Program Teknologi Kejuruteraan & Perniagaan /
Engineering Technology & Business Programmes

Universiti Malaysia Perlis

Ilmu • Keikhlasan • Kecemerlangan
Knowledge • Sincerity • Excellence

Buku Panduan AKADEMIK

Academic Guide Book

Program Sarjana Muda / Bachelor Degree Programmes

Sidang Akademik / Academic Session

2015/2016

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Deputy Vice-Chancellor's Office (Academic & International)

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Buku Panduan
AKADEMIK
Academic Guide Book
Program Sarjana Muda / Bachelor Degree Programmes
Program Teknologi Kejuruteraan & Perniagaan
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Sidang Akademik / *Academic Sessions* 2015-2016

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dan / and

semua Dekan-dekan Pusat Pengajian dan Pengarah Pusat / Unit di Universiti Malaysia Perlis.
all Deans and Directors of Centres / 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.

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

* *From time to time, the university may amend certain aspects of curriculum and academic system in order to fulfil current needs and requirements. All students shall be informed of and are subject to the change.*

PENGENALAN / *INTRODUCTION:*

Buku Panduan 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 semester pertama sehingga semester akhir pengajian. Buku panduan ini juga memberikan beberapa maklumat asas mengenai sistem akademik, struktur program, senarai kursus yang ditawarkan bersama-sama dengan sinopsis, sumber rujukan, senarai kakitangan dan maklumat berkaitan yang lain. Diharapkan pelajar akan mendapat manfaat daripada maklumat yang diberikan dalam buku panduan untuk merancang pengajian mereka di UniMAP.

The Academic Guidebook for Bachelor Degree Programme is prepared to assist new UniMAP students in understanding processes and procedures that are related to their study in UniMAP. Students should use this book as their major guidence in planning and deciding on courses to be taken from their first until final semester of their studies. This guidebook also gives some basic information on the academic system, program structures, list of courses offered together with the synopsis, 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*
10. Pusat Pengajian Pembangunan Insan dan Teknokomunikasi / *School of Human Development and Technocommunication* (iKOM)
11. Fakulti Teknologi Kejuruteraan / *Faculty of Engineering Technology*

Pusat-Pusat Pemantapan Akademik / *Academic Support Centres*:

1. Institut Matematik Kejuruteraan / *Institute of Engineering Mathematics* (IMK)
2. Pusat Kejuruteraan / *Engineering Centre*
3. Pusat Bahasa Antarabangsa / *Centre for International Languages*
4. Pusat Ko-kurikulum / *Centre for Co-Curriculum*
5. Pusat Kerjasama Industri dan Agensi Kerajaan / *Centre for Industrial and Governmental Collaboration* (CIGC)

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 Energy System Engineering)
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 Awam) /
Bachelor of Engineering (Honours) (Civil Engineering)
22. Sarjana Muda Perniagaan (Kepujian) (Keusahawanan Kejuruteraan) /
Bachelor of Business (Honours) (Engineering Entrepreneurship)
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) (Industrial Biotechnology)
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 System)
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) (Material 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 System)
34. Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Elektronik Bersepadu) /
Bachelor of Electronic Engineering Technology (Honours) (Integrated Electronic)
35. Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Telekomunikasi Elektronik) /
Bachelor of Electronic Engineering Technology (Honours) (Electronic Telecommunication Design)
36. Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Proses Kimia Industri) /
Bachelor of Chemical Engineering Technology (Honours) (Industrial Chemical Process)
37. Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Agromakanan) /
Bachelor of Chemical Engineering Technology (Honours) (Agrofood)
38. Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Teknologi Sukan) /
Bachelor of Mechanical Engineering Technology (Honours) (Sport Technology)
39. Sarjana Muda Teknologi Kejuruteraan Awam (Kepujian) (Bangunan) /
Bachelor of Engineering Technology in Civil Engineering (Honours) (Building)
40. Sarjana Muda Komunikasi Media Baharu (Kepujian) /
Bachelor of New Media Communication (Honours)

MISI / *MISSION*:

Melahirkan Modal insan kamil yang menyumbang kepada agenda pembangunan dan daya saing industri negara.
To produce holistic human capital 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

DULI YANG TERAMAT MULIA
TUANKU SYED FAIZUDDIN PUTRA IBNI TUANKU SYED SIRAJUDDIN JAMALULLAIL
D.K., S.P.M.P., P.A.T., Doctor of Education (Honoris Causa) La Trobe University Melbourne, Australia

RAJA MUDA PERLIS
(CANSELOR UNIVERSITI MALAYSIA PERLIS)

DULI YANG TERAMAT MULIA
TUANKU HAJAH LAILATUL SHAHREEN AKASHAH KHALIL
S.P.M.P., Honoris Causa in Health Sciences (Universidad Nacional Pedro Henriquez Urena, DR)

RAJA PUAN MUDA PERLIS
(PRO-CANSELOR UNIVERSITI MALAYSIA PERLIS)

KATA ALUAN NAIB CANSELOR

Bismillahirahmanirrahim

Assalamualaikum Warahmatullahi Wabarakatuh dan Salam Sejahtera.

Salam Ilmu, Keikhlasan, Kecemerlangan UniMAP,

Syukur ke hadrat Allah SWT kerana dengan limpah dan kurniaNya, Buku Panduan Akademik Program Pengajian Ijazah Sarjana Muda Sidang Akademik 2015/2016 dapat diterbitkan untuk membantu pelajar-pelajar baharu dalam memahami proses dan prosedur yang berkaitan dengan pengajian mereka.

Sekalung tahniah diucapkan kepada anak-anak pelajar yang telah berjaya menempatkan diri ke Universiti Malaysia Perlis, sebuah 'Universiti Pilihan yang Berdaya Saing dan merupakan Universiti Awam Malaysia pertama yang dianugerahkan QS Star.

Menuntut ilmu merupakan suatu proses yang berterusan untuk membentuk diri kita menjadi lebih baik dari sebelumnya. Keberadaan anak-anak pelajar sekalian di universiti ini, adalah menjadi tanggungjawab anda mempersiapkan diri untuk mengaut ilmu sebanyak mungkin bagi memperolehi pengalaman yang berganda untuk bergelar seorang siswazah yang cemerlang duniawi dan ukhrawi serta dapat memberi sumbangan dan manfaat kepada bukan hanya universiti ini malah kepada agama, negara dan juga masyarakat.

Di samping itu, saya dan seluruh warga UniMAP juga mengharapkan agar anak-anak pelajar sekalian akan bergerak seiringan, membantu UniMAP bagi merealisasikan misi untuk Melahirkan Modal Insan Kamil yang dapat menyumbang kepada Agenda Pembangunan dan Daya Saing Industri Negara bukan sahaja di peringkat kebangsaan malah di arena antarabangsa.

Akhir kata, selamat maju jaya diucapkan kepada anak-anak pelajar sekalian yang kini sudah melangkah alam menara gading yang bakal menjanjikan pelbagai cabaran dan keseronokan dalam usaha mendaki puncak kejayaan. Semoga peluang yang diperolehi ini tidak akan dipersiakan, sebaliknya menjadi pembakar semangat untuk mencatatkan kejayaan yang lebih cemerlang, gemilang dan terbilang selaras dengan Visi UniMAP.

Sekian, Wassalam.

Brig. Jen. Datuk Prof. Dr.
Kamarudin Hussin
Naib Canselor

VICE CHANCELLOR'S MESSAGE

Bismillahirrahmanirrahim

Assalamualaikum Warahmatullahi Wabarakatuh and Salam Sejahtera.

Salam Ilmu, Keikhlasan, Kecemerlangan UniMAP,

All Praise to the Almighty for His blessings that we are able to produce the UniMAP Academic Guide Book for the 2015/2016 Academic Session to assist our new students in understanding the processes and procedures related to their studies.

Congratulations to the new students who have successfully earned their positions in Universiti Malaysia Perlis, a 'Competitive University of Choice' and the first QS Star awarded Malaysian Public University.

Seeking knowledge is a continuous process in establishing our attitude in order to be better in the future. With your presence in this university, it is your responsibility to prepare yourself in earning as much experience as you can in order to become the outstanding graduates not just in this world, but as well as in the hereafter, and at the same time positively contributing not only towards the university but also towards the religion, nation and society.

In addition, the entire staff of UniMAP and I are also hoping that you will be moving in tandem with us in helping UniMAP to objectify the mission which is Producing a Holistic Human Capital who are able to Contribute to the Nation's Development and Industrial Competitiveness Agenda, not only at national level but also at the international arena.

Finally, best wishes to all of you, who have stepped into the higher level of education that would promise a variety of challenges and excitements in the attempt to achieve pure success. Hopefully this opportunity will not be wasted, but rather become the ignition to achieve a whole new level of excellence, in line with UniMAP's vision.

Thank you, Wassalam.

Brig. Jen. Datuk Prof. Dr.
Kamarudin Hussin
Vice Chancellor

Pegawai Utama UniMAP
UniMAP Principal Officers

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Deputy Vice Chancellor
(Academic & International)

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Timbalan Naib Canselor
(Penyelidikan & Inovasi) /
Deputy Vice Chancellor
(Research & Innovation)

Prof. Madya Dr.
Mohd Fo'ad Sakdan
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(Hal Ehwal Pelajar dan Alumni) /
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Pn. Saodah Hassan
Bendahari / *Bursar*

Pn. Mazmin Mat Akhir
Pustakawan Kanan /
Chief Librarian

KALENDAR AKADEMIK IJAZAH SARJANA MUDA
SEMESTER PERTAMA, SIDANG AKADEMIK 2015/2016

SEMESTER 1 7 September 2015 hingga 17 Januari 2016 (19 minggu)				
AKTIVITI	**JANGKA MASA**		**TEMPOH**	**CATATAN**
Pendaftaran Pelajar Baru / Minggu Suai Kenal	1 September 2015	6 September 2015	6 hari	**Hari Kebangsaan** 31 Ogos 2015 (Isnin)
Kuliah	7 September 2015	8 November 2015	9 minggu	**Hari Malaysia** 16 September 2015 [Rabu] **Hari Raya Qurban** 24 & 25 September 2015 [Khamis & Jumaat] **Awal Muharam** 14 Oktober 2015 [Rabu]
Cuti Pertengahan Semester	9 November 2015	15 November 2015	1 minggu	**Hari Deepavali** 10 November 2015 [Selasa]
Kuliah	16 November 2015	20 Disember 2015	5 minggu	-
Minggu Ulangkaji	21 Disember 2015	27 Disember 2015	1 minggu	**Maulidur Rasul** 24 Disember 2015 [Khamis] **Hari Krismas** 25 Disember 2015 [Jumaat]
Peperiksaan	28 Disember 2016	17 Januari 2016	3 minggu	
Cuti Antara Semester	18 Januari 2016	14 Februari 2016	4 minggu	**Tahun Baru Cina** 8 & 9 Februari 2016 [Isnin & Selasa]

KALENDAR AKADEMIK IJAZAH SARJANA MUDA

SEMESTER PERTAMA, SIDANG AKADEMIK 2015/2016

SEMESTER 2 15 Februari hingga 26 Jun 2016 (19 minggu)				
AKTIVITI	**JANGKA MASA**		**TEMPOH**	**CATATAN**
Kuliah	15 Februari 2016	10 April 2016	8 minggu	-
Cuti Pertengahan Semester	11 April 2016	17 April 2016	1 minggu	-
Kuliah	18 April 2016	29 Mei 2016	6 minggu	**Hari Pekerja** 1 Mei 2016 [Ahad] **Israk Mikraj** 5 Mei 2016 [Khamis] **Hari Keputeraan DYMM Tuanku Raja Perlis** 17 Mei 2016 [Selasa] **Cuti Hari Wesak** 21 Mei 2016 [Sabtu]
Minggu Ulangkaji	30 Mei 2016	5 Jun 2016	1 minggu	**Hari Keputeraan SPB Yang Di-Pertuan Agung** 4 Jun 2016 [Sabtu]
Peperiksaan	6 Jun 2016	26 Jun 2016	3 minggu	**Nuzul Al-Quran** 22 Jun 2016 [Rabu]
Cuti Panjang / Latihan Industri	27 Jun 2016	4 September 2016	10 minggu *Latihan Industri	**Hari Raya Aidilfitri** 7 & 8 Julai 2016 [Khamis & Jumaat] **Hari Kebangsaan** 31 Ogos 2016 [Rabu]

**Latihan Industri (LI) bagi pelajar tahun 3 Ijazah Sarjana Muda Kejuruteraan dan pelajar tahun 2 Ijazah Sarjana Muda Perniagaan (Keusahawanan Kejuruteraan) bagi Semester II Sidang Akademik 2015/2016 akan bermula pada 27 Jun sehingga 4 September 2016 selama 10 minggu*

SYARAT KEMASUKAN BAGI PROGRAM PENGAJIAN IJAZAH SIDANG AKADEMIK 2015/2016

CALON LEPASAN MATRIKULASI

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi / Asasi
		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)**.
Program Kejuruteraan		
1.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Awam) **RK01** (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.
2.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Mikroelektronik) **RK05** (8 Semester)	
3.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Mekanikal) **RK08** (8 Semester)	
4.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Pembuatan) **RK13** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi / Asasi
5.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Komputer) **RK20** (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.
6.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Sistem Elektrik) **RK23** (8 Semester)	
7.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Mekatronik) **RK24** (8 Semester)	
8.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Elektronik Industri) **RK45** (8 Semester)	
9.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Perhubungan) **RK53** (8 Semester)	
10.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Metalurgi) **RK56** (8 Semester)	
11.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Rekabentuk Produk) **RK84** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi / Asasi
12.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Elektronik) **RK86** (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.
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)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi / Asasi
16.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Alam Sekitar) **RK07** (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;** **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.
17.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Bahan) **RK12** (8 Semester)	
18.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Bioproses) **RK28** (8 Semester)	
19.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Polimer) **RK32** (8 Semester)	
20.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Elektronik Bioperubatan) **RK85** (8 Semester)	
21.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Biosistem) **RK90** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi / Asasi
	Program Perniagaan	
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 / Civil Engineering Studies / Mechanical Engineering Studies / Electrical And Electronic Engineering Studies / 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 sehingga menyukarkan pembelajaran.

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi / Asasi
		Program Perniagaan
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 / Civil Engineering Studies / Mechanical Engineering Studies / Electrical And Electronic Engineering Studies / 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 / Prinsip Perakaunan / Ekonomi Asas / Perdagangan / Pengajian Keusahawanan / Perakaunan Perniagaan **dan** Calon tidak cacat anggota sehingga menyukarkan pembelajaran.

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi / Asasi
	Program Teknologi Kejuruteraan	
24.	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 / Civil Engineering Studies / Mechanical Engineering Studies / Electrical And Electronic Engineering Studies;** **dan** **(ii) Mathematics** Calon yang menggunakan kelayakan mata pelajaran **Chemistry / Engineering Chemistry / Biology / Civil Engineering Studies / Mechanical Engineering Studies / Electrical And Electronic Engineering Studies** 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 Kimia (Kepujian) (Proses Kimia Industri) **RY20** (8 Semester)	
26.	Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Bioteknologi Industri) **RY21** (8 Semester)	
27.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Kuasa Industri) **RY31** (8 Semester)	
28.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Teknologi Robotik dan Automasi) **RY32** (8 Semester)	
29.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Sistem Elektronik) **RY40** (8 Semester)	
30.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Telekomunikasi Elektronik) **RY41** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi / Asasi
	Program Teknologi Kejuruteraan	
31.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Rangkaian Elektronik) **RY43** (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 / Civil Engineering Studies / Mechanical Engineering Studies / Electrical And Electronic Engineering Studies;** **dan** **(ii) Mathematics** Calon yang menggunakan kelayakan mata pelajaran **Chemistry / Engineering Chemistry / Biology / Civil Engineering Studies / Mechanical Engineering Studies / Electrical And Electronic Engineering Studies** 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.
32.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Elektronik Bersepadu) **RY44** (8 Semester)	
33.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemesinan) **RY55** (8 Semester)	
34.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Sistem Pertanian) **RY56** (8 Semester)	
35.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pembangunan Produk) **RY57** (8 Semester)	
36.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemprosesan Bahan) **RY58** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Matrikulasi / Asasi
	Program Komunikasi Media Baharu	
37.	Ijazah Sarjana Muda Komunikasi Media Baharu (Kepujian) **RA72** (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 / Civil Engineering Studies / Mechanical Engineering Studies / Electrical And Electronic Engineering Studies / Computing** **atau** **Aliran Perakaunan:** **Mathematics / Ekonomi / Pengurusan Perniagaan / Akaun** **dan** **Mendapat sekurang-kurangnya Tahap 2 (Band 2) dalam Malaysia University English Test (MUET)** **dan** Calon tidak cacat anggota sehingga menyukarkan pembelajaran.

