia Edisi Baharu’, DBP, 2003.
3. Pickvance, R., ‘A Gamelan Manual: A player’s guide to the central Javanese gamelan’, Jaman Mas Books, 2006.
4. Sutton,R.A., ‘Traditions of Gamelan Music in Java: Musical Pluralism and Regional Identity (Cambridge Studies in Ethnomusicology)’, Cambridge University Press, 2008.
5. Tenzer, M., ‘Balinese Music’, Periplus Editions, 1998.

UZW351
Gamelan III

Course Synopsis

The Gamelan III Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of the traditional art of gamelan. The theoretical aspect of the course covers the history, background, terminology, self-management and other related aspects of traditional art of gamelan, while the technical portion focuses on the practical training i.e. skills in playing the gamelan.

References

1. Ahmad, A., 'Lagu- lagu Gamelan: Buku 1', UM, 1997.
2. Nasarudin, M.G., 'Buku Muzik Tradisional Malaysia Edisi Baharu', DBP, 2003.
3. Pickvance, R., 'A Gamelan Manual: A player's guide to the central Javanese gamelan', Jaman Mas Books, 2006.
4. Sutton, R.A., 'Traditions of Gamelan Music in Java: Musical Pluralism and Regional Identity (Cambridge Studies in Ethnomusicology)', Cambridge University Press, 2008.
5. Tenzer, M., 'Balinese Music', Periplus Editions, 1998.

UZW152
Jazz Band I

Course Synopsis

The Jazz Group Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of the jazz music. The theoretical aspect of the course covers the history, background, terminology, self-management and other related aspects of jazz music, while the technical portion focuses on the practical training i.e. skills in playing the jazz music.

References

1. Mause, A.D., 'How to Play Jazz Guitar: For Group or Individual Instruction (Acorn Basic Lessons, 120360)', Acorn Music Press, 1978.
2. Meeder, C., 'Jazz: the Basics', Routledge, 2007.
3. Mike, C., 'The Sound of Improvisation: A Basic Method for Individuals, Small Groups, Jazz Band - Book One', Alfred Publishing Co., 1976.
4. Sutro, D., 'Jazz for Dummies', NJ Wiley Pub, 2006.
5. Szwed, J.F., 'Jazz 101: A Complete Guide to Learning and Loving Jazz', Hyperion, 2000.

UZW252
Jazz Band II

Course Synopsis

The Jazz Group II Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of the jazz music. The theoretical aspect of the course covers the history, background, terminology, self-management and other related aspects of jazz music, while the technical portion focuses on the practical training i.e. skills in playing the jazz music.

References

1. Mause, A.D., 'How to Play Jazz Guitar: For Group or Individual Instruction (Acorn Basic Lessons, 120360)', Acorn Music Press, 1978.
2. Meeder, C., 'Jazz: the Basics', Routledge, 2007.
3. Mike, C., 'The Sound of Improvisation: A Basic Method for Individuals, Small Groups, Jazz Band - Book One', Alfred Publishing Co., 1976.
4. Sutro, D., 'Jazz for Dummies', NJ Wiley Pub, 2006.
5. Szwed, J.F., 'Jazz 101: A Complete Guide to Learning and Loving Jazz', Hyperion, 2000

UZW352
Jazz Band III

Course Synopsis

The Jazz Group II Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of the jazz music. The theoretical aspect of the course covers the history, background, terminology, self-management and other related features of jazz music, while the technical portion focuses on the practical training i.e. skills in playing the jazz music.

References

1. Mause, A.D., ‘How to Play Jazz Guitar: For Group or Individual Instruction (Acorn Basic Lessons, 120360)’, Acorn Music Press, 1978.
2. Meeder, C., ‘Jazz: the Basics’, Routledge, 2007.
3. Mike, C., ‘The Sound of Improvisation: A Basic Method for Individuals, Small Groups, Jazz Band - Book One’, Alfred Publishing Co., 1976.
4. Sutro, D., ‘Jazz for Dummies’, NJ Wiley Pub, 2006.
5. Szwed, J.F., ‘Jazz 101: A Complete Guide to Learning and Loving Jazz’, Hyperion, 2000.

UZW153
Brass Band I

Course Synopsis

The Brass Band Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of brass musical instruments. The theoretical aspect of the course covers the history, background, terminology, self-management and other related features of brass band, while the technical portion focuses on practical training of playing the brass musical instruments in group.

References

1. Bailey, W. and Caneva, T., ‘The Complete Marching Band Resource Manual: Techniques and Materials for Teaching, Drill Design, and Music Arranging (Plastic Comb)’, University of Pennsylvania Press, 2003.
2. Brand, V. and Brand, G., ‘Brass Bands in the Twentieth Century’, Egon Publishers Ltd, 1979.
3. Burns, M., ‘Keeping the Beat on the Street: The New Orleans Brass Band Renaissance’, Louisiana State University Press, 2008.
4. Cameron, A., ‘A Whole Brass Band’, Harbour, 1992.
5. Newsome, R., ‘The Modern Brass Band: From The 1930s To The New Millennium’, Ashgate Publishing, 2006.

UZW253
Brass Band II

Course Synopsis

Brass Band II Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of brass musical instruments. The theoretical aspect of the course covers the history, background, terminology, self-management and other related features of brass band, while the technical portion focuses on practical training of playing the brass musical instruments in group.

References

1. Bailey, W. and Caneva, T., ‘The Complete Marching Band Resource Manual: Techniques and Materials for Teaching, Drill Design, and Music Arranging (Plastic Comb)’, University of Pennsylvania Press, 2003.
2. Brand, V. and Brand, G., ‘Brass Bands in the Twentieth Century’, Egon Publishers Ltd, 1979.
3. Burns, M., ‘Keeping the Beat on the Street: The New Orleans Brass Band Renaissance’, Louisiana State University Press, 2008.
4. Cameron, A., ‘A Whole Brass Band’, Harbour, 1992.
5. Newsome, R., ‘The Modern Brass Band: From The 1930s To The New Millennium’, Ashgate Publishing, 2006.