SYARAT KEMASUKAN BAGI PROGRAM PENGAJIAN IJAZAH SIDANG AKADEMIK 2015/2016

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)**.

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum STPM
	Program Kejuruteraan	
1.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Awam) **RK01** (8 Semester)	**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** 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.
2.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Mikroelektronik) **RK05** (8 Semester)	
3.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mekanikal **RK08** (8 Semester)	
4.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Pembuatan) **RK13** (8 Semester)	
5.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Komputer) **RK20** (8 Semester)	
6.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Sistem Elektrik) **RK23** (8 Semester)	
7.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Mekatronik) **RK24** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum STPM
	Program Kejuruteraan	
8.	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 (NGMP 2.00)** pada peringkat STPM dalam mata pelajaran berikut: **(i) Physics / Chemistry;** **dan** **(ii) Mathematics T / Further Mathematics** 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.
9.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Perhubungan) **RK53** (8 Semester)	
10.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Metalurgi) **RK56** (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 STPM</th></tr>
<tr><td colspan="3">Program Kejuruteraan</td></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;

dan

(ii) Mathematics T / Further Mathematics

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>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
	Program Perniagaan	
22.	Ijazah Sarjana Muda Perniagaan (Kepujian) (Keusahawanan Kejuruteraan) **RP52** (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 / Sastera:** **Mathematics T / Further Mathematics / Mathematics M / Physics / Chemistry / Biology / Economy / Pengurusan Perniagaan / Perakaunan / Information And Communications Technology (ICT)** **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 d& Elektronik / Prinsip Perakaunan / Ekonomi Asas / Perdagangan / Pengajian Keusahawanan / Perakaunan Perniagaan **dan** Calon tidak cacat anggota sehingga menyukarkan pembelajaran.

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum STPM
	Program Perniagaan	
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 / Sastera:** **Mathematics T / Further Mathematics / Mathematics M / Physics / Chemistry / Biology / Economy / Pengurusan Perniagaan / Perakaunan / Information And Communications Technology (ICT)** **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 sehingga menyukarkan pembelajaran.

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum STPM
	Program Perniagaan	
24.	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 (NGMP 2.00)** pada peringkat STPM dalam mata pelajaran berikut: **(i) Physics / Chemistry / Biology;** **dan** **(ii) Mathematics T / Further Mathematics** 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.
25.	Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Proses Kimia Industri) **RY20** (8 Semester)	
26.	Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Bioteknologi Industri) **RY21** (8 Semester)	
27.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Kuasa Industri) **RY31** (8 Semester)	
28.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Teknologi Robotik dan Automasi) **RY32** (8 Semester)	
29.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Sistem Elektronik) **RY40** (8 Semester)	
30.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Telekomunikasi Elektronik) **RY41** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum STPM
	Program Perniagaan	
31.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Rangkaian Elektronik) **RY43** (8 Semester)	**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** 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.
32.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Elektronik Bersepadu) **RY44** (8 Semester)	
33.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemesinan) **RY55** (8 Semester)	
34.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Sistem Pertanian) **RY56** (8 Semester)	
35.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pembangunan Produk) **RY57** (8 Semester)	
36.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemprosesan Bahan) **RY58** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum STPM
	Program Sains Sosial	
37.	Ijazah Sarjana Muda Komunikasi Media Baharu (Kepujian) **RA72** (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/Sastera:** Mathematics T / Mathematics M / Physics / Chemistry / Biology / Information And Communications Technology (ICT) / Mathematics M / Ekonomi / Pengurusan Perniagaan / Perakaunan / Kesusasteraan Melayu Komunikatif / Sejarah / Geografi / Sains Sukan / Seni Visual dan Mendapat sekurang-kurangnya **Tahap 2 (Band 2)** dalam **Malaysia University English Test (MUET)** **dan** Calon tidak cacat anggota sehingga menyukarkan pembelajaran.

SYARAT KEMASUKAN BAGI PROGRAM PENGAJIAN IJAZAH SIDANG AKADEMIK 2015/2016

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 2013** 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 2014** atau **sebelumnya** dengan mendapat sekurang-kurangnya **PNGK 2.00**; **dan** Mendapat sekurang-kurangnya **Tahap 1 (Band 1)** dalam Malaysian **University English Test (MUET)**.

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Diploma/Setaraf
	Program Kejuruteraan	
1.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Awam) **RK01** (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 2014 atau sebelumnya)</u>** Mengikut syarat kemasukan kelayakan STPM / Matrikulasi / Asasi tahun semasa.
2.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Mikroelektronik) **RK05** (8 Semester)	
3.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Alam Sekitar) **RK07** (8 Semester)	
4.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Mekanikal) **RK08** (8 Semester)	
5.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Bahan) **RK12** (8 Semester)	
6.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Pembuatan **RK13** (8 Semester)	
7.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Komputer) **RK20** (8 Semester)	
8.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Sistem Elektrik) **RK23** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Diploma/Setaraf
	Program Kejuruteraan	
9.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Mekatronik) **RK24** (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 2014 atau sebelumnya)</u>** Mengikut syarat kemasukan kelayakan STPM / Matrikulasi / Asasi tahun semasa.
10.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Bioproses) **RK28** (8 Semester)	
11.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Polimer) **RK32** (8 Semester)	
12.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Elektronik Industri) **RK45** (8 Semester)	
13.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Perhubungan **RK53** (8 Semester)	
14.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Metalurgi) **RK56** (8 Semester)	
15.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Rekabentuk Produk) **RK84** (8 Semester)	
16	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Elektronik Bioperubatan) **RK85** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Diploma/Setaraf
	Program Kejuruteraan	
17.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Elektronik) **RK86** (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 2014 atau sebelumnya)</u>** Mengikut syarat kemasukan kelayakan STPM / Matrikulasi / Asasi tahun semasa.
18.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Fotonik) **RK89** (8 Semester)	
19.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Biosistem) **RK90** (8 Semester)	
20.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Rangkaian Komputer) **RK93** (8 Semester)	
21.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) (Kejuruteraan Elektrik Sistem Tenaga) **RK96** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Diploma/Setaraf
	Program Perniagaan	
22.	Ijazah Sarjana Muda Perniagaan (Kepujian) (Keusahawanan Kejuruteraan) **RP52** (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 2014 atau sebelumnya)</u>** Mengikut syarat kemasukan kelayakan STPM / Matrikulasi / Asasi tahun semasa.
23.	Ijazah Sarjana Muda Perniagaan (Kepujian) (Perniagaan Antarabangsa) **RE09** (6 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Diploma/Setaraf
	Program Teknologi Kejuruteraan	
24.	Ijazah Sarjana Muda Teknologi Kejuruteraan Awam (Kepujian) (Pembinaan) **RY11** (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 2014 atau sebelumnya)</u>** Mengikut syarat kemasukan kelayakan STPM / Matrikulasi / Asasi tahun semasa.
25.	Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Proses Kimia Industri) **RY20** (8 Semester)	
26.	Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Bioteknologi Industri) **RY21** (8 Semester)	
27.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Kuasa Industri) **RY31** (8 Semester)	
28.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Teknologi Robotik dan Automasi) **RY32** (8 Semester)	
29.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Sistem Elektronik) **RY40** (8 Semester)	
30.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Telekomunikasi Elektronik) **RY41** (8 Semester)	

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Diploma/Setaraf
	Program Teknologi Kejuruteraan	
31.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Rangkaian Elektronik) **RY43** (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 2014 atau sebelumnya)</u>** Mengikut syarat kemasukan kelayakan STPM / Matrikulasi / Asasi tahun semasa.
32.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Elektronik Bersepadu) **RY44** (8 Semester)	
33.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemesinan) **RY55** (8 Semester)	
34.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Sistem Pertanian) **RY56** (8 Semester)	
35.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pembangunan Produk) **RY57** (8 Semester)	
36	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
	Program Komunikasi Media Baharu	
37.	Ijazah Sarjana Muda Komunikasi Media Baharu (Kepujian) **RA72** (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. **dan** Mendapat sekurang-kurangnya **Tahap 2 (Band 2)** dalam **Malaysian University English Test (MUET)**. **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 2014 atau sebelumnya)</u>** Mengikut syarat kemasukan kelayakan STPM / Matrikulasi / Asasi tahun semasa.

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 dan Sarjana Muda Komunikasi Media Baharu 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.

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, pelajar Sarjana Muda Perniagaan perlu mengambil 72 atau 74 unit Kursus Teras (mengikut pengkhususan yang diambil) dan 30 unit Kursus Elektif manakala pelajar Sarjana Muda Komunikasi Media Baharu pula perlu mengambil 87 unit kursus Teras dan 15 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, 20 unit bagi program Sarjana Muda Perniagaan dan Sarjana Muda Komunikasi Media Baharu pula perlu mengambil 18 unit kursus Keperluan Universiti.

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, Sarjana Muda Perniagaan dan Sarjana Muda Komunikasi Media Baharu dikelompokkan seperti yang ditunjukkan dalam Jadual 1 (a), (b), (c), (d) dan (e). Bagi tujuan pengijazahan, pelajar dikehendaki untuk mengambil sejumlah 137 unit bagi program Sarjana Muda Kejuruteraan, 142 unit bagi program Sarjana Muda Teknologi Kejuruteraan, 122 unit atau 124 unit bergantung kepada pengkhususan program Sarjana Muda Perniagaan dan 120 unit bagi program Sarjana Muda Komunikasi Media Baharu.

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 untuk Komunikasi Teknikal	2
e. Tamadun Islam & Tamadun Asia/Budaya Malaysia	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 untuk Komunikasi Teknikal	2
e. Tamadun Islam & Tamadun Asia/Budaya Malaysia	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**
ELEKTIF	**30**
KURSUS KEPERLUAN UNIVERSITI	**20**
a. Keusahawanan Kejuruteraan	2
b. Kemahiran Berfikir	2
c. Bahasa Melayu Universiti	2
d. Bahasa Inggeris Akademik	2
e. Tamadun Islam & Tamadun Asia/Budaya Malaysia	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**
ELEKTIF	**30**
KURSUS KEPERLUAN UNIVERSITI	**20**
a. Keusahawanan Kejuruteraan	2
b. Kemahiran Berfikir	2
c. Bahasa Melayu Universiti	2
d. Bahasa Inggeris Akademik	2
e. Tamadun Islam & Tamadun Asia/Budaya Malaysia	2
f. Hubungan Etnik	2
g. Kemahiran & Teknologi dalam Komunikasi	2
h. Komunikasi dalam Perniagaan	3
i. Ko-kurikulum	3
JUMLAH	**124**

Jadual 1(e): Struktur Program Sarjana Muda Komunikasi Media Baharu

SARJANA MUDA KOMUNIKASI MEDIA BAHARU	
KURSUS	**UNIT**
KURSUS TERAS MEDIA BAHARU	**87**
ELEKTIF	**15**
KURSUS KEPERLUAN UNIVERSITI	**18**
a. Kemahiran Berfikir	2
b. Bahasa Melayu Universiti	3
c. Bahasa Inggeris Akademik	2
d. Tamadun Islam & Tamadun Asia/Budaya Malaysia	2
e. Hubungan Etnik	2
f. Bahasa Asing	4
g. Ko-kurikulum	3
JUMLAH	**120**

JENIS-JENIS KURSUS

1. Kursus Keperluan Universiti

Kursus Keperluan Universiti ialah kursus-kursus di luar pengkhususan pelajar. Kursus-kursus ini ditawarkan oleh Pusat Pengajian Pembangunan Insan dan Teknokomunikasi (iKOM), Pusat Bahasa Antarabangsa dan Pusat Kokurikulum. Semua kursus ini wajib diambil dan pelajar perlu lulus dengan gred C sebagai syarat utama untuk pengijazahan. Kursus-kursus tersebut ialah:

a. Keusahawanan Kejuruteraan (2 unit)

Semua pelajar wajib mengambil kursus Keusahawanan Kejuruteraan. Pelajar digalakkan mengambil kursus-kursus lain di dalam kategori 'keusahawanan', di mana unit yang dikumpul boleh dikira sebagai Kursus Opsyen.

b. Kemahiran Berfikir (2 unit)

Semua wajib mengambil kursus Kemahiran Berfikir.

c. Bahasa Melayu Universiti (2 unit)

Kursus Bahasa Melayu Universiti wajib diambil oleh semua pelajar.

d. Bahasa Inggeris Untuk Komunikasi Teknikal/ Bahasa Inggeris Akademik (2 unit)
Semua pelajar wajib mengambil kursus Bahasa Inggeris untuk Komunikasi Teknikal (bagi program Sarjana Muda Kejuruteraan dan Sarjana Muda Teknologi Kejuruteraan) atau kursus Bahasa Inggeris Akademik (bagi program Sarjana Muda Perniagaan dan Sarjana Muda Komunikasi Media Baharu). Pelajar yang memperolehi Band 1, 2 atau 3 dalam MUET diwajibkan mengambil Bahasa Inggeris Asas dan mendapat kelulusan minimum Gred C sebelum dibenarkan mengambil Bahasa Inggeris untuk Komunikasi Teknikal atau Bahasa Inggeris Akademik. Dua (2) unit tambahan kursus Bahasa Inggeris Asas ini akan dikira sebagai Kursus Opsyen (rujuk perkara [h]). Pelajar yang memperolehi Band 4 atau 5 dalam MUET tidak perlu mengambil Bahasa Inggeris Asas sebelum mengambil Bahasa Inggeris untuk Komunikasi Teknikal atau Bahasa Inggeris Akademik. Pelajar yang memperolehi Band 4 atau 5 dalam MUET tidak dibenarkan mengambil Bahasa Inggeris Asas sebagai kursus Opsyen.

e. Tamadun Islam & Tamadun Asia/Budaya Malaysia (2 unit)
Kursus Tamadun Islam & Tamadun Asia wajib diambil oleh semua pelajar tempatan manakala kursus Budaya Malaysia wajib diambil oleh semua pelajar antarabangsa.

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

g. Kemahiran dan Teknologi Dalam Komunikasi (2 unit)
Kursus Kemahiran dan Teknologi dalam Komunikasi wajib diambil oleh pelajar Sarjana Muda Teknologi Kejuruteraan dan Sarjana Muda Perniagaan.

h. Kursus Opsyen
Kursus Opsyen terdiri daripada kursus-kursus yang ditawarkan oleh Pusat Pengajian Pembangunan Insan dan Teknokomunikasi (iKOM) dan Pusat Bahasa Antarabangsa untuk pelajar Program Sarjana Muda Kejuruteraan dan Sarjana Muda Teknologi Kejuruteraan bertujuan untuk memberi nilai tambah kepada pelajar.

i. Komunikasi Dalam Perniagaan (3 unit)
Kursus Komunikasi dalam Perniagaan wajib diambil oleh semua pelajar program Sarjana Muda Perniagaan.

j. Program Ko-Kurikulum (3 unit)
Semua pelajar diwajibkan mengumpul 3 unit ko-kurikulum sepanjang pengajiannya di UniMAP. Dua (2) unit Badan Beruniform perlu diambil oleh pelajar secara berpakej 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 dalam mana-mana semester.

2. Kursus Teras (Sarjana Muda Kejuruteraan)
Kursus Teras terdiri daripada kursus-kursus Kejuruteraan yang wajib diambil oleh semua pelajar bidang Sarjana Muda Kejuruteraan. Kursus-kursus ini menjadi keperluan utama untuk pengijazahan. Pelajar yang gagal mana-mana kursus Teras Kejuruteraan mesti mengulanginya dan lulus sebelum layak dipertimbangkan untuk pengijazahan.

3. Kursus Teras (Sarjana Muda Teknologi Kejuruteraan)
Kursus Teras terdiri daripada kursus-kursus Teknologi Kejuruteraan yang wajib diambil oleh semua pelajar bidang Teknologi Kejuruteraan. 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 Kursus Teras Perniagaan dan 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 Sarjana Muda Perniagaan boleh memilih kursus Elektif berdasarkan minat mereka dalam bidang-bidang tertentu.

6. Kursus Pra-Syarat

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

SISTEM UNIT

Setiap kursus diberikan nilai yang dikenali sebagai UNIT. Unit diberikan berdasarkan skop 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 1 unit bagi Latihan Industri adalah setara dengan 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 bagi program Kejuruteraan adalah bersamaan 2 jam pertemuan dalam seminggu atau 28 jam pertemuan dalam 1 semester. Satu (1) unit komponen Praktikal bagi program Teknologi Kejuruteraan adalah bersamaan 3 jam pertemuan dalam seminggu atau 42 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 beberapa kali sepanjang pengajiannya di UniMAP. Ini termasuklah program IndEx (Pendedahan kepada Industri), InTra (Latihan Industri), Keusahawanan Industri, dan lain-lain lagi.

LATIHAN INDUSTRI

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

Pelajar Sarjana Muda Kejuruteraan Tahun 3 dikehendaki untuk menjalani 12 minggu Latihan Industri untuk mendapatkan 4 kredit, pelajar Sarjana Muda Teknologi Kejuruteraan Tahun 4 pula dikehendaki untuk menjalani 12 minggu Latihan Industri untuk mendapatkan 12 kredit manakala pelajar Tahun 3 program Sarjana Muda Komunikasi Media Baharu pula dikehendaki menjalani 12 minggu Latihan Industri untuk mendapatkan 6 kredit untuk kursus ini.

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 (2+2), pelajar akan mengikuti 2 fasa (2 bulan + 2 bulan) Latihan Industri di syarikat-syarikat multinasional di Malaysia dan bagi Pilihan Kedua (3+1), pelajar akan menjalani Latihan Industri di syarikat multinasional di Malaysia dan lawatan sambil belajar di luar negara (International Business Field Trips).

Pelajar program Sarjana Muda Perniagaan (Keusahawanan Kejuruteraan) 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 dalam 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 dan Agensi Kerajaan (CIGC) akan menyelaraskan bersama pusat-pusat lain kursus-kursus yang melibatkan industri seperti di bawah:

1. Pendedahan Industri (IndEx)
   a. Program singkat 1 hari
   b. Pakar-pakar, pengurus dan jurutera-jurutera dari industry 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 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 pengkomersilan. 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 LAWATAN KERJA UNTUK PERNIAGAAN ANTARABANGSA *(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 dan Agensi Kerajaan (CIGC) UniMAP.

Bagi Pilihan Kedua (3+1), pelajar akan menjalani Latihan Industri di syarikat-syarikat multinasional yang terpilih di Malaysia untuk 3 bulan pertama dan kemudian meneruskan lawatan sambil belajar di luar negara selama 1 bulan lagi. Pelajar diberi kebebasan untuk memilih mana-mana dua pilihan yang diberikan untuk Latihan Industri mengikut minat dan kemampuan kewangan mereka.

KOD KURSUS

Setiap kursus yang ditawarkan mempunyai kod yang tersendiri. Untuk pengajian program Kejuruteraan, Teknologi Kejuruteraan, Perniagaan dan Komunikasi Media Baharu, 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
K	Sarjana Muda Komunikasi Media Baharu
U	Kursus Umum (Subjek ini boleh diambil oleh pelajar dari semua program pengajian)

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

Abjad Kedua di dalam Kod	Pusat Pengajian
E	PPK Sistem Elektrik
M	PPK Mikroelektronik
K	PPK Komputer & Perhubungan
N	PPK Mekatronik
B	PPK Bahan
P	PPK Pembuatan
R	PPK Bioproses
A	PPK 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 dan Agensi Kerajaan
F	Pusat Pengajian Inovasi Perniagaan & Teknousahawan
U	Pusat Pengajian Pembangunan Insan dan Teknokomunikasi
V	Pusat Bahasa Antarabangsa
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 Sarjana Muda: • 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)**

PRA-PENDAFTARAN KURSUS

Pra-pendaftaran kursus adalah suatu sistem yang membolehkan pelajar membuat pra-pendaftaran "atas talian" untuk kursus-kursus di semester seterusnya pada tempoh masa yang lebih awal. Tempoh masa yang ditetapkan untuk pra-pendaftaran ini adalah sebelum bermula cuti semester pada semester semasa. Semua pelajar (Aktif/Percubaan/Berhutang) DIWAJIBKAN melakukan proses pra-pendaftaran ini.

Pelajar dikehendaki mendaftar pada tarikh yang ditetapkan. Kursus yang perlu didaftarkan adalah kursus yang akan diambil pada semester akan datang (semua kursus termasuk Ko-kurikulum). Pelajar mestilah berjumpa Rakan Pendamping Siswa (RPS) dan mengisi borang HEA-09a (Borang Pendaftaran Kursus) sebelum membuat proses Pra-pendaftaran tersebut. Pelajar yang gagal membuat proses Pra-pendaftaran dalam tempoh yang ditetapkan akan menyebabkan pendaftaran rasmi kursus bagi semester hadapan terjejas (tempat tertakluk kepada kekosongan). Pelajar tidak perlu mencetak slip pra-pendaftar ini dan tidak perlu mendapatkan pengesahan daripada RPS.

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 memperolehi kelulusan daripada Dekan Pusat Pengajian.

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/ penambahan kursus / pengguguran kursus / tarik diri di luar tempoh yang ditetapkan tanpa sebab-sebab yang boleh diterima oleh Universiti, boleh dikenakan denda kecuali pelajar yang mempunyai alasan yang tertentu sahaja akan dipertimbangkan oleh Dekan Pusat Pengajian. Pelajar tidak dibenarkan membuat pendaftaran kursus/penambahan kursus/pengguguran kursus/tarik diri kursus semasa minggu peperiksaan.

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

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

1. Pendaftaran Kursus Pelajar Berstatus Aktif

Pelajar berstatus Aktif boleh mendaftar kursus secara online tidak melebihi 22 unit dan tidak kurang daripada 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 RPS dengan kelulusan daripada Dekan Pusat Pengajian.

Keterangan mengenai Pendaftaran Kursus pelajar berstatus Aktif diringkaskan seperti di 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 (FYP)	10	28

** Pelajar yang tidak mengambil kursus LI atau FYP boleh mengambil kursus melebihi 22 unit dengan kelulusan Dekan Pusat Pengajian terlebih dahulu dan mengisi Borang HEA-09a (Borang Pendaftaran Kursus).*

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 nasihat dan pengesahan daripada Dekan serta perlu juga mengisi Borang HEA-09b [Borang Pendaftaran Kursus-Berstatus Percubaan (P)] sebelum menyerahkannya kepada Penolong Pendaftar Pusat Pengajian untuk didaftarkan. Hanya Penolong Pendaftar Pusat Pengajian atau Jabatan Pendaftar sahaja yang boleh mendaftarkan kursus bagi pelajar ini. Jumlah unit yang dibenarkan untuk Pelajar Percubaan adalah seperti Jadual 6 berikut:

Jadual 6: Ringkasan Pendaftaran Kursus Pelajar Percubaan [P]

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

PENAMBAHAN / PENGGUGURAN / TARIK DIRI KURSUS

1. Tambah Kursus

a) Tempoh yang dibenarkan untuk penambahan kursus adalah sehingga minggu ke-2 minggu pembelajaran

b) Pelajar perlu mengisi Borang HEA-11 (Borang Tambah Kursus) dan menyerahkannya kepada Penolong Pendaftar Pusat Pengajian untuk dikemaskini dalam sistem

2. Gugur Kursus

a) Tempoh yang dibenarkan untuk menggugurkan kursus adalah sehingga minggu ke-6 minggu pembelajaran.

b) Pelajar perlu mengisi Borang HEA-10 (Borang Gugur Kursus). Borang perlu ditandatangani oleh pensyarah kursus, Dekan Pusat Pengajian dan diserahkan 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 daripada kursus yang telah didaftarkan pada semester yang berkenaan tidak lewat dari hari akhir bekerja pada minggu ke-12 minggu pembelajaran.Pelajar yang ingin menarik diri daripada kursus perlulah mengisi Borang HEA-19 (Borang Tarik Diri Kursus).

b) Kebenaran untuk pelajar menarik diri daripada 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 diambil kira dalam pengiraan PNG dan PNGK.

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 dibenarkan 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. Pelajar perlu 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 terkini atau keputusan pada 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 disertakan dengan sebab-sebab pertukaran program pengajian yang kukuh secara bertulis. 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. Penerangan boleh diperolehi daripada Jabatan Hal Ehwal Pelajar dan Alumni.

6. Sekiranya permohonan diluluskan, pelajar perlu mengambil tindakan untuk mendaftar kursus-kursus baru yang ditawarkan dalam 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 tidak akan diambil kira dalam pengiraan PNG/ PNGK dan kredit.

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 dan kredit tidak akan diambil kira dalam pengiraan PNG/PNGK.

PENANGGUHAN PENGAJIAN

Penangguhan pengajian adalah kebenaran kepada pelajar untuk tidak mengikuti pengajian pada sesuatu semester atas alasan-alasan tertentu yang dibenarkan Universiti.

Permohonan penangguhan pengajian dibenarkan kepada pelajar yang mempunyai masalah kesihatan dan disahkan sakit oleh Hospital Kerajaan/Doktor Panel Universiti / Pusat Kesihatan UniMAP sahaja. Bagi kes-kes tertentu sijil sakit yang bukan daripada Hospital Kerajaan atau Doktor Panel Universiti perlu mendapat perakuan Pusat Kesihatan UniMAP. Permohonan yang diasaskan selain daripada masalah kesihatan boleh dipertimbangkan sekiranya mempunyai alasan yang munasabah dan mendapat kelulusan Naib Canselor/ Timbalan Naib Canselor (Akademik & Antarabangsa).

Pelajar yang memohon untuk menangguhkan pengajian perlu mengisi Borang Penangguhan Pengajian (HEA/ HEP-13) yang boleh didapati 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 (7) 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 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.

Bagi pelajar yang menangguhkan pengajian atas sebab kesihatan/sakit atau untuk alasan-alasan yang dibenarkan, semester berkenaan tidak akan diambil kira dalam pengiraan semester yang digunakan untuk pengijazahan (Tanpa Penalti). Bagi kes Tanpa Penalti, kursus yang didaftarkan pada semester tersebut akan digugurkan, dan sekiranya terdapat keputusan peperiksaan yang telah disahkan pada peringkat Majlis Peperiksaan Universiti (MPU), keputusan peperiksaan tersebut juga akan terbatal.

Pelajar 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 diukur dengan sistem Purata Nilai Gred (PNG) sepanjang pengajian di universiti. Seseorang pelajar yang berjaya mendapat sekurang-kurangnya 2.00 bagi 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 2 untuk menentukan markah PNG dan taraf akademik pelajar. Jika purata gabungan adalah lebih baik, maka pelajar akan diberi taraf terbaharunya tetapi jika purata gabungan adalah kurang baik, maka taraf Semester 2 dikekalkan.

Pelajar dengan PNG kurang daripada 2.00 pada satu-satu semester akan di beri taraf PERCUBAAN 1 (P1). Taraf PERCUBAAN 2 (P2) pula diberikan kepada pelajar yang mendapat PNG kurang daripada 2.00 bagi dua semester berturut-turut. Jika pelajar masih mendapat kurang dari 2.00 bagi PNG semester berikutnya pula, pelajar berkenaan tidak dibenarkan meneruskan pengajian, melainkan PNGK pelajar tersebut 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 dan Sarjana Muda Komunikasi Media Baharu pula, perlu menamatkan program pengajian dalam tempoh masa minimum 6 semester (3 tahun) dan tempoh maksimum 10 semester (5 tahun).

Tempoh Minimum atau Maksimum pengajian pelajar adalah seperti berikut:

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

KURSUS KURATIF

Kursus Kuratif ditawarkan kepada pelajar yang akan bergraduat. Pelajar digalakkan mengulang kursus-kursus yang gagal sebelum memohon untuk mengikuti kursus kuratif. Kursus Kuratif diadakan selepas Semester 2. Permohonan bagi 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 diberi kepada pelajar yang telah mendapat sekurang-kurangnya C dalam kursus tertentu, mengikut sistem penggredan Universiti dan tertakluk kepada terma-terma dan syarat-syarat yang ditetapkan oleh universiti. Pengecualian kredit diberi kepada pelajar yang telah mengambil satu kursus yang sama atau setara dengan 80% kandungan pembelajarannya adalah sama. 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 oleh Pusat Pengajian masing-masing yang telah diluluskan oleh 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 adalah 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	

Gred LULUS untuk sesuatu kursus adalah tertakluk kepada keperluan kursus seperti yang berikut:-

1. Gred LULUS untuk semua kursus ialah Gred C dan ke atas
2. Gred TIDAK LULUS adalah Gred C- hingga Gred F
3. Bagi Kursus Teras, sekiranya pelajar memperolehi PNGK (CGPA) $\geq$ 2.00 dan mendapat Gred C- atau Gred D+, ianya adalah dikira sebagai LULUS. Walaubagaimanapun, pelajar dibenarkan untuk mengulang kursus tersebut untuk memperbaiki GPA/ CGPA.

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	= Jumlah NG Terkumpul / Jumlah Bil. Unit Terkumpul = 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 dalam tempoh 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 borang 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 INGGERIS

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, peperiksaan 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 perlu berjumpa dengan Rakan Pendamping Siswa (RPS) untuk mendapatkan nasihat semasa tempoh pendaftaran.

RPS adalah satu sistem di mana staf akademik menyelia sekumpulan kecil pelajar sepanjang tempoh pengajian pelajar di UniMAP. ‘Penyeliaan’ di sini melibatkan perjumpaan yang kerap secara tidak formal, di mana pelajar boleh bersantai dengan staf yang berperanan sebagai “‘rakan” bagi membincangkan isu-isu akademik dan sosial yang berkenaan dengan mereka. Pelajar yang mempunyai prestasi akademik yang tidak memuaskan boleh merujuk kepada RPS sebagai ‘mentor’, dan pelajar tersebut menjadi ‘mentee’, di mana ini akan benar-benar membantu pelajar dalam setiap perkara yang memerlukan penyelesaian.

PUSAT-PUSAT PEMANTAPAN AKADEMIK

Pusat-pusat ini ditubuhkan untuk menyokong pencapaian akademik pelajar UniMAP:

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

   Pusat ini juga menyokong aktiviti penyelidikan dan pembangunan di UniMAP serta menjadi pusat mereka bentuk dan menghasilkan produk-produk kejuruteraan yang inovatif. Pusat Kejuruteraan juga menawarkan kemudahan bagi kursus-kursus yang memerlukan latihan dan kemahiran teknikal, selari dengan standard industri.

2. **Institut Matematik Kejuruteraan**
   Institut Matematik Kejuruteraan (IMK) adalah pusat yang 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 dalam kampus dan personel luar kampus dalam bidang yang berkaitan dengan matematik.

3. **Pusat Bahasa Antarabangsa**
   Pusat Bahasa Antarabangsa menyediakan kursus-kursus bahasa Keperluan Universiti untuk semua pelajar UniMAP bagi program pengajian peringkat Diploma dan Ijazah Sarjana Muda. Pusat ini menawarkan bukan sahaja kursus Bahasa Melayu dan kursus Bahasa Inggeris tetapi juga menawarkan kursus-kursus bahasa asing lain seperti Bahasa Arab, Bahasa Jerman, Bahasa Jepun, Bahasa Mandarin, Bahasa Korea, Bahasa Rusia dan Bahasa Thai.

4. **Pusat Ko-kurikulum**
   Pusat Ko-kurikulum menawarkan pelbagai kursus Ko-kurikulum dan Badan-badan Beruniform. Semua pelajar wajib untuk mengambil 3 unit kursus Ko-kurikulum. Pusat ini menawarkan 44 jenis kursus untuk pelajar tanpa mengira program akademik mereka.