UZW353
Brass Band III

Course Synopsis

Brass Band III Co-Curriculum course aims to expose the students to both the theoretical and technical aspects of brass musical instruments. The theoretical aspect of the course covers the history, background, terminology, self-management and other related features of brass band, while the technical portion focuses on practical training of playing the brass musical instruments in group.

References

1. Bailey, W. and Caneva, T., 'The Complete Marching Band Resource Manual: Techniques and Materials for Teaching, Drill Design, and Music Arranging (Plastic Comb)', University of Pennsylvania Press, 2003.
2. Brand, V. and Brand, G., 'Brass Bands in the Twentieth Century', Egon Publishers Ltd, 1979.
3. Burns, M., 'Keeping the Beat on the Street: The New Orleans Brass Band Renaissance', Louisiana State University Press, 2008.
4. Cameron, A., 'A Whole Brass Band', Harbour, 1992.
5. Newsome, R., 'The Modern Brass Band: From The 1930s To The New Millennium', Ashgate Publishing, 2006.

UZW154
Angklung

Course Synopsis

Angklung Co-Curriculum course seeks to expose the students to both the theoretical and traditional aspects of the traditional art of angklung music. The theoretical aspect of the course covers on the history, background, terminology, self-management and other related to angklung, while the technical portion focuses on practical training (practical) of skills in playing the angklung musical instruments.

References

1. Benary, B., ‚Angklung Sampler Book‘, Self Published, 1993.
2. LLC, B., 'Indonesian Music: Gamelan, Music of Indonesia, Indonesian Popular Music Recordings, Gamelan Gong Kebyar, Kecak, Angklung, I La Galigo‘, Books LLC, 2010.
3. Nasarudin, M.G., 'Buku Muzik Tradisional Malaysia Edisi Baharu', DBP, 2003.
4. Tenzer, M., 'Balinese Music', Periplus Editions, 1998.
5. Winitasasmita, M.H., 'Angklung: Petunjuk praktis‘, Balai Pustaka, 1978.

UZW254
Angklung II

Course Synopsis

Angklung II Co-Curriculum course seeks to expose the students to both the theoretical and traditional aspects of the traditional art of angklung music. The theoretical aspect of the course covers on the history, background, terminology, self-management and other related to angklung, while the technical portion focuses on practical training (practical) of skills in playing the angklung musical instruments.

References

1. Benary, B., Angklung Sampler Book‘,Self Published, 1993.
2. LLC, B., 'Indonesian Music: Gamelan, Music of Indonesia, Indonesian Popular Music Recordings, Gamelan Gong Kebyar, Kecak, Angklung, I La Galigo‘, Books LLC, 2010.
3. Nasarudin, M.G., 'Buku Muzik Tradisional Malaysia Edisi Baharu', DBP, 2003.
4. Tenzer, M., 'Balinese Music', Periplus Editions, 1998.
5. Winitasasmita, M.H., 'Angklung: Petunjuk praktis‘, Balai Pustaka, 1978.

UZW354
Angklung III

Course Synopsis

Angklung III Co-Curriculum course seeks to expose the students to both the theoretical and traditional aspects of the traditional art of angklung music. The theoretical aspect of the course covers on the history, background, terminology, self-management and other related to angklung, while the technical portion focuses on practical training (practical) of skills in playing the angklung musical instruments.

References

1. Benary, B., Angklung Sampler Book',Self Published, 1993.
2. LLC, B., 'Indonesian Music: Gamelan, Music of Indonesia, Indonesian Popular Music Recordings, Gamelan Gong Kebyar, Kecak, Angklung, I La Galigo', Books LLC, 2010.
3. Nasarudin, M.G., 'Buku Muzik Tradisional Malaysia Edisi Baharu', DBP, 2003.
4. Tenzer, M., 'Balinese Music', Periplus Editions, 1998.
5. Winitasasmita, M.H., 'Angklung: Petunjuk praktis', Balai Pustaka, 1978.

UZW155
Art of Creative Movement

Course Synopsis

Creative movement Co-Curriculum course aims to expose the students to the knowledge of arts creative movement in terms of theoretical skills and technical. In terms of theory, this course is more focused on the history, background, terminology, self-management and other related arts creative movement, while technically, this course is more focused practical training (practical) of skills in the art of creative movement.

References

1. Bossler, C., '15 minutes Dance Workout', London Dorling Kindersley, 2009.
2. Kaufmann, K.A., 'Inclusive Creative Movement and Dance', Human Kinetics, 2005.
3. Dora, M.B., 'See what I can do!: A book of creative movement', Prentice-Hall, 1973.
4. H' Doubler, M.N. and Mary Alice Brennan, M.A., 'Dance: A Creative Art Experience', University of Wisconsin Press, 1959.
5. Whitehouse, M.S., 'Authentic Movement (v. 1)', Jessica Kingsley Publishers, 1999.

UZW156
Drama, Playwright and Acting

Course Synopsis

The drama, playwright and acting co-curriculum course aims to expose the students to the knowledge of drama, theatre in terms of theoretical and technical skills. In terms of theory, this course is more focused on the history, background, terminology, self-management and other related aspects of drama, theatre and arts. The technical terms, this course is more focused on the practical training (practical) skills in drama, theatre and playwright. .

References

1. Adler, S., 'The Art of Acting', Applause Books, 2000.
2. Bernard, I., 'Film and Television Acting, Second Edition: From stage to screen', Focal Press; 2nd edition, 1997.
3. Comey, J., 'The Art of Film Acting: A Guide For Actors and Directors', http://www.amazon.com/Art-Film-Acting-Actors-Directors/dp/0240805070/ref=pd_sim_b_4Focal Press; 1st edition, 2002.
4. Marsh, M., 'Screen Acting', Nabu Press, 2010.
5. Tucker, P., 'Secret of Screen Acting', New York Routledge, 2003.

UZW191
Community Service

Course Synopsis

The community service co-curriculum course fosters community spirit of volunteerism among the students. In addition, the course will also help the process of forming communication network and self-stimulate the intellectual of the community.