5. **Pusat Kerjasama Industri dan Agensi Kerajaan**
   Pusat Kerjasama Industri dan Agensi Kerajaan (CIGC) berperanan menjalin hubungan dengan pihak industri dan agensi kerajaan dalam pelbagai aspek, terutama dalam program yang berkaitan terus dengan pembelajaran pelajar. Program seperti pendedahan kepada industri, forum bersama industri dan Latihan Perindustrian Staf, diselia dan diselaraskan oleh pusat ini. Sesetengah daripada program ini wajib diambil oleh semua pelajar.

BAHAGIAN PENGURUSAN AKADEMIK
JABATAN PENDAFTAR

Bahagian Pengurusan Akademik bertanggungjawab mengendalikan urusan-urusan berkaitan kemasukan dan rekod pelajar, peperiksaan dan pengijazahan pelajar serta hal ehwal Senat Universiti.

Bahagian Pengurusan Akademik, Jabatan Pendaftar terdiri daripada:

1. **Unit Kemasukan dan Rekod Pelajar**
   Unit ini bertanggungjawab mengendalikan urusan berkaitan dengan kemasukan dan rekod pelajar. Antara bidang tugas unit ini adalah:

   i. Mengendalikan secara keseluruhan proses pengambilan dan pendaftaran pelajar dalam negara pada peringkat ijazah pertama dan diploma.
   ii. Mengendalikan proses pengambilan dan pendaftaran pelajar antarabangsa pada peringkat ijazah pertama.

iii. Mengurus proses kemasukan dan pengemaskinian data dalam Sistem Maklumat Pelajar.
iv. Menguruskan rekod peribadi pelajar sepanjang pengajiannya di UniMAP.
v. Menguruskan pendaftaran kursus pelajar secara online bagi setiap semester pengajian.
vi. Menguruskan proses pengecualian dan pemindahan kredit pelajar.

2. Unit Peperiksaan dan Pengijazahan

Unit ini bertanggungjawab mengendali dan memantau perjalanan Peperiksaan Akhir Semester dan perkara-perkara yang berkaitan dengannya. Antara bidang tugas unit ini 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 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 urusan peminjaman dan pemulangan jubah staf akademik.
x. Menyemak kelayakan pengijazahan untuk pelajar tahun akhir serta mengeluarkan surat pengesahan tamat pengajian dan kelayakan berijazah 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 siswazah.

3. Unit Senat

Unit ini bertindak sebagai urusetia kepada Senat Universiti dalam mengendalikan urusan berkaitan dengan hal ehwal Senat Universiti. Antara bidang tugas unit ini adalah:

i. Merancang aktiviti Senat dan Jawatankuasa di bawahnya, di samping menyelaraskan perkara yang berkaitan dengan pihak-pihak lain yang berkenaan.
ii. Menyediakan Kalendar Akademik bagi perakuan dan kelulusan Senat Universiti.
iii. Menguruskan pencalonan penerima Ijazah Kehormat

Alamat:

Bahagian Pengurusan Akademik
Jabatan Pendaftar
Universiti Malaysia Perlis
Tingkat 3, Bangunan KWSP
Jalan Bukit Lagi
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PERLIS.

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ACADEMIC CALENDAR 2015/2016 SESSION
(DEGREE PROGRAMME)

SEMESTER 1 7th September 2015 - 17th January 2016 (19 Weeks)				
ACTIVITIES	**DATE**		**PERIOD**	**NOTES**
Registration New Intake / Orientation	1st September 2015	6th September 2015	6 Days	**Independence Day** 31st August 2015
Lecture	7th September 2015	8th November 2015	9 Weeks	**Malaysia Day** 16th September 2015 **Hari Raya Aidiladha** 24th September & 25th September 2015 **Awal Muharam** 14th October 2015
Mid Semester Break	9th November 2015	15th November 2015	1 Weeks	**Deepavali** 10th November 2015
Lecture	16th November 2015	20th December 2015	5 Weeks	-
Study week	21th December 2015	27th December 2015	1 Week	**Maulidur Rasul** 24th December 2015 **Christmas** 25th December 2015
Examination	28th December 2015	17th January 2016	3 Weeks	
Semester Break	19th January 2016	16th February 2015	4 Weeks	**Chinese New Year** 8th & 9th February 2016

ACADEMIC CALENDAR 2015/2016 SESSION
(DEGREE PROGRAMME)

SEMESTER 2 15th February 2016 – 26th June 2016 (19 Weeks)				
AKTIVITIES	**DATE**		**PERIOD**	**NOTE**
Lecture	15th February 2016	10th April 2016	8 Weeks	
Mid Semester Break	11th April 2016	17th April 2016	1 Weeks	-
Lecture	18th April 2016	29st May 2016	6 Weeks	**Labour Day** 1st May 2016 **Israk Mikraj** 5th May 2016 **Birthday of DYMM Tuanku Raja Perlis** 17th May 2016 **Wesak Day** 21st May 2016
Study week	30st May 2016	5th June 2016	1 Weeks	**Birthday of SPB Yang Di-Pertuan Agung** 4th June 2016
Examination	6th June 2016	26th June 2016	3 Weeks	**Nuzul Al-Quran** 22thJuly 2016
Semester Break / Industrial Training	27th June 2016	4th September 2016	10 Weeks * Industrial Training	**Hari Raya Aidilfitri** 7th July 2016 & 8th July 2016 **Independence Day** 31st August 2016

** Industrial Training for 3rd year students of Bachehor of Engineering and 2rd Year students of Bachelor of Business (Entrepreneurship Engineering) will start for 27th June 2016 until 4th September 2016 (10 weeks)*

ADMISSION REQUIREMENTS FOR UNDERGRADUATE DEGREE PROGRAM ACADEMIC SESSION OF 2014/2015

INTERNATIONAL STUDENTS

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
China	• Completed 12 years of education in 3 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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 schooling (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 - 10.00 in Senior Secondary @ Sekolah Menengah Atas examination. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent (Candidates who do not possess qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Saudi Arabia	• Completed 12 years of education in 3 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%
Iraq	• Completed 11 or 12 years of education in 3 levels of schooling (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 qualification equivalent to 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 the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Nigeria	• Completed 12 years of education in 2 or 3 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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 schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Uzbekistan	• Completed 11 or 12 years of education in 2 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%
Yemen	• Completed 12 years of education in 2 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Somalia	• Completed 12 years of education in 2 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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 schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Sudan	• Completed 11 years of education in 2 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%
Syria	• Completed 12 years of education in 3 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Jordan	• Completed 12 years of education in 2 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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 schooling (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 qualification equivalent to 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 the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Libya	• Completed 12 years of education in 2 levels of schooling (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 qualification equivalent to 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 the 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%
Ethiopia	• Completed 12 or 13 years of education in 3 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Iran	• Completed 12 years of education in 3 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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 schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS	
Chad	• Completed 13 years of education in 2 levels of schooling (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 qualification equivalent to 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 the University Senate.	Bachelor of Engineering	**(Electronic-Based)**
			• English 60% • Mathematics 60% • Physics/Chemistry 60%
			(Bio-Based)
			• English 60% • Mathematics 60% • Physics/Chemistry/Biology 60%
		Bachelor of Business	• English 60% • Mathematics 60% • Physics/Chemistry/Biology 60% or Business/ Economics/ Commerce/Accounting 60%
Algeria	• Completed 13 years of education in 2 levels of schooling (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 qualification equivalent to 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 the University Senate.	Bachelor of Engineering	**(Electronic-Based)**
			• English 60% • Mathematics 60% • Physics/Chemistry 60%
			(Bio-Based)
			• English 60% • Mathematics 60% • Physics/Chemistry/Biology 60%
		Bachelor of Business	• English 60% • Mathematics 60% • Physics/Chemistry/Biology 60% or Business/ Economics/ Commerce/Accounting 60%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Bangladesh	• Completed 12 years of education in 2 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%
United Arab Emirates (UAE)	• Completed 12 years of education in 3 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Lebanon	• Completed 12 years of education in 3 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%
Myanmar	• Completed 11 years of education in 3 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Tunisia	• Completed 13 years of education in 2 levels of schooling (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 qualification equivalent to 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 the 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%
Cameroon	• Completed 14 years of education in 2 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Egypt	• Completed 11 or 13 years of education in 3 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%
Cambodia	• Completed 12 years of education in 3 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Vietnam	• Completed 12 years of education in 3 levels of schooling (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 qualification equivalent to 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 the 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%
Turkey	• Completed 12 years of education in 2 levels of schooling (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 qualification equivalent toTOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP). • Other requirements that have been endorsed by the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Tanzania	• Completed 13 years of education in 2 levels of schooling (Primary School and Secondary School). • Pass Advanced Certificate of Secondary Education (A level) with 'principal pass' in at least 2 related subjects. • Obtain minimum Grade C in English at O level. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent (Candidates who do not possess qualification equivalent to 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 the 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%
Zimbabwe	• Completed 13 years of education in 2 levels of schooling (Primary School and Secondary School). • Pass Zimbabwe General Certificate of Education Advanced Level with 'principal pass' in at least 2 related subjects. • Obtain minimum Grade C in English at Zimbabwe General Certificate of Education Ordinary Level. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent (Candidates who do not possess qualification equivalent to 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 the 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%

COUNTRY	GENERAL REQUIREMENTS	SPECIFIC REQUIREMENTS		
Qatar	• Completed 12 years of education in 3 levels of schooling (Primary School, Preparatory School and Secondary School) • Pass and obtain at least 60% in General Secondary Education Certificate (Al-Thanawiyya Al-Amma). • Obtain TOEFL 525 / IELTS 5.5 / Equivalent (Candidates who do not possess qualification equivalent to 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 the 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%

THE ACADEMIC SYSTEM

The Bachelor of Engineering and The Bachelor of Engineering Technology curriculum are designed to be completed in 4 years while the Bachelor in Business and the Bachelor of New Media Communication are 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 the semester. Courses are divided into four levels which are levels 100, 200, 300, and 400.

For the graduation purposes, Bachelor of Engineering students must complete 120 units of Core Courses and the Bachelor of Engineering Technology students will have to complete 123 units of Core Courses. Bachelor of Business students must complete 72 or 74 units of Core Courses (based on specialization) and 30 units of Elective Courses while the Bachelor of New Media Communication students must complete 87 units of Core Courses and 15 units Elective Courses.

Students are also required to complete University Requirement Courses of 17 units for Bachelor of Engineering Degree, 19 units for Bachelor of Engineering Technology Degree, 20 units for Bachelor of Business Degree and 18 units for Bachelor of New Media Communication.

To graduate, students also need to pass all courses and obtain the required number of credits according to their respective study programmes as well as a GCPA of at least 2.00.

PROGRAMME STRUCTURE

The programme structures for the Bachelor of Engineering, Bachelor of Engineering Technology, Bachelor of Business and Bachelor of New Media Communication programme are shown in Tables 1 (a), 1 (b), 1 (c), 1 (d) and 1 (e). Students are required to complete 137 units for Bachelor of Engineering, 142 units for Bachelor of Engineering Technology, 122 or 124 units for Bachelor of Business and 120 units for Bachelor of New Media Communication in order to graduate.

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. English for Technical Communication	2
e. Islamic and Asian Civilization/Malaysian Cultures	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. English for Technical Communication	2
e. Islamic and Asian Civilization/Malaysian Cultures	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

BACHELOR OF BUSINESS (ENGINEERING ENTREPRENEURSHIP)	
COURSES	**UNIT (S)**
BUSINESS CORE COURSES	**72**
ELECTIVES	**30**
UNIVERSITY REQUIREMENT COURSES	**20**
a. Engineering Entrepreneurship	2
b. Thinking Skills	2
c. University Malay Language	2
d. English for Academic Purposes	2
e. Islamic and Asian Civilization/Malaysian Cultures	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**
ELECTIVES	**30**
UNIVERSITY REQUIREMENT COURSES	**18**
a. Engineering Entrepreneurship	2
b. Thinking Skills	2
c. University Malay Language	2
d. English for Academic Purposes	2
e. Islamic and Asian Civilization/Malaysian Cultures	2
f. Ethnic Relations	2
g. Skills and Technology in Communication	2
h. Business Communication	3
i. Co-Curriculum	3
TOTAL	**124**

Table 1(e): Programme Structure for Bachelor of New Media Communication

BACHELOR OF NEW MEDIA COMMUNICATION	
COURSES	**UNIT**
NEW MEDIA COMMUNICATION CORE COURSES	**87**
ELECTIVES	**15**
UNIVERSITY REQUIREMENT COURSES	**18**
a. Thinking Skills	2
b. University Malay Language	3
c. English for Academic Purposes	2
d. Islamic and Asian Civilization/Malaysian Cultures	2
e. Ethnic Relations	2
f. Foreign Language	4
g. Co-Curriculum	3
TOTAL	**120**

TYPES OF COURSES

1. **University Core Courses**
   University Core Courses are courses which are NOT the student's major. These courses are offered by the School of Human Development and Techonocommunication (iKOM), the Centre of International Languages (CIL) and the Co-Curriculum Centre. All these courses are compulsory and students need to pass with grade C to graduate. The University Core Courses are:

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

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

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

d. English for Technical Communication/ English for Academic Purposes (2 units)
It is compulsory for all students to take English for Technical Communication (for Bachelor of Engineering and Bachelor of Engineering Technology) or English for Academic Purposes (for Bachelor of Business and Bachelor of New Media Communication). Students who obtained Band 1, 2 or 3 in MUET must take Foundation English and pass with a minimum of Grade C before enrolling for English for Technical Communication or English for Academic Purposes. These two (2) additional units will be counted as their Option course (refer item (h)). Students who acquired Band 4 or 5 in MUET are not required to take Foundation English before enrolling for English for Technical Communication or English for Academic Purposes. Students who acquired Band 4 or 5 in MUET are also not allowed to take Foundation English as their Option course.

e. Islamic and Asian Civilization/Malaysian Cultures (2 units)
Islamic and Asian Civilization is compulsory for all local students, while Malaysian Cultures is compulsory for all international students.

f. Ethnic Relations (2 units)
Ethnic Relations 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. Optional Courses
Optional Courses are courses which are offered by the School of Human Development and Techonocommunication (iKOM) and The Centre for International Languages for the students of Engineering and Engineering Technology. Two (2) units of Optional Courses have to be taken by students of Bachelor of Engineering and Engineering Technology students, during their study in UniMAP.

i. Business Communication (3 units)
Business Communication is compulsory for all students of Bachelor of Business.

j. Co-Curriculum Programme (3 units)
All students are required to collect 3 units for Co-Curriculum during their study at UniMAP. Two (2) units are to be collected from Uniformed Bodies, where the 1st unit needs to be taken in Semester I and another 1 unit in Semester II (in the First Year of study), while the other 1 unit can be collected from any other Co-Curriculum courses in any semester.

2. Core Courses (Bachelor of Engineering)
Core Courses are courses that must be taken by Bachelor of Engineering students. These courses are part of the requirements for graduation. Students who fail Core Courses must repeat them and pass before they can graduate.

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

4. Core Courses (Bachelor of Business)
There are two types of Core Courses for the Bachelor of Business:

a. Business Core Course: Business Core Courses are contemporary courses in the business field. It is compulsory for Bachelor of Business students to take these courses.

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

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

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

6. **Prerequisite Courses**
   All students MUST take and pass prerequisite courses set before registering for any subsequent courses. The subsequent courses have prerequisites which have to be fulfilled as determined in the academic programme structure of the degree programmes offered. Students, who fail the prerequisite courses and intend to take them together with the subsequent courses in the same semester, must apply to and obtain the approval of the Dean of schools. Note, however, that prerequisite and subsequent courses cannot be taken together in the same semester for language courses.

THE UNIT SYSTEM

Each course is given a value known as the UNIT. The unit is based on the scope and the 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 mode such as Problem Based Learning (PBL), e-learning modules, visits ect….	1	3 hours
Industrial Training	1*	Depending on the programme of study

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

TEACHING AND LEARNING APPROACHES AT UniMAP

Many of the Core Courses offered include Theory Component and 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 for Engineering programme is equivalent to 2 contact hours per week or 28 hours per semester. One (1) unit of Practical Component for Engineering Technology programme is equivalent to 3 contact hours per week or 42 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 Components consist of the following teaching and learning modes:

1. **Lab Intensive Learning** - two or three students carry out an experiment in a group. In some basic lab intensive programmes, each student will conduct an experiment individually (1:1) and not in a group.

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** - Learning approach that is reinforced using ICT, complementing the conventional approach. Through the UniMAP website, students obtain access to course modules 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 Exposure (IndEnt) and others.

INDUSTRIAL TRAINING

Industrial Training is a course, carrying 4 units for Bachelor of Engineering students, 12 units for Bachelor of Engineering Technology students, 6 units for Bachelor of Business and Bachelor of New Media Communication students.

Third (3rd) Year Bachelor of Engineering students are required to undergo 12 weeks of Industrial Training in order to collect 4 credits for this course while 4th Year of Bachelor of Engineering Technology students are required to undergo 12 weeks of Industrial Training in order to collect 12 credits for this course. Third year students Bachelor of New Media Communication 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 Option 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 the selected multinational companies in Malaysia for the first 3 months, followed by an educational trip abroad (International Business Field Trips).

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

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

The main objectives of the Industrial Training are to:

- Instill professionalism in students
- Raise students' awareness on the importance and connection between industrial training, lab - intensive and engineering theories.
- Provide students with early exposure to industrial environment and practices. Students also are given the opportunity to equip themselves with the necessary skills and knowledge needed in their respective academic and training fields.

The Centre for Industrial and Governmental Collaboration (CIGC) coordinates programmes which require the involvement of industry and government's agencies with relevant units and centres:

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

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

BUSINESS INCUBATOR PROGRAMME

Teaching and Learning approaches for Bachelor of Business (Engineering Entrepreneurship) programme, not only includes lectures and tutorials but also Practical

Training through the Business Incubator Program. After the 4th semester, students will participate in the Business Incubator Programme for 12 weeks which will earn them 6 credit hours.

Students are mentored by companies in Business Incubators, providing them the opportunity to be part of the 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 programme, students are required to prepare a report on their experience throughout the Business Incubator Programme in the selected companies.

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 (2nd) and fourth (4th) 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 in collaboration with UniMAP Centre for Industrial and Governmental Collaboration (CIGC).

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

COURSE CODE

Each course is assigned a code. For Bachelor of Engineering, Bachelor of Engineering Technology, Bachelor of Business and Bachelor of New Media Comunication programmmes, the codes are summarized in Tables 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 programme offered
E	Bachelor of Engineering
B	Bachelor of Business
P	Bachelor of Engineering Technology
K	Bachelor of New Media Communication
U	General Course (This subject can be taken by students from all programmes)

Table 3(b): Second Alphabet;
Courses offered by faculties

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

Second alphabet in the code	Faculty offering courses
C	Engineering Centre
Q	Institute of Engineering Mathematics
I	Centre for Industrial and Governmental Collaboration
F	Centre of Business Innovation and Technopreneurship (PPIPT)
U	School of Human Development and Techonocommunication (iKOM)
V	Centre for International Languages
Z	Co-Curriculum Centre

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

Third alphabet in the code	Types of Courses (University Requirement or Core Courses)
T	Core Courses
W	University 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 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,
↓	↓	∟	→	→	→	→	TYPE OF COURSE	Refer Table 3(c)
↓	∟	→	→	→	→	→	FACULTIES	Refer Table 3(b)
∟	→	→	→	→	→	→	TYPE OF PROGRAMME	Refer Table 3(a)

PRE-REGISTRATION

Pre-registration is a system that enable students to pre-register their courses via online for all the courses to be taken in the following semesters at an earlier period. The period set for the preregistration is before the semester break of each semester. All students (Active/ P1 or P2 Status/ With Outstanding Fees) ARE REQUIRED to perform the preregistration process.

Students MUST register within the deadline set. Courses to be registered are courses to be taken in the following semester (all courses including Cocurriculum Courses). Students are encouranged to meet with their Rakan Pendamping Siswa (RPS) and to fill up the HEA-09a (Course Registation Form) form prior to the Pre-registration process. Students who fail to Pre-register their courses within the period set, run the risk of their official registration to be affected (seat for the course are subject to availability). For the pre-registration, students are not required to print the Pre-registration slip or to get the approval from their RPS.

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 Student Admissions and Records Unit via email and portal.

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 slip for verification by RPS in the system during the discussion session. Registration of courses without the RPS verification is considered INVALID. If there are any changes in student course registration, i.e add, drop or withdraw courses within the prescribed period, the student must also obtain verification from the RPS.

Students who fail to register within the prescribed period shall be subject to a penalty of RM50. Late registration must not exceed the 3rd week of the semester. Students must complete form HEA-09 (Late Registration Form) and obtain the approval from the Dean.

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

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

Students who do not register for a maximum of 2 consecutive semesters without any reason can be terminated through the submission of form HEA-20 (Termination of Study Form).
Students who have been terminated and wish to place an appeal to reasume their studies may do so by submitting an appeal letter to the Vice-Chancellor through the Dean (Dean's verification required). A penalty of RM100 will be imposed on the student whose application for re-admission has been approved.

1. **Active Student Course Registration**
   All "Active" students are allowed to register not more than 22 units and not less than ten 10 units except for those who are involved in Industrial Training and the Final Year Project. Student, who wish to register more than 22 units, need to obtain approval from their RPS and verification by the Dean. Table 5 below summarises units that students can register for each semester based on their status:

Table 5: Summary of Units for Active Student

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 with the approval from the Dean and must also fill the HEA-09a form (Course Registration Form).*

2. **Probation Student Course Registration (P)**
   Student with the "Probation" status are not allowed to register online, by themselves. The students must meet up with their RPS to obtain confirmation from the Dean. They also need to fill up form HEA-09b (Course Registration Form-Probation (P)) before handing it to the Assistant Registrar. Only the Assistant Registrar of School/Registrar Office is allowed to register the subjects for the students in this case. The numbers of units allowed is as in Table 6 below:

Table 6: Summary of Units for Probation Student

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 adding of courses is up to week 2 (week of study).
   b. Students are required to fill in Form HEA-11 (Adding Course Form) 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 6 (week of study).
   b. Students must use Form HEA-10 (Dropping Courses Form), to be signed by the course

lecturer, Dean of the School and submit it to the Assistant Registrar of the School to be updated in the system.

3. Course Withdrawal (TD)

a. With the consent of 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 at week 12 (week of study). To apply to withdraw from a course, student must fill in Form HEA-19 (Course Withdrawal Form).
b. Permission to allow students to withdraw a course is subject to the minimum unit allowed except with permission of the Dean.
c. Witdrawal status (TD) will be recorded in the record of registration and academic transcript. However, the grade will not be included to contribute towards the GPA and CGPA.

CHANGE OF PROGRAMME

Change of programme refer to the changing of a programme of study to another, for reason agreed by both of the current Dean and Dean of school offering the intended programme.

Students are not encouraged to change programmes as it involves distribution of resources that have been planned at the beginning of each academic session. However, an appeal to change programme can be considered based on certain conditions:

1. An application can only be made by students upon completion of at least one semester of study. The students will have to complete form HEA-12 (Change of Programme Application Form). The application form is available at the Registry Department or at Schools. However, for certain cases, change of programme at the beginning of study, may be considered with approval by the Vice Chancellor or Deputy Vice Chancellor (Academic & International).
2. The application must be submitted within the first 2 weeks of the semester. The application form must be attached together with a copy of the latest semester result or Matriculation/STPM/Diploma result.
3. Students can only apply for change of programme no later than the first 2 semesters of study at UniMAP. An application made into the 3rd semester of study will not be considered.
4. Every application for change of programme must be justified with strong reasons for the change. The application must be approved by the RPS (the current and intended programme), Dean of the school (the current and intended programme), the Dean of Academic Management and Vice Chancellor / Deputy Vice Chancellor (Academic & International).
5. For students who have obtained scholarships or PTPTN or other types of sponsorships, must be obtained 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 Courses 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 transcrip, the GPA/CGPA and credit amassed will not be taken into account.
8. Student who change programmes across different fields can only apply for credit transfer for University Core Course 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 transcrip, 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 studies in a semester for reasons allowed by the university.

Postponement of study is permitted for students who have 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 and 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 Form) which can be obtained from The Registry Department or schools. Application 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 counsellor (if applicable)
5. Recommended by the Dean of Academic Management and
6. Approved by the Vice Chancellor / Deputy Vice Chancellor (Academic and International).

Application for postponement of study should be submitted before the 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 the Vice Chancellor / Deputy Vice Chancellor (Academic and International).

Students are not allowed to postpone their studies for more than 2 semesters consecutively except with the approval of the Vice Chancellor / Deputy Vice Chancellor (Academic and International). In cases not related to health, students are only allowed to leave the university after the application for postponement is approved by the university. Student who leave 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 counted for graduation (without penalty). For case without penalty, courses registered in the particular semester will be dropped and results verified by the Majlis Peperiksaan Universiti (MPU) (if any), will be cancelled.

Students who postpone their study 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 / Deputy Vice Chancellor (Academic and 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 Majlis Peperiksaan Universiti (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. Student who fail to submit an application for the postponement of studies within a period of time will be terminated from the university. Their names will be dropped from the list of Registered Students and verified as having quit from the university.

STUDENT GRADING

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 with the next semester. Students are also required to obtain minimum Cumulative Grade Point Average (CGPA) of 2.00 in order to graduate.

For students who are allowed to take the Curative Course (course offered during long semester break), the examination results will be combined with their Semester 2 examination results, in order to determine the GPA and 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 result for Semester II, then the status of Semester 2 will be maintained.

Students with GPA lower than 2.00 in a semester, will be given the Probation 1 (P1) status. The Probation 2 (P2) status is given to students with 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 student who does not perform and fulfil the 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 8 semesters (4 years) or the maximum 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 and Bachelor of New Media Communication students' should complete the programme within a minimum of 6 semesters (3 years) and a maximum of 10 semesters (5 years).

The minimum and maximum period of study is as follow:

Programme	Minimum (Semester)	Maximum (Semester)
Bachelor of Engineering	8	14
Bachelor of Engineering Technology	8	14
Bachelor of Business	6	10
Bachelor of New Media Communication	6	10

CURATIVE COURSES

Curative Courses are offered to student who will graduate. Students are encouraged to repeat courses that have failed before applying for curative courses. Curative Courses are held after Semester 2. 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 one time. Only tutorials will be conducted for these courses. Curative course normally comprises 2 weeks of tutorials and a week of examinations.

CREDIT EXEMPTION

Credit Exemption is defined as an exemption from registration and study of a course prescribed for a programme, based on the course taken by the student before being accepted into the university programme, as approved by the Dean of a School/ Dean of Academic Management.

Credit Exemption is given to students who have obtained at least a C in certain courses, according to the grading system of the University and subject to the terms and conditions set by the university. Credit Exemption is given to students who have taken a course that is the same as, or cointain at least 80% similarities to a course for which exemption is applied. Two or more courses can also be combined for the purpose of credit exemption for one course offered at UniMAP.

Credit exemption for certain courses depend on the list of courses approved by the respective School and has been approved by the Senate.

EXAMINATION AND EVALUATION SYSTEM

Written examination is conducted at the end of the semester. Every student must fulfil the requirements for lecture, tutorial, practicum and other requirements before being eligible to sit for an exam. The duration for the exams is as follows:

Figure 7: 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 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 8: 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	

The passing grade of a course is subject to the requirement of the course as follows;

1. The PASSING grade for all courses is Grade C and above
2. The FAILING grade is C- to F
3. For Core Courses, if students were to obtain a CGPA of ≥ 2.00 and has obtained C-/D+, they would be considered as having PASSED. However, students are allowed to repeat the course to improve GPA/ CGPA.

Figure 9: Calculation of GPA and CGPA:

COURSE	UNIT	GRADE VALUE [NG]	GRADE [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 = $\frac{\text{Total Accumulated Grade Value}}{\text{Total Accumulated Unit}}$ = $\frac{62.00 + 59.75}{20 + 18}$ = 3.20				

APPEAL FOR EXAMINATION RESULTS REVISION

In certain cases, a student might wish to apply for a revision of their examination results. Students are only allowed to appeal for a revision within the duration of 15 days after the examination results are officially released by the Registrar. Application 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, and Registry Department. The appeal form must be submitted within the period of 15 days after the official result is announced. Students will have to fill in their details in two (2) copies, one of which is the student copy. Students will be charged RM50 per course for appealed. Payment shall be made in cash or using Money Order / Pos Malaysia / Bank Draft / Cheque in the name BENDAHARI UniMAP.

ENGLISH LANGUAGE USE

Malay is the official language of the university. However English is used widely in the teaching and learning process at UniMAP. This is to help students in their career. For courses that are taught in English, the examination will be conducted 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 course registration is done online, students are advised to meet with their RPS during the registration exercise for advisory purposes.

In the system, an academic staff supervises a small group of students for the whole duration of the students' study period in UniMAP. 'Supervision' here entails frequent meetings under informal settings, where students are able to discuss about academic and social issues with their lecturers who act as a 'buddy' to them. Students who have unsatisfactory academic performance may refer to RPS as a mentor, and the student is a 'mentee'.

ACADEMIC SUPPORT CENTRES

These centres are established to support UniMAP students' academic achievement.

1. **Engineering Centre**
   The Engineering Center was established to manage laboratories and workshops which are vitally needed for various programmes in UniMAP.
   Besides managing laboratories and workshops, this centre also supports research and development activities in UniMAP and aspires to be a centre for designing and creating innovative engineering products. The Engineering Centre also offers facilities for courses which require training and technical skills, conforming to industry standard.

2. **Institute of Engineering Mathematics (IMK)**
   The Institute of Engineering Mathematics is a centre which plans and handles engineering mathematics curriculum in UniMAP. It also serves as as a reference centre in providing expertise in mathematical research methods, simulation and statistical methods. IMK also serves as a training center for in-campus and off-campus personnel in fields related to mathematics.

3. **Centre for International Languages (CIL)**
   The Centre for International Languages (CIL) provide language courses which are a requirement for students enrolled in all UniMAP programmes, at both diploma and undergraduate degree levels. CIL offers not only Bahasa Melayu and English but also foreign languages such as Arabic, German, Japanese, Mandarin, Korean, Russian and Thai language.

4. Co-curiculum Centre

The Co-curiculum Centre offers many co-curricular and uniform bodies courses. It is compulsory for all undergraduate students to take co-curricular courses. This centre offers up to 44 co-curricular courses for students irrespective of their academic programmes.

5. Centre for Industrial and Governmental Collaboration (CIGC)

The Centre for Industrial and Governmental Collaboration (CIGC) liaises with industrial sectors in various aspects, especially in programmes directly related to students' 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.

ACADEMIC MANAGEMENT DIVISION, REGISTRAR'S DEPARTMENT

Academic Management Division is responsible for handling matters related to admission and student records, examinations and graduation of students and the Senate.

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

1. Admissions and Student Records Unit

The admissions and Student Records Unit is responsible for handling matters related to the admission and student records. This unit carries out the following tasks:

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 enrolment of international students at undergraduate level.
iii. Manage and updating the data processing aspects of the Student Information System.
iv. Manage personal records of students throughout their studies at UniMAP.
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

The examination and Graduation Unit is responsible to manage and monitor the process of Final Examinations and other matters related. This unit is responsible for the following:

i. Issue the Examination Circular to Schools/ Centres/ Institutes.
ii. Issue Examination Schedules for Diploma and Degree Programmes.
iii. Manage the Final Examination during the prescribed period.
iv. Acts as the Secretariat for the University Examination Council.
v. Manage the processing of exanmination data using the Student Information System.
vi. Issue Final Exam results.
vii. Manage students' appeal for a review of examination results.
viii. Issue academic transcripts after the Convocation.
ix. Conduct the process of borrowing and returning of robes for academic staff.
x. Review students' eligibility to graduate for final year students and issue Completion of Study letter.
xi. Responsible for the students convocation process with regard to the invitation, borrowing and returning of robes.
xii. Manage the preparation and delivery of graduation scrolls to the graduates.
xiii. Record and update data of graduates.