References

1. Carole B., 'Community Care for an Aging Society: Issues, Policies, and Services (Springer Series on Lifestyles and Issues in Aging)', Springer Publishing Company; 1st edition, 2004.
2. Faizulaswad, 'Modul perlaksana kursus & seminar Motovasi', 2003.
3. Faizulaswad, 'Modul teknik-teknik belajar yang berkesan', 2003.
4. Kamaruddin Hussin, 'Modul konsep kumpulan Dinamika & Peranan Fasilitator dalam mengendalikan latihan kumpulan secara berkesan', 1999.
5. Marlene, G. and Lesser, G., 'Clinical Social Work Practice: An Integrated Approach', Allyn & Bacon; 3rd edition, 2007.

UZW192
Initiative & Innovation

Course Synopsis

This course intends to train the students to master the basic skill of design and engineering. Additionally, it gives an exposure to students to know ways of using recycling materials, mechanisms that can be used and techniques of designing. This course gives the opportunity to students to spill out ideas that are constructive and apply it in a form of a product, high level of cooperativeness, be responsible and ability to develop student personality that is excellent.

References

1. Ocvirk, Otto G. et al. (1998). Art Fundamentals: Theory and Practice. Boston, Mesachusetts.
2. *Acoustic*.

UZW193
Tajwid

Course Synopsis

This course covers an introduction to the basics of Tajweed knowledge, basic knowledge of the laws of the holy Qur'an is right, and so Talaqqi and practice reading the Quran in mujawwad. Students learn the basic rules and laws fluently, held talks in a feedback session, complete Quran recitation, Tajweed and subsequently apply the knowledge Talaqqi Musyafahah and undergo testing for evaluation.

References

1. Theory and Practice of Tajwid," Encyclopedia of Arabic Language and Linguistics, IV, Leiden, Brill, 2007.
2. Surul Shahbudin bin Hassan (2007). Ilmu Tajwid Hafs 'An 'Asim. Kuala Lumpur: Prospecta Printers Sdn. Bhd.
3. Ustaz Mahadi bin Dahlan & Ustaz Azharuddin Sahil (2005). Al-Quran Rasm Uthmani – Bertajwid dan Disertai Makna. Kuala Lumpur : Pustaka Haji Abdul Majid.
4. Haji Abdul Ghani Arifin (2005). Panduan Tajwid & Taranum. Kuala Lumpur: Sarjana Media.
5. Theory and Practice of Tajwid," Encyclopedia of Arabic Language and Linguistics, IV, Leiden, Brill, 2009.

UZW194
Elocution

Course Synopsis

Speech curriculum courses expose students to the purposes, techniques and types of speech. Speech emphasizes interpersonal communication skills, self-confidence, motivation, enthusiasm and accurate information.

References

1. Abdullah Hassan & Ainon Muhammad (1994). Bahasa Melayu untuk maktab Perguruan. Kuala Lumpur: Fajar Bakti.
2. Abdullah Hassan (1994) Tatabahasa Dinamika. Kualala Lumpur: Utusan Publication & Distributors.

3. Abdul Halim A. Karim (1992) Pengucapan Awam. Sungai Petani: Intan.
4. Amat Johari Moain (1989) Sistem Panggilan Dalam Bahasa Melayu: Kuala Lumpur: Dewan Bahasa dan Pustaka. 3
5. Ahmad Kamal Mohamad (1992) Kejayaan Berkomunikasi. Kuala Lumpur: Nurin Enterprise.
6. Awang Sariyan (1980) Kesalahan Umum Penggunaan Bahasa Malaysia. Kuala Lumpur: Dewan Bahasa dan Pustaka.

UZW195
Campus Radio

Course Synopsis

Radio is one of the most effective medium or disseminator of information, and also more extensive compared to TV. Campus Radio curriculum will expose students to the ethics of broadcasting, editing management, recording, and live events. Campus Radio will help students to communicate better and have better ethical in delivering information to the public.

References

1. Multimedia dan Teknologi Komunikasi Edisi Kedua (2005)

UZW196
Student In-Free Enterprise (SIFE)

Course Synopsis

SIFE co-curriculum courses is to inculcate entrepreneurial culture and foster a sense of community among students. In addition, this course also has 3 elements that are taken to contribute to the entrepreneurial community, education and the environment. It is implemented so that the students can help the community to improve the standard of living for those in need.

References

1. Kuratko, Donald F (2009). *Introduction to Entrepreneurship*, 8th edn, Canada: South Western.
2. Scarborough, Norman M. & Zimmerer, Thomas W (2004). *Esssentials of Entrepreneurship and Small Business Management*, 4th ed., New Jersey: Pearson Education.
3. AB Aziz Yusof (2003). *Prinsip Keusahawanan*, Prentice Hall-Pearson Malaysia Education.
4. AB Aziz Yusof (2000). *Usahawan dan Pengukuhan Jaringan Rakan Niaga, Kedah, Malaysia*: Penerbit UUM.
5. Barringer, Bruce R & Ireland, R. Duane (2008). *Entrepreneurship: Succesfully Launching New Ventures*, 2nd ed., New Jersey: Prentice Hall.

UZW160
Rotu Army I

Course Synopsis

Candidates must fulfil the conditions that have been set by ATM Selection Board. Training will start after the candidates have succeeded in the selection test by PALAPES Base and Reserve Team Section. Level I and II aims are to expose students to Basic Military Training (Theory and Practical) and life in camp.

References

i) Modul Latihan dari Kolej Tentera Darat ATM
ii) Buku Panduan Senjata-senjata Kompeni, Kementerian Pertahanan Malaysia, 2004
iii) Buku Panduan Askar Wataniah, Kementerian Pertahanan Malaysia, 1995.

UZW161
Rotu Army II

Course Synopsis

Candidates must fulfil the conditions that have been set by ATM Selection Board. Training will start after the candidates have succeeded in the selection test by PALAPES Base and Reserve Team Section. Level I and II aim are to expose students to the Basic Military Training (Theory and Practical) and life in camp.

References

i) Modul Latihan dari Kolej Tentera Darat ATM.
ii) Buku Panduan Senjata-senjata Kompeni, Kementerian Pertahanan Malaysia, 2004.
iii) Buku Panduan Askar Wataniah, Kementerian Pertahanan Malaysia, 1995.