3. The Senate Unit

The Senate Unit is responsible for handling matters related to the Senate. The unit is responsible for the following:

i. Plan activities of the Senate and Committee, as secretariat and coordinate with other relevant parties
ii. Provides Academic Calendar for certification and approval of the Senate
iii. Manage the nomination of Honorary Degree recipients

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IINTRODUCTION OF FACULTY OF ENGINEERING TECHNOLOGY

The Faculty of Engineering Technology (FEtech)

Faculty of Engineering Technology (Eng-Tech), UniMAP is established at Universiti Malaysia Perlis in 2013's. Its establishment is in line with the objectives of the Technical University in Malaysia under the Malaysian Technical University Network, (MTUN), which is to educate and train highly talented workforce to contribute to the advanced industrial countries, in addition to being a catalyst for national strategies to achieve high-income nation status.

UniMAP has begun to move towards the establishment of the Faculty of Engineering Technology since 2011 with the inception first engineering technology programme namely, Bachelor of Chemical Engineering Technology (Hons) (Biotechnology Industry) under the auspices of the School of Bioprocess Engineering. In 2012 additional four (4) new engineering technology programme under several other engineering school has been introduced :-

1. Bachelor of Mechanical Engineering Technology (Hons) (Machining) managed by the School of Manufacturing Engineering
2. Bachelor of Mechanical Engineering Technology (Hons) (Agriculture Systems) managed by the School of Bioprocess Engineering
3. Bachelor of Electrical Engineering Technology (Hons) (Industrial Power) managed by the School of Electrical Systems Engineering
4. Bachelor of Electronics Engineering Technology (Hons) (Electronic Network Design) managed by the School of Computer and Communication Engineering.

In 2013, in addition to continuing the five (5) existing engineering technology programs, the Faculty of Engineering Technology has begin to offer eight (8) another new programmes :-

1. Bachelor of Chemical Engineering Technology (Hons) (Chemical Process Industry)
2. Bachelor of Engineering Technology in Mechanical Engineering (Hons) (Product Development)
3. Bachelor of Engineering Technology in Mechanical Engineering (Hons) (Material Processing)
4. Bachelor of Engineering Technology in Electrical Engineering (Hons) (Technology Robotic and Automation)
5. Bachelor of engineering Technology in Electronics Engineering (Hons) (Electronic Systems)
6. Bachelor of Engineering Technology in Electronics Engineering (Hons) (Integrated Electronics)
7. Bachelor of Engineering Technology in Electronics Engineering (Hons) (Design Telecommunications Electronics)
8. Bachelor of Engineering Technology in Civil Engineering (Hons) (Construction)

In new Academic Session 2016/2017, new programmes will be offered :-

1. Bachelor of Chemical Engineering Technology (Hons) (Agrofood)-RYXX
2. Bachelor of Mechanical Engineering Technology (Hons) (Sport Technology)-RYXX
3. Bachelor of Engineering Technology in Civil Engineering (Hons) (Building) – RYXX

Engineering Technology at UniMAP offer a unique area where that bridges the existing engineering field, which focuses on the theory and design of engineering applications. Engineering technology is a field that applies the knowledge of applied mathematics and science by learning theory and practical experience in the aaplication of engineering principles through advanced technology practices for public benefit. All engineering technology program at UniMAP employs teaching and learning in a practical oriented approach. Emphasis is practical and laboratory activities which will be given more focus without compromising adequate theoreticaly of content.

In short, the difference that can be drawn between the field of engineering and engineering technology are as follow :-

- Engineering Technology programme will produce a practical engineer, able to deal with problem solving skills and the application of technology
- Teaching and learning will involve a lot of practical work in laboratory and field in addition to not deplete the theoretical contently
- Research will focus on the current technology, especially related to the application of technology, the latest processing and settlement problems.

Although both engineering and engineering technology generally compete in getting the same job, the fact they actually work hand in hand with each other in a group of engineers, technical

engineers engineering technology program graduates will be involved more and more to work implementing technology applications, while engineers graduate engineering programs are more focused on the design and planning of a technology.

- **Department of Chemical Engineering Technology**

  Description of Chemical Engineering Technology Department

  Chemical Engineering Technology Department is offering two programs known as Bachelor of Chemical Engineering Technology (Industrial Biotechnology) and Chemical Engineering Technology (Industrial Chemical Process) program. Those programs 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 chemical and biotechnology-based industries.

  Bachelor of Chemical Engineering Technology (Industrial Biotechnology) – RY21

  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 qdequate communication and soft skills that could equip the graduates to serve in the biotechnology-based industries and biofuels, biopharmaceuticals, enzymes, biomaterials and bioenergy that ensure sustainability and optimization of resources used.

  Bachelor of Chemical Engineering Technology (Industrial Chemical Process) – RY20

  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.

  Career Opportunities

  Careers for Chemical Engineering Technology (Industrial Biotechnology) Program in related industries :-
  - Biofuel
  - Biopharmaceutical
  - Enzymes
  - Biomaterials
  - Bioenergy

  Careers for Chemical Engineering Technology (Industrial Chemical Process) Program in related industries :-
  - Oleochemical
  - Petrochemical
  - Polymer
  - Oil and gas
  - Biofuel
  - Biodesel
  - Bioenergy
  - Biopharmaceutical

- **Department of Electronic Engineering Technology**

  Department of Electronic Engineering Technology is offering four (4) programme known as Bachelor of Electronics Engineering Technology (Hons) (Electronic Systems), Bachelor of Electronic Engineering Technology (Hons) (Integrated), Bachelor of Electronic Engineering Technology (Hons) (electronic Telecommunication Design) and Bachelor of Electronic Engineering Technology (Hons) (Electronic Network Design).

  Bachelor of Electronic Engineering Technology (Hons) (Electronic System) – RY40

  Bachelor of Electronic Engineering Technology (Hons) (Electronic System) is a programme offered under Department of Electronic Engineering Technology. The programme curriculum which is has been designed is aimed to render the needs of knowledge highly skilled engineering technologist in parallel with Malaysian National Industrial Master Plan aspiration. The programme focuses on industrial exposure, through direct involvement with the

industrial sector. This four years programme emphasizes on integrated circuit (IC) design and IC fabrication with include semiconductor technology, microfabrication process technology, microelectronic reliability and failure analysis. In addition, the programme also covers semiconductor physics, Micro-Electro—Mechanical System (MEMS) as well as IC packaging.

Career Oppotunities

There is a high demand for highly skilled electronic engineering technologist in private and government sector especially in microelectronic fabrication and failure analsis. Career prospect for our graduates are very promising. Among the fields that may be ventured into by the graduates are :-

- Semiconductor / Microelectronic Fabrication
- Mask Design
- Process and Devices Simulation
- IC Packaging
- Reverse Engineering on ICs

The graduates can look forward for career opportunities in :-

- Research and Development sector in multi-national company, local and small industries, universities and local authorities such as MIMOS and SIRIM
- Semiconductor fabrication industry where product manufacturing process requires “hands – on” expertise
- Electronics, IC Design, Factory Automation, Process, Integrated Process and Production Technologist, R&D Technologist, Executive Manager and Technical Entrepreneur

Bachelor of Engineering Technology (Hons) (Integrated Electronic) – RY44

Bachelor of Electronic Engineering Technology (Hons) (Integrated Electronic) is a programme offered under the Department of Electronic Engineering Technology. The programme curriculum which has been designed is aimed to render the needs of knowledgeable highly skilled engineering technologist in parallel with Malaysian National Industrial Master Plan aspiration. The programme covers both full custom IC design and semi custom IC design for digital, analogue, mixed-signals systems, field programmable gate array (FPGA) applications and system on chip (SoC) desing. The programme also emphasizes on conventional electronic subjects, which include power electronic, electronic instrumentation, control systems, computer architecture and digital signal processing.

Career Opportunities

There is a high demand for highly skilled electronic engineering technologist in provate and government sector especially in IC desing, fabrication and testing. Career prospect for the graduates are very promising. Among the fields that may be ventured into by the graduates are :-

- VHDL- based Design
- Mask Design
- Process and Devices Simulation
- Application Specific ICs (ASICs) and Very Large Scale Integration (VLSI)
- Reverse Engineering on ICs

The graduates can look forward for career opportunities in :-

- Research and Development sector in multi-national company, local and small industries, universities and local authorities such as MIMOS and SIRIM
- Semiconductor fabrication industry where product manufacturing process requires “hands – on” expertise
- Electronics, IC Design, Factory Automation, Process, Integrated Process and Production Technologist, R&D Technologist, Executive Manager and Technical Entrepreneur

Bachelor of Engineering Technology (Hons) (Electronic Telecommunication Design) – RY41

The Bachelor of Engineering Technology (Hons) (electronic Telecommunication Design) is designed to prepare students for careers in the telecommunications industry as well as to address the transfer and continuing education needs of associate degree graduates in Telecommunication or other related disciplines. The programme has a sound foundation of Mathematics and Physics, provides a variety of electives in the Arts, Sciences and the Humanities and is focused on applying current engineering technology methods to the solution of technical problems.

Career Opportunities

Program graduates, known as Telecommunications technologist, are well prepared for a wide range of industry positons in the areas of telecommunications systems. Career prospect for our graduates are very promising. Among the fields that may be ventured into by the graduates are :-

- Telecommunication System and Network
- Transmission and Switching Systems
- Security in Communication Networks
- Optical and Wireless communication
- Internet Technologist
- Telecommunication Technologist

Bachelor of Electronic Engineering Technology (Hons) (Electronic Network Design) – RY43

Students of this programme are equipped with sound theoretical foundation and ample practical work to cater for the high demands of current industry where everything is now connected via electronic network. These industry-driven skills and knowledge include security design, network modelling, router administration and networking programming.

Career Opportunities

Graduates of this programme, known as network design technologist, can expect to venture a career in the computer and communication systems area, which include but not limited to :-

- Network Analysis
- Network Security
- Internetworking
- IP Telephony
- Network Desing
- Data Systems Specialist

- **Department of Electrical Engineering Technology**

Department of Electrical Engineering offers two programmes, Bachelor of Engineering Technology (Electrical) (Hons) (Industrial Power) and Bachelor of Engineering Technology (Electrical) (Hons) (Robotic and Automation)

Industrial Power (RY31)

Bachelor of Engineering Technology (Hons) (Industrial Power) is a programme offered under Department of Electrical Engineering. This programme is focuses on the needs of leading electrical engineering technologies to develop an engineer that have more practical skills and knowledge to solve the real problems at the workplace. This programme is known for quality and responsiveness to industry. In addition to a solid foundation in industrial power concepts, students will learn the most current and relevant topics for today's advanced technologies. Real world theory and applications are emphasizes throughout the in industrial power technology degree program and theory is balanced with extensive hands- on experience.

Career Opportunities

There is a high demand for highly skilled electrical engineer in private and government sector especially in maintenance, operation and electrical services. Career prospect for our graduates are very promising. Among the fields that may be ventured into by the graduates are :-

- Electrical power distribution sector
- Electronic and instrumentation sector
- Renewable energy and energy management sector
- Education sector
- Manufacturing sector

Bachelor of Electrical Engineering (Hons) (Robotic and Automation) (RY32)

Bachelor of Electrical Engineering Technology (Hons) (robotic & Automation) is a new programme offered in UniMAP. This programme is a multi-diciplinary field that is synergistic of electrical, mechanical, electronic, control and computer engineering discipline which enables its graduates having good theoretical and practical-oriented knowledge of integrated mechatronic systems to cater for the needs in the robotics and automation industry.

The curriculum of the programme is designed to produced graduate professionals who equipped with analytical skills and ability to work in all multidisciplinary engineering fields and industries. In addition to a solid foundation in machatronics concepts, Engineering Technology Degree students learn the most current relevant topics for today's advanced technologies. Additionally, the learning environment will be more enjoyable and competitive with good mixture between local and international students.

Career Opportunities

Robotic and Automation Engineering 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 mufacturing, processing, automotive, aviation and shipping, mining and services, communications

and building services and medical industries. Among of the firms that had offered employment opportunisities to the graduates of these areas are as follow :-

- Vehicle making and installation firms
- Home making appliances firms
- Electronic product 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 firms
- Hospitals
- Companies, maintenance and repair firms of medical equipment
- Companies, marketing and sale firms of medical equipment
- Manufacturing industry of medical instrumentation
- Education and training (universities, polytechnics and colleges)

- **Department of Mechanical Engineering Technology**

Mechanical Engineering technology activities include the application, testing, manufacturing, field services engineering as well as development and utilisation of latest mechanical and production of tools, machines as well as their products. Hence, this department is committed to prepare the students for a wide range of technological challenges in this exciting field through highest-quality educational programmes. The primary goal is to provide students with a solid technical foundation which enable to readily adaprt to a wide variety of careers within the existing engineering field.

Careers Opportunities

The degree programme in mechanical engineering technology prepares graduates for various possible in manufacturing, sport technology, agricultural and other technical industries which include :-

- Production or process engineer / technologist
- Product engineer / technologist
- Service engineers / technologist
- Quality engineer / technologist
- R & D engineer / technologist
- Agra-based production engineer / technologist
- Agro-based SM / R & D
- Agra-based sales / technical services
- Maintenance and service indudtries
- Electronic packaging / metal / polymer / materials processing industries
- Automotive industries

This department offers four (4) exciting Mechanical engineering Techology degree programmes, namely :-

Mechanical Engineering Technology (Machining) – RY55

This programme prepare the workforces who are productive, innovative, creative and well verse with the state-of-the art technology related to mechanical engineering technology. In essence, the programme curricular is designed to lead towards practical needs so as to produce highly skilled graduates in the field of engineering and technology that meet the recent industrial requirement and other sectors concerned. In particular, this programme emphasises on the applications or utilisations of related knowledge and skills within the spectrum of mechanical and machining technology fields. This includes material and metal cutting technology, management of technology and sustainability. In addition, the required university course allow the students to enchance their communication and thinking skills, as well as ethical elements of professionalism in their careers.

Mechanical Engineering Technology (Agricultural Systems) – RY56

The programme aims to generate engineering technologist who are competent and posses a sound and balanced skill in integrating biological engineering and management principles. The course are delivered based on practical approach that covers basic and applied engineering principles of economics and business management in the agricultural and related industries. The students are also exposed to agra-industrial know-how through courses and skills that are applicable in many related industries. The final semester of the programme is dedicated to the industrial training activitiy attaching the students to relevant industries mainly to enchance their capability and skill in accordance to the market needs.

Mechanical Engineering Technology (Product Development) – RY57

The objectives of this programme is to produce highly skilled qraduates that possess solid foundation knowledge in the general field of mechanical engineering technology and in the areas of product development particularly. The programme has been designed in a holistic manner to provide students with a blend of theoretical knowledge, industrial artistic and technical skills in the discipline of technology-based product development in line with the requirements of the mechanical engineering industry. Therefore, it would help in producing engineering technologist who are responsible in applyinh, preparing, maintaining and development products in all aspects to modern mechanical engineering technology.

Mechanical Engineering Technology (Material Processing Technology) – RY58

The objective of this programme is to produce graduates who are skilled, competitive and have a strong knowledge based in the field of materials processing engineering technology. Graduates will have the capability to demonstrate as a knowledge and talented engineering technologist in problem solving skills, in addition to materials processing, characterization and testing in materials processing technology field.

The course are delivered based on practical approach that covers four main fields which is metal processing, polymer processing, electronic packaging and ceramic processing as well as principles in economics and management. The programme has been designed to cultivate materials engineering technologist who are committed to the important of life-long learning and continuous improvement. Hence, upholding the importance of professionalism and ethics of material processing profession to form a cultured and more developed society.

Mechanical Engineering Technology (Sports Technology) – RYXX

The objective of this programme is to produce highly skilled engineering technologist capable of providing knowledge-based practical engineering services to the sports, sports science, and exercise and rehabilitation industries. Also, to produce graduates, as sports engineering technologist, who are capable of making a contribution to society and design and test of sports equipment and product to enhance athlete performance by providing a detailed understanding of human performance, sport related business studies and product design principles. It has been specifically developed to provide the sports industry with graduates possessing the required specialist technological knowledge and skills.

Career Opportunities

Graduates can seek employment in sporting organisations and institutes, orthopaedic and industrial design companies and can work together with scientists, coaches, athletes, the disables, sporting goods manufacturers, venue managers and other engineers.

Within these organisations and individuals, the sports engineering technologists will have the skills to develop equipment and facilities used by sportspersons including designing sporting goods, rehabilitation devices, apparel, computer simulation models and infrastructure that will improve and enhance athletic performance.