UZW260
Rotu Army III

Course Synopsis

This training is the addition from Level I, II and III. Emphasis made towards the administration leadership principle, planning and grouped training.

References

i) Modul Latihan dari Kolej Tentera Darat ATM.
ii) Buku Panduan Senjata-senjata Kompeni, Kementerian Pertahanan Malaysia, 2004.
iii) Buku Panduan Askar Wataniah, Kementerian Pertahanan Malaysia, 1995.

UZW261
Rotu Army IV

Course Synopsis

This training is the addition from Level I, II and III. Emphasis made towards the administration leadership principle, planning and grouped training.

References

i) Modul Latihan dari Kolej Tentera Darat ATM.
ii) Buku Panduan Senjata-senjata Kompeni, Kementerian Pertahanan Malaysia, 2004.
iii) Buku Panduan Askar Wataniah, Kementerian Pertahanan Malaysia, 1995.

UZW360
Rotu Army V

Course Synopsis

This course is the continuity from Level III and IV. In this level, student is trained to become a head, lead the team in all related to training, administration and social. Student will be evaluated and given the support to be accredited in the Commissioning Ceremony and Certificate Awarding by DYMM SPB Yang Dipertuan Agong.

References

i) Modul Latihan dari Kolej Tentera Darat ATM.
ii) Buku Panduan Senjata-senjata Kompeni, Kementerian Pertahanan Malaysia, 2004.
iii) Buku Panduan Askar Wataniah, Kementerian Pertahanan Malaysia, 1995.

UZW361
Rotu Army VI

Course Synopsis

This course is the continuity from Level III, IV and V. In this level, student is trained to become a head, lead the team in all related to training, administration and social. Student will be evaluated and given the support to be accredited in the Commissioning Ceremony and Certificate Awarding by DYMM SPB Yang Dipertuan Agong.

References

i) Modul Latihan dari Kolej Tentera Darat ATM.
ii) Buku Panduan Senjata-senjata Kompeni, Kementerian Pertahanan Malaysia, 2004.
iii) Buku Panduan Askar Wataniah, Kementerian Pertahanan Malaysia, 1995.

UZW162
Malaysia Civil Defense Department I (Kor SISPA I)

Course Synopsis

This course offers basic knowledge and skills of marching, first aid essentials, human blood circulation, fire burns treatment, treatment for bone injuries, joint and muscle pain, treatment of insect bites and poisonous animals, Cardiopulmonary resuscitation, and extrication techniques. The students will learn the the teoretical and practical rescue, and also first aid during accidents to enhance the understanding, mentally and physically ready to face any emergency issues.

References

1. Buku Panduan Pengurusan Kor Siswa Siswi Pertahanan Awam (Kor SISPA). (2011) Universiti Teknologi MARA, Shah Alam, Selangor.
2. Pertolongan Cemas: Manual Pelajar. (1999) Federal Publication, Selangor.
3. Ali NAfiah. (2011) Panduan Menyelamatkan Nyawa. Pertolongan Cemas. Shuth Network Sdn. Bhd.

UZW163
Malaysia Civil Defense Department II (Kor SISPA II)

Course Synopsis

This course offers basic knowledge and skills of marching, extrication techniques, rope knots, chainsaw safety operation manual, fire science and firefighting equipment, map and compass reading techniques, first aid management and also security during natural disasters. The students will learn the theoretical and practical rescue and first aid during an accident to enhance the understanding and the mental and physical readiness to face any emergency issues.

References

1. Buku Panduan Pengurusan Kor Siswa Siswi Pertahanan Awam (Kor SISPA). (2011) Universiti Teknologi MARA, Shah Alam, Selangor.
2. Pertolongan Cemas: Manual Pelajar. (1999) Federal Publication Selangor.
3. Ali Nafiah. (2011) Panduan Menyelamatkan Nyawa. Pertolongan Cemas. Shuth Network Sdn. Bhd.

UZW262
Malaysia Civil Defense Department III (Kor SISPA III)

Course Synopsis

This course offers basic knowledge and skills of marching, National Integrity Plan (NIP), the use of power cutter and hydraulic equipment, tools and techniques of ascending and descending, rescue techniques from high places, the introduction of basic fire-fighting equipment, tools & Basic Trauma Life Support (BTLS) and the introduction of ambulance equipment. The students will learn the theoretical and practical rescue and first aid during an accident to enhance the understanding and the mental and physical readiness to face any emergency issues.

References

1. Buku Panduan Pengurusan Kor Siswa Siswi Pertahanan Awam (KorSISPA). (2011) Universiti Teknologi MARA, Shah Alam, Selangor.
2. Pertolongan Cemas: Manual Pelajar. (1999) Federal Publication, Selangor.
3. Ali Nafiah. (2011) Panduan Menyelamatkan Nyawa. Pertolongan Cemas. Shuth Network Sdn. Bhd.

UZW263
Malaysia Civil Defense Department IV (Kor SISPA IV)

Course Synopsis

This course offers basic knowledge and skills of marching, 999 Emergency services, disaster and crisis management, training management, team management, leadership courses in the organization (PTB), and etiquette and protocol courses. Students will learn the theory and practice of rescue operations and administration of the Civil Defense Department (JPA) to enhance students' understanding of the organizational structure of JPA.

References

1. Buku Panduan Pengurusan Kor Siswa Siswi Pertahanan Awam (Kor SISPA). (2011) Universiti Teknologi MARA, Shah Alam, Selangor.

2. Pertolongan Cemas: Manual Pelajar. (1999) Federal Publication, Selangor.
3. Ali NAfiah. (2011) Panduan Menyelamatkan Nyawa. Pertolongan Cemas. Shuth Network Sdn. Bhd.

UZW362
Malaysia Civil Defense Department V (Kor SISPA V)

Course Synopsis

This course offers basic knowledge and skills of marching, management of meetings, characteristics, ethics, leadership, etiquette and protocol, endurance training coaching-skills courses and courses to be officers. The students will learn in theory and practice regarding the management and administration of the Malaysian Civil Defence Department (JPA) team to further enhance the preparedness of the students with the possibility in the future.

References

1. Buku Panduan Pengurusan Kor Siswa Siswi Pertahanan Awam (Kor SISPA). (2011) Universiti Teknologi MARA, Shah Alam, Selangor.
2. Pertolongan Cemas: Manual Pelajar. (1999) Federal Publication, Selangor.
3. Ali Nafiah. (2011) Panduan Menyelamatkan Nyawa. Pertolongan Cemas. Shuth Network Sdn. Bhd.

UZW164
The Malaysian Red Crescent Societies Certification Course I

Course Synopsis

Certified Red Crescent Co-Curriculum course aims to expose the students to both the theoretical and traditional aspects of Certified Red Crescent. The theoretical aspect of the course covers on historical background, terminology, self-management and other related features of Certification by the Red Crescent, while the technical aspects focuses on practical training in terms of skills for the Certification of the Red Crescent.

References

1. Akta Persatuan Palang Merah Malaysia (PERBADANAN),1965.
2. DK Publishing, 'ACEP First Aid Manual, 3rd Edition', by, DK Adult, 2010.
3. Handal, K.A., 'The American Red Cross First Aid and Safety Handbook', Little, Brown and Company, 1992.
4. Mu'in, H.U., 'Gerakan Palang Merah dan Bulan Sabit Merah Internasional & Perhimpunan Palang Merah Indonesia', Gramedia Pustaka Utama, 1999.
5. Perlembagaan dan Undang-undang Persatuan Palang Merah Malaysia.

UZW165
The Malaysian Red Crescent Societies Certification Course II

Course Synopsis

Certification of Red Crescent II Co-Curriculum course aims to expose students in terms of sport science in Certification by the Red Crescent theoretical and technical skills. In terms of theory, this course is focused on historical background, terminology, self-management and other related Certification by the Red Crescent. While technically, this course is focus on practical training (practical) in terms of skills Certification of the Red Crescent.

References

1. Akta Persatuan Palang Merah Malaysia (PERBADANAN), 1965.
2. DK Publishing, 'ACEP First Aid Manual, 3rd Edition', by, DK Adult, 2010.
3. Handal, K.A., 'The American Red Cross First Aid and Safety Handbook', Little, Brown and Company, 1992.
4. Mu'in, H.U., 'Gerakan Palang Merah dan Bulan Sabit Merah Internasional & Perhimpunan Palang Merah Indonesia', Gramedia Pustaka Utama, 1999.
5. Perlembagaan dan Undang-undang Persatuan Palang Merah Malaysia.

UZW264
The Malaysian Red Crescent Societies Certification Course III

Course Synopsis

Certification of Red Crescent III Co-Curriculum course aims to expose students in terms of sport science in Certification by the Red Crescent theoretical and technical skills. In terms of theory, this course is focused on historical background, terminology, self-management and other related Certification by the Red Crescent. While technically, this course is focus on practical training (practical) in terms of skills
Certification of the Red Crescent.

References

1. Akta Persatuan Palang Merah Malaysia (PERBADANAN),1965.
2. DK Publishing, 'ACEP First Aid Manual, 3rd Edition', by, DK Adult, 2010.
3. Handal, K.A., 'The American Red Cross First Aid and Safety Handbook', Little, Brown and Company, 1992.
4. Mu'in, H.U., 'Gerakan Palang Merah dan Bulan Sabit Merah Internasional & Perhimpunan Palang Merah Indonesia', Gramedia Pustaka Utama, 1999.
5. Perlembagaan dan Undang-undang Persatuan Palang Merah Malaysia.

UZW166
SVPC-1 @ Students Voluntary Police Corp

Course Synopsis

The Co-Curriculum course is to form personality and student development that is knowledgeable, disciplined and patriotic, and also possesses good level of police knowledge. The training programme and SVPC Corp activities are by following the training programme and activity that was provided and approved by PDRM. A total of 672 hours needed to comply with the training needs and SVPC Corp activity for commission purposes. Thus, a total of 112 hours of training are needed to fulfil the training requirement in the aspect of Administration/Management, outdoor activity and academic. The reason the SVPC Corp was established are:

a. To produce a SVPC Corp Police officer that is knowledgeable in relation to law, has the attitude and suitable (police) discipline Able to play a role and responsible efficiently and effective as a SVPC Crop Police Officer.
b. To create civic consciousness and good police relationship with society.
c. Nurture physical resilience, mental and strong personality to face challenge.

References

1. Akta Polis 1967 (Akta 344) Kanun Keseksaan (Akta 574) atau Penal Code (Act 574)
2. Modul Latihan dari PDRM Akta Dadah Merbahaya 1952 (Akta 234)
3. Modul Undang-undang PDRM Akta Penagih Dadah (Rawatan dan Pemulihan) (Akta 283)
4. Buku Panduan Senjata Akta Pencegahan Jenayah 1959
5. Manual Pertolongan Cemas PBSMM
6. Manual Senjata Kecil PDRM

UZW 167
SVPC-2 @ Students Voluntary Police Corp

Course Synopsis

This is the addition from the programme that has been implemented in semester one that intends to shape student personality and development that is knowledgeable, discipline and patriotic, and also possess good police knowledge level. The training programme and SVPC Corp activity is followed by the training programme and activity that has been provided and approved by PDRM. Thus, a total of 112 hours of training are needed to fulfil the training requirement in the aspect of Administration/Management, outdoor activity and academic.

References

1. Akta Polis 1967 (Akta 344) Kanun Keseksaan (Akta 574) atau Penal Code (Act 574)
2. Modul Latihan dari PDRM Akta Dadah Merbahaya 1952 (Akta 234)
3. Modul Undang-undang PDRM Akta Penagih Dadah (Rawatan dan Pemulihan) (Akta 283)
4. Buku Panduan Senjata Akta Pencegahan Jenayah 1959
5. Manual Pertolongan Cemas PBSMM
6. Manual Senjata Kecil PDRM

UZW 266
SVPC-3 @ Students Voluntary Police Corp

Course Synopsis

This is the addition from the programme that has been implemented in semester two that intends to shape student personality and development that is knowledgeable, discipline and patriotic, and also possess good police knowledge level. The training programme and SVPC Corp activity is followed by the training programme and activity that has been provided and approved by PDRM. Thus, a total of 112 hours of training are needed to fulfil the training requirement in the aspect of Administration/Management, outdoor activity and academic.