However, being based on a mechanical engineering technology degree, graduates will retain flexibility in the choice of engineering industry for their careers. In most cases graduates will also be able to work wherever mechanical engineering technologists are employed.

- **Department of Civil Engineering Technology**

Currently, Department of Civil Engineering Technology offers one (1) degree programme namely Bachelor of Civil Engineering Technology (Hons) (Constructuion). This programme will be offered under auspices of School of Environemtal Engineering located at Kompleks Pusat Pengajian Jejawi 3, Jejawi, Arau, Perlis.

Civil Engineering Technology (Construction) – RY11
This programme is design to equip students with the essential knowledge and skill needed to enter careers in construction, operation, maintenance of the built environment and global insfrastructure. Therefore, the graduate of this programme will have skills in the construction, testing, operation and maintenance of building and infrastructure. They also will have the ability to utilize basic construction documents to participate in construction activities.

Bachelor of Civil Engineering Technology (Building) -RYXX

This programme is design o produce graduate which has expertise theoretically and practical in areas of technology building construction. It is also design to to produce graduate with technical expertise and where knowledge engineering technology they will be able to apply according to demand current market and able to expand their knowledge through own learning continuously. They also will have the ability to use entrepreneurial skills especially in construction field.

Career Opportunities

Employment prospects and the career of the graduates are broad because this programme combines the necessary skills in three important fields : Construction Management, Engineering and Entrepreneurship. These skills are necessary to successfully manage construction projects. In our programme, students learn how to build projects, prepare construction estimates, generate project schedules, handle field opearions, administer construction contracts, use surveying equipment, perform structural design (wood, concrete and steel structures), understand accounting principles, determine economical feasibility and communicate with others effectively. These skills position our students to succeed employments as :-

- Contractor
- Developer
- Survey Contractor
- Construction Inspector
- Material Tester
- Building Inspector
- Estimator
- Sales Engineer
- Installation Supervisor
- Quality Control Supervisor
- Structural Detailer
- Project Coordinator / Manager

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BACHELOR OF CIVIL ENGINEERING TECHNOLOGY (Honours) (CONSTRUCTION) RY11

PEO Bachelor of Civil Engineering Technology (Construction)

PEO 1
Graduates who are practically expertise in construction technology field

PEO 2
Graduates who have technical skill and construction engineering technology knowledge where they can apply according to current market

PEO 3
Graduates who are able to expand their construction engineering technology knowledge through continuous self learning

PEO 4
Graduates who demonstrate entrepreneurial skills in construction.

PO Bachelor of Civil Engineering Technology (Construction)

PO 1
Ability to apply knowledge of mathematics, science, engineering fundamental and an engineering specialisation principles to defined and applied engineering procedures, processes, systems or methodologies;

PO 2
Ability to solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialisation;

PO 3
Ability to design solutions for broadly-defined construction engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health safety, as well as cultural, societal, environmental and sustainability concerns;

PO 4
Ability to plan and conduct experimental investigations for broadly-defined problems, using data from relevant sources;

PO 5
Ability to select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations;

PO 6
Ability to function effectively as individuals, and as members or leaders in diverse technical teams;

PO 7
Ability to communicate effectively with the engineering community and society at large;

PO 8
Ability to demonstrate an awareness of and consideration for societal. Health, safety, legal and cultural issues and their consequent responsibilities;

PO 9
Ability to demonstrate an understanding of professional ethics, responsibilities and norms of construction engineering technology practices;

PO 10
Ability to demonstrate an understanding of the impact of construction engineering practices, taking into account the need for sustainable development;

PO 11
Ability to understand awareness of management, business practices and entrepreneurship in construction engineering technology; and

PO 12
Ability to recognise the need for professional development and to engage in independent and lifelong learning.

STRUCTURE CURRICULUM BACHELOR OF CIVIL ENGINEERING TECHNOLOGY (Honours) (CONSTRUCTION) – RY11

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
DISCIPLINE CORE (105)	PAT 101/2 Fundamental of Engineering Mechanics	PAT 151/3 Fundamental of Solid Mechanics	PAT 201/2 Structural Theory	PAT 251/2 Structural Analysis	PAT 302/3 Construction Technology 1	PAT 351/3 Structure Design 2	PAT 401/3 Industrial Building Construction Technology	PAT 450/12 Industrial Training
	PAT 102/3 Physic Technology	PAT 152/3 Fundamental of Fluid Mechanics	PAT 202/3 Hydraulic and Hydrology	PAT 255/3 Building Services 2	PAT 301/4 Structure Design 1	PAT 353/3 Environmental Management	PAT 402/4 Construction Technology Integrated Project	
	PAT 103/2 Introduction to Civil Engineering Technology	PAT 153/3 Geomatic	PAT 203/2 Soil Mechanic	PAT 252/3 Construction Project Management	PAT 303/3 Highway and Traffic Technology	PAT 454/3 Final Year Project 1	PAT 454/5 Final Year Project 2	
	PAT 104/2 Technical Drawing	PAT 154/2 Construction Drawing	PAT 204/3 Construction Material	PAT 254/3 Construction Value Estimation	PAT 304/2 Contract and Site Administration	PAT 352/3 Construction Technology 2		
			PAT 205/3 Building Services 1	PAT 256/2 Management of Occupational Safety and Health	PAT 308/3 PAT 309/3 Elective 1	PAT 358/3 PAT 359/3 Elective 2	PAT 408/3 PAT 409/3 Elective 3	
				PAT 253/2 Geotechnic				
COMMON CORE (18)	PQT 111/3 Mathematic for Engineering Technology I	PQT 112/3 Mathemathic for Engineering Technology II	PQT 213/3 Mathemathic for Engineering Technology III					
	PTT 110/3 Engneering Material					EUT 442/3 Engineering Management	EUT 444/3 Engineers in Society	
UNIVERSITY REQUIRED (19)	EUT 122/2 Skills and Technology in Communication	UVW 410/2 University Malay Language		UUW 224/2 Engineering Entrepreneurship	UUW 233/2 Islamic Civilization and Asia Civilization			
	UZW 1XX/1 Co-Curricular Activities	UZW 1XX/1 Co-Curricular Activities	UZW 1XX/1 Co-Curricular Activities	UUW 235/2 Ethnic Relation	UUW 322/2 Thinking Skill			
		UVWxxx/2 English for General Purposes UVW XXX/2 Option Subjects	UVW 312/2 English for Technical Communication					
142	18	19	19	19	19	18	18	12

Elective Courses

Elective 1: PAT 308/3 Financial and Human Resources Management / PAT 309/3 Building Survey
Elective 2: PAT 358/3Construction Technology of Highway and Bridge / PAT 359/3 Construction Risk Management
Elective 3: PAT 408/3Advanced Structure Design / PAT 409/3Higrise Buiding Technology

COURSE SYLLABUS

PAT 101/2
FUNDAMENTAL OF ENGINEERING MECHANICS

Course Synopsis

The aim of this course is to enable the students to learn the Fundamentals of engineering mechanics. 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 of particle in dynamics potion. In material engineering portion, the student will be also taught on structure of crystalline solids and strength of material.

Course Outcome

CO1: Ability to explain basic concept of force vector and solve problem related toforce vector.
CO2: Ability to construct free body diagram and ability to solve problem related to equilibrium of rigid body.
CO3: Ability to solve problems related to kinematics of a particle.
CO4: Ability to explain basic concepts of material strength as well as their mechanic properties

List of experiments

Lab 1: Equilibrium of beam
Lab 2: Tensile test
Lab 3: Rockwell Hardness Test

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.
4. Peter Schiavone, Hibbeler, R.C. Engineering Mechanics Dynamics Study Pack. 12th Ed. , Prentice Hall, 2010.
5. William D. Callister, Jr. Material Science and Engineering An Introduction, 5th Ed, 2000.
6. Cheng. Statics and Strength of Materials, 2nd Ed. ,McGraw-Hill, 1998

PAT 102/3
PHYSIC TECHNOLOGY

Course Synopsis

This course aims to teach students on understanding basic concept on physics towards technology and its applications especially in engineering. At the end of this course students must be able to calculate and solve basic physics problems that related to heat, lighting, electricity, magnetism and acoustics. The students must also be able to demonstrate the theory and its applications.

List of experiments

Lab 1: Lightings
Lab 2: Magnetisms
Lab 3: Acoustic
Lab 4: Electricity

Course Outcome

CO1: Ability to explain fundamental physics concepts in technology.
CO2: Ability to solve basic physics calculation and formula.
CO3: Ability to apply concepts of physics in technology through understanding in lab experiments.
CO4: Ability to evaluate overall important physics phenomena related to building services.

References

1. Poh Liong Yong, “Physics” Oxford Fajar, 2012
2. Cebeci, T. “Convective Heat Transfer” 2nd Rev, Springer, 2002
3. Nichols, D. H. (2002). Physics for technology: with applications in industrial control electronics. Prentice Hall
4. Hunt, B. J. (2010). Pursuing power and light: technology and physics from James Watt to Albert Einstein. John Hopkins University Press
5. Muller, R. A. (2010). Physics and Technology for Future Presidents: An Introduction to the Essential Physics Every World Leader Needs to Know. Princeton University Press

PAT 103/2
INTRODUCTION TO CIVIL ENGINEERING TECHNOLOGY

Course Synopsis

This course provides further discussion and explanation related to role of civil engineering technology in society, unit systems and their applications, solutions of engineering problems, and use of computer software in civil engineering problems.

Course Outcome

CO1: Ability to evaluate the role of civil engineering technology in society.
CO2: Ability to estimate using unit systems and analyze their applications in engineering problems.

CO3: Ability to analyze solutions for engineering problems by algebra and trigonometry principles.
CO4: Ability to evaluate computer software in civil engineering problems.

References

1. Purushothama Raj.P., Basic civil engineering, 3rd Edn., Dhanam Publications, Chennai, 2001.
2. Natarajan, K V, Basic Civil Engineering, 11th Edition, Dhanalakshmi Publications, Chennai, 2001.
3. Punmia, B.C., et.al Building Construction, Laxmi Publishers, New Delhi ,2002.
4. Venugopal K., Engineering Drawing and Grahics + Auto CAD, 4th edition, New Age International Publication Ltd., 2004
5. Chen, Wai-Fah, Liew, J. Y. Richard. The civil engineering handbook [electronic resource] / edited by W.F. Chen and J.Y. Richard Liew. Boca Raton [FL], CRC Press, , c2003.

PAT 104/2
TECHNICAL DRAWING

Course Synopsis

The aim of this course is to enable the students to understand the basic concept in the civil engineering drawing. This includes Introduction to Graphics Communication, manual drawing techniques in civil engineering and Isometric drawings. Other concept of drawing also includes such as Multiviews Drawing , Pictorial Projections , Section Views and Dimensioning and Tolerancing Practices.

Course Outcome

CO1: Ability to understand graphic communication and geometry in civil engineering.
CO2: Ability to understand and sketch multiview and Auxiliary drawing concept.
CO3: Ability to understand and define axonometric, isometric, dimetric, and trimetric projection.
CO4: Ability to understand concept of section view and dimensioning and tolerance practices.

STUDIO WORKS

1. Introduction to basics engineering drawings
2. Manual drawing techniques in civil engineering
3. Isometric drawings
4. Contours, earthwork cut and fills
5. Architectural, Mechanical & Electrical Drawings
6. Civil and structural engineering Drawings
7. Water and Sanitary Installation Drawings
8. Road and Drainage Drawings
9. Reinforced Concrete Detailing

References

1. James H. Earle, “Engineering Design Graphics”, 11th ed. Pearson Prentice-Hall, 2004
2. Gary R Bertoline, Eric N Wiebe, “Technical Graphics Communication. 3rd Ed. , McGraw-Hill, 2003.
3. Parker M. A. and Pickup F. (1991), “Engineering Drawing with Worked Examples”, Vol. I and II”, 3rd edition, Stanley Thornes (publishers) Ltd., England, U.K., 1991.
4. David A. Madsen, Terence M. Shumaker, David P. Madsen. Civil drafting technology 7th ed: Prentice Hall , c2010.
5. David L. Goetsch, William S. Chalk, John A. Nelson. Technical drawing 4th ed. Delmar Publishing , 2000

PAT 151/3
FUNDAMENTAL OF SOLID MECHANICS

Course Synopsis

This course will be focused on basic principles and terminology of solid mechanics which begins with the concept of stress and strain, mechanical behaviour of engineering materials, methods to solve important types of solid mechanics problems and ability to apply this knowledge for solution of simple problems of practical importance. 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.

Course Outcome

CO1: Ability to determine the stresses, strains and deformation of members in simple one-dimensional elastic system.
CO2: Ability to evaluate the values and distribution of bending and shear stresses in beam section.
CO3: Ability to construct Mohr’s Circle to calculate the principle stresses, maximum shear stresses, and stresses on inclined planes.

CO4: Ability to solve for the support reactions on a beam that is statically indeterminate and deduce the buckling load of columns with various types of support.

List of experiments

1. Tensile test
2. Torsion
3. Bending moment
4. Shear force
5. Beam
6. Strut Buckling
7. Rockwell Hardness Test

References

1. R.C Hibbeler' "Mechanics of Materials", 7th Ed, Prentice Hall, 2008.
2. Ferdinand P. Beer, E. Russell Johnston Jr., John T. DeWolf.,"Mechanics of Materials". 3rd Edition. McGraw Hill, 2004.
3. Gere, "Mechanics of materials, Thomson, Brookes/Cole, 2004
4. Megson, T.H.G., "Structural and Stress Analysis", Butterworth: Heinemann, 2002.
5. E.Popov., "Mechanics of materials", Prentice Hall, 1983

PAT 152/3
FUNDAMENTAL OF FLUID MECHANICS

Course Synopsis

This course provides student knowledge in the patterns of movement of fluid particles. By the end of this subject student will be expected to understand the basic characteristics of fluid mechanics and fluid statics, be able to analyze the hydrostatics and basic hydrodynamics in fluid. Student also will be able to analyze and differentiate between the flow in pipe and flow in open channels. In this subject, student will be introduced to the Darcy-Weisbach equation, Moody diagram, Energy losses in pipelines, Minor losses and analysis multiple pipe systems.

Course Outcome

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 pipe flow system

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.
4. Robert, L.M. 2000. Applied Fluid Mechanics. 5th Edition. United States of America: Prentice Hall.
5. John F. Douglas, Janusz M. Gasiorek, John A. Swaffield. Fluid mechanics; 4th ed: Prentice Hall , 2000.

PAT 153/3
GEOMATIC

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. Lastly, student will be test in real work, in geomatic camp.

Course Outcome

CO1: Ability to understand basic concept of geomatic.
CO2: Ability to perform surveying task and procedures.
CO3: Ability to transform data to other format (e.g : map, excel and etc)

List of experiments

1. Introduction to Distance Measurement and Bearing
2. Introduction to Levelling Work (Collimation and Rise & Fall Method)
3. Traversing With Compass and Theodolite
4. Introduction to Tacheometry
5. Introduction to Electronic Distance Measurement (EDM) With Total Station
6. Geomatic Camp

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.
4. Barry F. Kavanagh. Geomatics; Prentice Hall, c2003.
5. Kavanagh, B.F." Geomatic" Prentice Hall, 2003

PAT 154/2
CONSTRUCTION DRAWING

Course Synopsis

The course equips students with the basic computer-aided drawing skill for general engineering drawing and especially for civil engineering profession. This includes plan, cross section drawing and structural detailing. Through lectures, students will learn the basic characteristics of professional civil engineering drawing. Through hand-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. Moreover, students will learn about bill of quantity through construction drawings.

Course Outcome

CO1: Ability to understand and construct CAD of architectural, mechanical and electrical symbols.
CO2: Ability to understand and construct CAD of Civil and Structural Engineering drawings.
CO3: Ability to analyze and design structural components using design software.
CO3: Ability to predict bill of quantity that used in tendering in construction industry.