References:

1. Akta Polis 1967 (Akta 344)Kanun Keseksaan (Akta 574) atau Penal Code (Act 574)
2. Modul Latihan dari PDRM Akta Dadah Merbahaya 1952 (Akta 234)
3. Modul Undang-undang PDRM Akta Penagih Dadah (Rawatan dan Pemulihan) (Akta 283)
4. Buku Panduan Senjata Akta Pencegahan Jenayah 1959
5. Manual Pertolongan Cemas PBSMM
6. Manual Senjata Kecil PDRM

UZW267
SVPC-4 @ Students Voluntary Police Corp

Course Synopsis

This is the addition from the programme that has been implemented in semester three that intends to shape student personality and development that is knowledgeable, discipline and patriotic, and also possess good police knowledge level. The training programme and SVPC Corp activity is followed by the training programme and activity that has been provided and approved by PDRM. Thus, a total of 112 hours of training are needed to fulfil the training requirement in the aspect of Administration/Management, outdoor activity and academic.

References

1. Akta Polis 1967 (Akta 344) Kanun Keseksaan (Akta 574) atau Penal Code (Act 574)
2. Modul Latihan dari PDRM Akta Dadah Merbahaya 1952 (Akta 234)
3. Modul Undang-undang PDRM Akta Penagih Dadah (Rawatan dan Pemulihan) (Akta 283)
4. Buku Panduan Senjata Akta Pencegahan Jenayah 1959
5. Manual Pertolongan Cemas PBSMM
6. Manual Senjata Kecil PDRM

UZW366
SVPC-5 @ Students Voluntary Police Corp

Course Synopsis

This is the addition from the programme that has been implemented in semester four that intends to shape student personality and development that is knowledgeable, discipline and patriotic, and also possess good police knowledge level. The training programme and SVPC Corp activity is followed by the training programme and activity that has been provided and approved by PDRM. Thus, a total of 112 hours of training are needed to fulfil the training requirement in the aspect of Administration/Management, outdoor activity and academic.

References

1. Akta Polis 1967 (Akta 344) Kanun Keseksaan (Akta 574) atau Penal Code (Act 574)
2. Modul Latihan dari PDRM Akta Dadah Merbahaya 1952 (Akta 234)
3. Modul Undang-undang PDRM Akta Penagih Dadah (Rawatan dan Pemulihan) (Akta 283)
4. Buku Panduan Senjata Akta Pencegahan Jenayah 1959
5. Manual Pertolongan Cemas PBSMM
6. Manual Senjata Kecil PDRM

UZW367
SVPC-6 @ Students Voluntary Police Corp

Course Synopsis

This is the addition from the programme that has been implemented in semester five that intends to shape student personality and development that is knowledgeable, discipline and patriotic, and also possess good police knowledge level. The training programme and SVPC Corp activity is followed by the training programme and activity that has been provided and approved by PDRM. Thus, a total of 112 hours of training are needed to fulfil the training requirement in the aspect of Administration/Management, outdoor activity and academic.

References

1. Akta Polis 1967 (Akta 344) Kanun Keseksaan (Akta 574) atau Penal Code (Act 574)
2. Modul Latihan dari PDRM Akta Dadah Merbahaya 1952 (Akta 234)
3. Modul Undang-undang PDRM Akta Penagih Dadah (Rawatan dan Pemulihan) (Akta 283)
4. Buku Panduan Senjata Akta Pencegahan Jenayah 1959
5. Manual Pertolongan Cemas PBSMM
6. Manual Senjata Kecil PDRM

UZW168
Malaysian People ‘s Volunteer Corp I

Course Synopsis

This course exposes students to the introduction of the People’s Volunteer Corps (RELA), REAL legislation, union people, the concept of voluntary, external training and marching.

References

1. Abdullah Sanusi Ahmad (1982) “Kerajaan & Pentadbiran Malaysia “. Dewan Bahasa Dan Pustaka, Kuala Lumpur.
2. Abu Saman Abd Kader (1997). ”Khidmat Masyarakat (PKJ)”. Muzakah FKJ, Institut Teknologi maklumat, Segamat, Johor.
3. Jamaludin Badusah et al. (2009).”Pembangunan Pelajar: Memperkasakan Kokurikulum Institut Pengajian Tinggi”.Jabatan Pengajian Tinggi dan Penerbit Universiti Putra Malaysia.

UZW169
Malaysian People ‘s Volunteer Corp II

Course Synopsis

This course exposes students to the introduction of the People’s Volunteer Corps (RELA), REAL legislation, union people, the concept of voluntary, external training and marching.

References

1. Abdullah Sanusi Ahmad (1982) “Kerajaan & Pentadbiran Malaysia “. Dewan Bahasa Dan Pustaka, Kuala Lumpur.
2. Abu Saman Abd Kader (1997).” Khidmat Masyarakat (PKJ)”. Muzakah FKJ, Institut Teknologi maklumat, Segamat, Johor.
3. Jamaludin Badusah et al. (2009).” Pembangunan Pelajar: Memperkasakan Kokurikulum Institut Pengajian Tinggi”.Jabatan Pengajian Tinggi dan Penerbit Universiti Putra Malaysia.

UZW268
Malaysian People ‘s Volunteer Corp III

Course Synopsis

This course exposes students to the introduction of the People’s Volunteer Corps (RELA), REAL legislation, union people, the concept of voluntary, external training and marching.

References

1. Abdullah Sanusi Ahmad (1982) "Kerajaan & Pentadbiran Malaysia ". Dewan Bahasa Dan Pustaka, Kuala Lumpur.
2. Abu Saman Abd Kader (1997)." Khidmat Masyarakat (PKJ)". Muzakah FKJ, Institut Teknologi maklumat, Segamat, Johor.
3. Jamaludin Badusah et al. (2009)." Pembangunan Pelajar: Memperkasakan Kokurikulum Institut Pengajian Tinggi".Jabatan Pengajian Tinggi dan Penerbit Universiti Putra Malaysia.

UZW269
Malaysian People 's Volunteer Corp IV

Course Synopsis

This course exposes students to the introduction of the People's Volunteer Corps (RELA), REAL legislation, union people, the concept of voluntary, external training and marching.

References

1. Abdullah Sanusi Ahmad (1982) "Kerajaan & Pentadbiran Malaysia ". Dewan Bahasa Dan Pustaka, Kuala Lumpur.
2. Abu Saman Abd Kader (1997)." Khidmat Masyarakat (PKJ)". Muzakah FKJ, Institut Teknologi maklumat, Segamat, Johor.
3. Jamaludin Badusah et al. (2009)." Pembangunan Pelajar: Memperkasakan Kokurikulum Institut Pengajian Tinggi".Jabatan Pengajian Tinggi dan Penerbit Universiti Putra Malaysia.

UZW368
Malaysian People 's Volunteer Corp V

Course Synopsis

This course exposes students to the introduction of the People's Volunteer Corps (RELA), REAL legislation, union people, the concept of voluntary, external training and marching.

References

1. Abdullah Sanusi Ahmad (1982) "Kerajaan & Pentadbiran Malaysia ". Dewan Bahasa Dan Pustaka, Kuala Lumpur.
2. Abu Saman Abd Kader (1997)." Khidmat Masyarakat (PKJ)". Muzakah FKJ, Institut Teknologi maklumat, Segamat, Johor.
3. Jamaludin Badusah et al. (2009)." Pembangunan Pelajar: Memperkasakan Kokurikulum Institut Pengajian Tinggi".Jabatan Pengajian Tinggi dan Penerbit Universiti Putra Malaysia.

UZW369
Malaysian People 's Volunteer Corp VI

Course Synopsis

This course exposes students to the introduction of the People's Volunteer Corps (RELA), REAL legislation, union people, the concept of voluntary, external training and marching.

References:

1. Abdullah Sanusi Ahmad (1982) "Kerajaan & Pentadbiran Malaysia ". Dewan Bahasa Dan Pustaka, Kuala Lumpur.
2. Abu Saman Abd Kader (1997)." Khidmat Masyarakat (PKJ)". Muzakah FKJ, Institut Teknologi maklumat, Segamat, Johor.
3. Jamaludin Badusah et al. (2009)." Pembangunan Pelajar: Memperkasakan Kokurikulum Institut Pengajian Tinggi".Jabatan Pengajian Tinggi dan Penerbit Universiti Putra Malaysia.

UZW120
Fire And Rescue Briged I

Course Synopsis

The main purpose of this course is expected to:

i. Foster the spirit of loyalty to the organization (UniMAP & Fire Brigade) and the National, independent mark, discipline and willing to provide volunteer services at any time and from any where in need.

ii. Foster and enhance the “soft skills” among students UniMAP
iii. Fire is a threat that there is no war, then this course hopes to promote and provide greater awareness to students and staff about the dangers of fire UniMAP.
iv. Provide knowledge, training, skills to students UniMAP as a precaution and prevention.
v. Enhance the spirit of community among the students served the UniMAP especially when there is a fire threat

References

1. Manual Pertolongan Cemas (BRCS, SJAA, SAA)
2. Manual Bomba dan Penyelamat Malaysia

UZW121
Fire And Rescue Briged II

Course Synopsis

The main purpose of this course is expected to:
i. Foster the spirit of loyalty to the organization (UniMAP & Fire Brigade) and the National, independent mark, discipline and willing to provide volunteer services at any time and from any where in need.
ii. Foster and enhance the “soft skills” among students UniMAP
iii. Fire is a threat that there is no war, then this course hopes to promote and provide greater awareness to students and staff about the dangers of fire UniMAP.
iv. Provide knowledge, training, skills to students UniMAP as a precaution and prevention.
v. Enhance the spirit of community among the students served the UniMAP especially when there is a fire threat.

References:

1. Manual Pertolongan Cemas (BRCS, SJAA, SAA)
2. Manual Bomba dan Penyelamat Malaysia

UZW122
Girl Guide I (PPS I)

Course Synopsis

Course curriculum uniformed bodies 1 Girl Guides Association was implemented in two semesters (semester 1 and 2) aims to produce graduates with soft skills through Girl Guides Association program especially in terms of basic knowledge and skills Guides
Princess based on teamwork that can be applied in your career or life..

References

1. Ab.Alim Abdul Rahim. (2004). Pengurusan Gerak Kerja Kokurikulum. Kuala Lumpur. Fajar Bakti Sdn. Bhd.
2. Ab. Alim Abdul Rahim. (2004). Panduan Perkhemahan, Simpulan dan Pioneering. Kuala Lumpur. Fajar Bakti Sdn. Bhd.
3. Dasar Pertubuhan dan Undang-undang – Am – Siswi – Pemimpin. (2011). Persatuan Pandu Puteri Malaysia.
4. Persatuan Pandu Puteri Malaysia. (2011).Perlembagaan Persatuan Pandu Puteri Malaysia. Kuala Lumpur.
5. Dasar Pertubuhan dan Undang-undang Perkhemahan Persatuan Pandu Puteri Malaysia (2011).
6. Risalah Upacara dan Istiadat Pandu Puteri. (2011). Persatuan Pandu Puteri Malaysia.
7. Baden - Powell, R. (2005). Ilmu Pengakap Bagi Budak-Budak. (Terjemahan). Batu Caves: Edusystem Sdn. Bhd.
8. Khairul Azman Arshad (2006). Asas Perkhemahan Dan Ikhtiar Hidup. Shah Alam: Fajar Bakti Sdn. Bhd.

UZW123
Girl Guide I (PPS II)

Course Synopsis

Course curriculum uniformed bodies 1 Girl Guides Association was implemented in two semesters (semester 1 and 2) aims to produce graduates with soft skills through Girl Guides Association program especially in terms of basic knowledge and skills GuidesPrincess based on teamwork that can be applied in your career or life.

References

1. Ab.Alim Abdul Rahim. (2004). Pengurusan Gerak Kerja Kokurikulum. Kuala Lumpur. Fajar Bakti Sdn. Bhd.
2. Ab. Alim Abdul Rahim. (2004). Panduan Perkhemahan, Simpulan dan Pioneering. Kuala Lumpur. Fajar Bakti Sdn. Bhd.
3. Dasar Pertubuhan dan Undang-undang – Am – Siswi – Pemimpin. (2011). Persatuan Pandu Puteri Malaysia.
4. Persatuan Pandu Puteri Malaysia. (2011).Perlembagaan Persatuan Pandu Puteri Malaysia. Kuala Lumpur.
5. Dasar Pertubuhan dan Undang-undang Perkhemahan Persatuan Pandu Puteri Malaysia (2011).
6. Risalah Upacara dan Istiadat Pandu Puteri. (2011). Persatuan Pandu Puteri Malaysia.
7. Baden -Powell, R. (2005). Ilmu Pengakap Bagi Budak-Budak. (Terjemahan). Batu Caves: Edusystem Sdn. Bhd.
8. Khairul Azman Arshad (2006). Asas Perkhemahan Dan Ikhtiar Hidup. Shah Alam:Fajar Bakti Sdn. Bhd.

UZW124
Malaysian St. John Ambulance I

Course Synopsis

This course introduces the basic principles and goals of first aid. Students will explore how to provide assistance in an emergency. They will learn methods of wrapping and pembebatan, as well as how to handle external bleeding and shock conditions. Students will recognize bone fracture, sprain, dislocation, and how to provide emergency treatment for such cases.

References

(i) First Aid Manual, 8th edition (2002). Authorised manual of the UK's leading First Aid providers. Great Britain: Dorling Kindersley.
(ii) Harvey D. Grant, Robert H. Murray, Jr., J. David Bergeron. Emergency Care, 5th Edition. U.S.A.: Prentice-Hall International.
(iii) Basic Life Support, Guidelines 2005, Handbook for Healthcare Providers, 4th Edition

UZW125
Malaysian St. John Ambulance II

Course Synopsis

This course introduces the basic principles and goals of first aid. Students will explore how to provide assistance in an emergency. They will learn methods of wrapping and pembebatan, as well as how to handle external bleeding and shock conditions. Students will recognize bone fracture, sprain, dislocation, and how to provide emergency treatment for such cases.

References

(i) First Aid Manual, 8th edition (2002). Authorised manual of the UK's leading First Aid providers. Great Britain: Dorling Kindersley.
(ii) Harvey D. Grant, Robert H. Murray, Jr., J. David Bergeron. Emergency Care, 5th Edition. U.S.A.: Prentice-Hall International.
(iii) Basic Life Support, Guidelines 2005, Handbook for Healthcare Providers, 4th Edition

UZW126
Malaysia Univesity Rover Training Group I

Course Synopsis

KLKM an international uniformed bodies are discussing about the science of life and survival skills. The students will be exposed to the ethical life settings, cooperation, respect, love fellow human beings and the environment through the appreciation of the Treaty and Scout Law.

References

1. Aktiviti Pengakap muda Malaysia (1990), Ab. Alim dan Balkis, Dewan Bahasa dan Pustaka.
2. Panduan Kelana Siswa (2010), Persekutuan Pengakap Malaysia.
3. Panduan Pengakap Raja (2008), Ab. Alim, Persekutuan pengakap Malaysia.

UZW127
Malaysia Univesity Rover Training Group II

Course Synopsis

KLKM an international uniformed bodies are discussing about the science of life and survival skills. The students will be exposed to the ethical life settings, cooperation, respect, love fellow human beings and the environment through the appreciation of the Treaty and Scout Law.

References

1. Aktiviti Pengakap muda Malaysia (1990), Ab. Alim dan Balkis, Dewan Bahasa dan Pustaka.
2. Panduan kelana siswa (2010), Persekutuan pengakap Malaysia.
3. Panduan Pengakap Raja (2008), Ab. Alim, Persekutuan pengakap Malaysia.

UZW128
Malaysia Univesity Rover Training Group I (SEA)

Course Synopsis

This course is also known by other names as Sea Rover Scouts Unit, which is part of the 4th of training in the Organization of Scouting Movement Sea Rover. It is a part of Scout Adults make space for youth in enriching their knowledge. Sea Rover Scouts devoted to follow Rover Wood Badge Leadership Course aims to produce Sea Rover Scout Leaders who are skilled, knowledgeable and qualified in the move The Sea Rover Scouts. This section consists of teens aged 17 to 25 years, offering a variety of activities and skills training in developing human capital individuals directly or indirectly. Convergence is also given to the development of self-awareness which emphasizes self-responsibility, obedience to leaders, organizations, communities and the country as well as providing volunteer services to the community, in accordance with Sea Rover Scout motto of “SERVICE”

References

1. Panduan Pengurusan Kumpulan Latihan Kelanasiswa Laut Malaysia.
2. Panduan Skim Latihan Pengakap Kelana Laut.
3. Panduan Skim Lencana Pengakap Malaysia

UZW129
Malaysia Univesity Rover Training Group II (SEA)

Course Synopsis

This course is also known by other names as Sea Rover Scouts Unit, which is part of the 4th of training in the Organization of Scouting Movement Sea Rover. It is a part of Scout Adults make space for youth in enriching their knowledge. Sea Rover Scouts devoted to follow Rover Wood Badge Leadership Course aims to produce Sea Rover Scout Leaders who are skilled, knowledgeable and qualified in the move The Sea Rover Scouts. This section consists of teens aged 17 to 25 years, offering a variety of activities and skills training in developing human capital individuals directly or indirectly. Convergence is also given to the development of self-awareness which emphasizes self-responsibility, obedience to leaders, organizations, communities and the country as well as providing volunteer services to the community, in accordance with Sea Rover Scout motto of “SERVICE”

References

1. Panduan Pengurusan Kumpulan Latihan Kelanasiswa Laut Malaysia.
2. Panduan Skim Latihan Pengakap Kelana Laut.
3. Panduan Skim Lencana Pengakap Malaysia

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