STUDIO WORKS

1. Architectural, Mechanical & Electrical Drawings.
2. Civil and structural engineering Drawing.
3. Introduction to Computer Aided Drafting
4. CAD of Architectural, Mechanical and Electrical Drawings
5. CAD of Civil and Structural Engineering Drawings
6. CAD of Water and Sanitary Installation Drawings
7. CAD of Road and Drainage Drawings

References

1. Zurflieh, Thomas P, AutoCAD 2004: 3D drawing and solid modeling, Prentice-Hall, 2005
2. Shwarna Lockhart, A tutorial Guide to AutoCAD 2005, Prentice-Hall, 2005
3. Mark Dix & Paul Riley, Discovering AutoCAD 2002 One step at a time, Prentice-Hall, 2003
4. Seeley IH. (1998). Building Quantities Explained 5th Revised edition, Macmillan.
5. Terry D. Metz. Title AutoCAD 2002 a building approach, Prentice Hall , 2003
6. James A. Leach, AutoCAD 2002 instructor : a student guide to complete coverage of AutoCAD's commands and features, McGraw-Hill, 2002.

PAT 201/2
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. Besides that, It also introduces deformations analysis of statically determinate structures using virtual work method for trusses, beams, and frames.

Course Outcome

CO1: Ability to calculate internal member forces for determinate structural systems.
CO2: Ability to illustrate internal member forces diagram for determinate structural systems.
CO3: Ability to determine deformations for determinate structural systems.
CO4: Ability to sketch deformations for determinate structural systems.

References

1. Kassimali, A., "Structural Analysis", Fourth Edition, Cengage Learning, 2011.
2. Hibbeler, R.C., "Structural Analysis", Seventh Edition, Prentice-Hall, 2009.
3. McKenzie W.M.C., "Examples in Structural Analysis" Taylor & Francis, 2006.
4. Connor, J.J., and Faraji, S., "Fundamentals of Structural Engineering" Springer, 2013
5. Pandit, G.S. and Gupta, S.P. "Structural Analysis: A Matrix Approach" Tata McGraw Hill, 2008

PAT 202/3
HYDRAULIC AND HYDROLOGY

Course Synopsis

This course provides student knowledge in Uniform Flow; Chezy equation , Ganguillet-Kutter, Bazin and Manning. Student will be able to understand Open Design Channel and Energy and Momentum Principle. Student also will be able to differentiate between laminar flow and turbulent flow and to understand the theory of transportation of sediment.

Course Outcome

CO1: Ability to understand the Chezy equation , Ganguillet-Kutter, Bazin and Manning and to analyze open design channel: cannot erode
CO2: Ability to analyze the Energy and Momentum Principle
CO3: Ability to differentiate between laminar and Turbulent Flow
CO4: Ability to understand theory of sedimentation and analyze open channel design: erode

References

1. V.T. Chow, 1988, *Open Channel Hydraulic*, Mc Graw Hill International Francis, J.R.D. dan P. Minton, 1986. Civil Engineering Hydraulics Arnold, Edward Arnold Ltd., London.
2. French, R.H., 1986. Open-Channel Hydraulics, McGraw-Hill, New York. Henderson, F.M., 1966. Open Channel Flow, The Macmillan Company, New York.
3. Das, M.M. and Saikia, M.D."Hydrology", PHI Learning Private Limited, 2009
4. Musy, A. and Higy, C. "Hydrology: A Science of Nature" Taylor and Francis Group, 2011
5. Brooks, K. N.,"Hydrlogy and Management of Watersheds", Iowa State University Oxford, 2003

PAT203/2
SOIL MECHANIC

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 rock and soil for engineering purposes. Application of mechanics on soil such as phase relationship, compaction, permeability and seepage, stresses and effective stresses, shear strength and consolidation are also covered.

Course Outcome

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.

LABS

(i) Rock Identifications
(ii) Sieve and Hydrometer Analysis
(iii) Liquid Limit and Plastic Limit Test
(iv) Constant Head Permeability Test
(v) Standard Proctor Compaction Test

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
4. R. Whitlow, ' Basic soil mechanics', Prentice Hall, 2001
5. Karl Terzaghi, Ralph B. Peck & Gholamreza Mesri, 'Soil mechanics in engineering practice', John Wiley and Sons, 1996

EAT204/3
CONSTRUCTION MATERIAL

Course Synopsis

This course provides an introductory overview of the various materials used in construction. After receiving an introduction into fundamental principles of structural, physical and long-term performance, students learn about material and product manufacturing techniques and how they relate to mechanical and non-mechanical properties of the various materials. Common construction methods are introduced and building details are explored.

Course Outcome

CO1: Ability to **COMPARE** and **IDENTIFY** material properties (physical, structural) for most common and advanced building materials,
CO2: Ability to **IDENTIFY** and **UNDERSTANDING** the typical and potential applications of building materials.
CO3: Ability to **IDENTIFY** crucial problem areas in manufacture and applications of building materials
CO4: Ability to **IDENTIFY** and **UNDERSTANDING** of importance of experimental verification of material properties.

References

1. Mehta, Scarborough, Armpriest, "**Building Construction: Principles, Materials, and Systems, Second Edition**". Pearson / Prentice Hall, 2013 ISBN-13: 978-0-13-214869-6
2. Spence, W.P., "Construction materials, methods and techniques: building for sustainable future", 3rd Edition, Delmar/Cengage Learning, 2011
3. Popovics, S. "Concrete Materials: Properties, specifications and testing" Nayos Publication, 1992
4. Wright, P.H."Highway Engineering" John Willey and Sons, 2004
5. Eisengh, V.D. "Steel: a Handbook for Materials Research and Engineering" Springer-Verlag, 2003

PAT205/3
BUILDING SERVICES 1

Course Synopsis

An overview on overall building facilities and understanding towards its functionalities in building is the main objectives in this course. Students must be able to explain the function of building services and how it's important to a building. Student also need to produce a simple mechanical and electrical design that always been expected from a Building Technologist.

Course Outcome

CO1: Ability to understand the building facilities systems in modern buildings and problems related to design, operation and maintenance.
CO2: Ability to calculate fundamental design related to building facilities for an application.

References

1. David, V Chadderton" Building Services Engineering:4th Ed" Taylor & Francis, 2004
2. Hall, F. and Greeno, R. "Building Services Handbook" Elsevier/ Butterworth Heinemann, 2009
3. Fredrick, P.M. "Building Services Engineering" VDM Publishing House, 2009
4. Hall, F. and Greeno, R. "Building Services Handbook" Elsevier/ Butterworth Heinemann, 2005
5. Knight, J. And Jones, P. "Building Services Pocket Book" Burlington Mass, Newness, 2004

PAT251/2
SRUCTURAL ANALYSIS

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 indeterminate structures for beams, trusses and frames. Two method are introduces in this analysis of statically indeterminate structures using method of consistent deformations and moment distribution.

Course Outcome

CO1: Ability to identify redundant forces for indeterminate structural systems.
CO2: Ability to determine member forces for indeterminate structural systems.
CO3: Ability to illustrate internal member forces diagram for indeterminate structural systems.

List of experiments

Lab 1: Trusses System
- Forces in truss
  - o Statically Determinate System
  - o Statically Indeterminate System
- Deflection of trusses

Lab 2: Beam
- Forces in beam
  - o Statically Determinate System
  - o Statically Indeterminate System
- Deflection of beam

Lab 3: Portal frame
- Forces in frame
  - o Statically Determinate System
  - o Statically Indeterminate System

Lab 4: Deflection of frame

References

1. Kassimali, A., "Structural Analysis", Fourth Edition, Cengage Learning, 2011.
2. Hibbeler, R.C., "Structural Analysis", Seventh Edition, Prentice-Hall, 2009.
3. Connor, J.J., and Faraji, S., "Fundamentals of Structural Engineering" Springer, 2013
4. Laible, J.P. "Structural Analysis" Holt-Saunders (Japan), 1985
5. Pandit, G.S. and Gupta, S.P. "Structural Analysis: A Matrix Approach" Tata McGraw Hill, 2008

PAT252/3
CONSTRUCTION PROJECT MANAGEMENT

Course Synopsis

This course aims to teach students on how to apply the project management skills throughout overall project life cycle. The role of engineering management is to assess the appropriateness of a given project, estimate its value, and justify it from an engineering standpoint. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineers relating to project management in project life cycle.

Course Outcome

CO1: Ability to analyze and evaluate the process of project management, develop work plans, do cost estimation and perform project evaluation
CO2: Ability to perform project management activities and to solve issues in site construction.

References

1. R. Logeswaran, Hairul Azhar, Pau Kiu Nai and Sim Hock Kheng, *Engineers in Society,* Mc Graw Hill 2nd edition.
2. S. Park Chan, *Fundamentals Engineering Economics*, 2nd ., Prentice-Hall. (2008)
3. Stanley E. P., Samuel J. M., Jack R.M, Scot M.S, Margaret M. Sutton; (2008); *Project Management: Planning, Scheduling, and Controlling Projects,* John Wiley & Sons Inc. USA
4. Lock, D. "Project Management"Burlington, Gower Publishing Limited, 2007
5. Klopenborg, T.J. "Project Management: A Contemporary Approach" South-Western Cengage Learning, 2009

PAT253/2
GEOTECHNIC

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.

Course Outcome

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.

LABS
1. JKR / McKintosh Probe Test
2. One dimensional Consolidation test
3. Triaxial test
4. Direct shear test

References

1. Das, B.M. 'Principles of Geotechnical Engineering', Thomson, 2007.
2. Das, B.M. 'Principles of Foundation Engineering', Thomson, 2004.
3. Handy, R.L. 'Geotechnical Engineering, Soil and Foundation Principles and Practise', Mc Graw Hill, Fifth Edition, 2007.
4. Gofar, N. & Kassim, K.A., 'Introduction to Geotechnical Engineering', Prentice Hall, 2007.
5. Budhu, M., 'Soil Mechanics and Foundations', John & Wiley, 2nd Edition, 2007.

PAT254/3
CONSTRUCTION VALUE ESTIMATION

Course Synopsis

This course involve with quantity survey which is an important part in construction field. In this course student will be taught on the method used in estimating cost for construction material and how to evaluate construction cost based on Standard Method of Measurement issued by Public Work Department (JKR).

Course Outcomes:

CO1: Ability to explain fundamental concept of quantity surveying
CO2: Ability to classify type and method in quantity surveying work
CO3 Ability to estimate value construction based on Standard Method of measurement issued by Public Work Department (JKR)

References

1. Kavanagh, B.F. and S.J. Glenn Bird. 1992. Surveying : Principles and Applications. 3rd. Edition. New Jersey: Prentice Hall.
2. Kennedy, M. 1996. The Global Positioning System and GIS: An Introduction. New York: Ann Abor Press Inc.

3. McCormac, J.C. 1991. Surveying: Fundamentals. 2nd. Edition. New Jersey: Prentice Hall.
4. Ahamd Abdullah. Anggaran kos bangunan, 2nd edition, Pearson Prentice hall 2011
5. Edition, Peurifoy, R.L. and Oberlander, G.D. Estimating Construction Cost, 5th Edition Mc Graw Hill (2002)

PAT255/3
BUILDING SERVICES 2

Course Synopsis

To highlight the importance of information and all building facilities such communication systems, electrical distribution system, building automation systems and public addressing systems in modern buildings. To summarize the understanding on mechanical services in building and ability to explains the operations and functionality of each service.Both services need to understand in a manner that considering energy efficiency spirit throughout building life cycles.

Course Outcome

CO1: Ability to understand the electrical distribution systems in modern buildings and problems related to design, operation and maintenance.
CO2: Ability to discuss, appreciates, and summarizes majority existing definitions of buildings terminologies and explains towards sustainability in building.

References

1. David, V Chadderton" Building Services Engineering:4th Ed" Taylor & Francis, 2004
2. Fred hall, 2012, Building Services Handbook, Routledge, 2012

PAT256/2
OCCUPATIONAL SAFETY AND HEALTH MANAGEMENT

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 Outcome

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.
4. Hughes P. and Ferrett E. (2010) Introduction to International Health and Safety at Work. Butterworth-Heinemann, Amsterdam.
5. Brauer R.L. (2006) Safety and Health for Engineers, 2nd Ed, Wiley, New Jersey.
6. Asfahl C.R. and David W. Rieske D. W. (2010) Industrial Safety and Health Management, 6th Ed. Pearson Prentice Hall.

PAT 301/4
STRUCTURAL DESIGN 1

Course Synopsis

The course is designed to provide the student with a basic understanding of the behavior of reinforced concrete members and structures; to provide a basic understanding of standards methods of analysis and design of reinforced concrete building. This course covers the design load, design member, reinforced concrete design, foundation and retaining walls. The basic design of steel structures. Stretching member, column and beams. Properties and structural steel members.

Course Outcome

CO1: Ability to identify physical properties of concrete materials; defined concrete proportions and testing; justify selection of concrete materials and mix proportion.
CO2: Ability to design concrete structures based on the British Standard BS 8110
CO3: Ability to describe basic concept of steel members, connections and structures behavior.
CO4: Ability to design steel structures elements based on the British Standard BS 5950

List of experiments

Lab 1: Properties of cement
Lab 2: Properties of aggregate
Lab 3: Concrete mix design and test on wet concrete
Lab 4: Reinforcement properties
Lab 5: Concrete properties

References

1. BS5950: Part 1: 1990. Structural Use Steelwork in Building
2. BS8110: Part 1: 1997. Structural Use of Concrete-Code of Practice for Design and Construction
3. Chanakya, A. (1994). "Design of Structural Elements: Conrete, Steelwork, Masonary, ad Timber Design to Britishh Standards & Eurocods". London: E & FN Spon
4. Jack C.McCormac, James K. Nelson, "Design of Reinforced Concrete", Sixth Edition, John Wiley & Sons, Inc. 2005
5. William T. Segui,"Steel Design", 4th Edition, Thomson, 2007

PAT 302/3
CONSTRUCTION TECHNOLOGY 1

Course Synopsis

Construction Technology I is an instructional program that prepares an individual for employment or continued education in the occupations of Carpentry, Electrical Wiring, Masonry, or Plumbing. It is a basic course teaching fundamentals of safety, tools, math, and basic carpentry, electrical, masonry, and plumbing skills.

Course Outcome

CO1: Explain safety practices and procedures
CO2: Ability to identify use of tools and equipment and estimate materials from blueprints
CO3: Ability to explain about carpentry and electrical wiring tools and the scope of work
CO4: Ability to explain about masonry and plumbing tools and the scope of work

References

1. Roy Chudley and Roger Greeno(2005), Construction Technology.
2. Eric Fleming (2005), Construction Technology: An Illustrated Introduction.
3. M. Y. L. Chew, Construction technology for tall buildings, 4th revised ed. World Scientific Publishing, 2012.
4. Michael T. Kubal, Construction waterproofing handbook 2nd ed. McGraw-Hill, 2008.
5. Michael Chew Yit Lin, Construction technology for tall buildings 2nd ed. World Scientific , 2001

PAT303/3
HIGHWAY AND TRAFFIC TECHNOLOGY

Course Synopsis

The course introduces the students with the basic and background of the traffic road and highway technology. The sub-topics discussed are characteristics of drivers, pedestrians, vehicles and road, fundamentals of traffic light, 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 Outcome

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 discuss the flexible pavement includes the methods of pavement design
CO4: Ability to discuss the Rigid pavement includes the methods of pavement design

List of Experiments

i. Marshall Test
ii. Penetration Test
iii. Softening Point Test
iv. Extraction of Bitumen from Bituminous Mixture
v. Sieve Analysis of Extracted Aggregate
vi. Capacity of Unsignalised Intersections

References

1. Principle Oh Highway Engineering and Traffic Analysis , Fred L. Mannering, Scott B. Washburn, Walter P. Kilareski, John Wiley & Son, 2009.
2. Traffic and Highway Engineering, Fourth Edition, Nicholas J. Garber and Lester A. Hoel, 2009 Cengage Learning
3. Traffic Engineering Design, Principles and Practice, Second edition, 2005, Elsevier Butterworth-Heinemann
4. AASHTO Guide For Design Of Pavement Structures, 1993, American Association Of State Highway And Transportation Officials

5. Arahan Teknik Jalan 5/85, Jabatan Kerja Raya, Manual Of Paveent Design

PAT304/2
CONTRACT AND SITE ADMINISTRATION

Course Synopsis

The administration of a project including award of the contract, progress claims, instructions, variations, rise and fall calculations, certificates, claims, cash flow and dispute resolution. Conditions of standard form of domestic and international building contract. Develop the company safety program and hazard communication program.

Course Outcome

CO1: Ability to analyze and compare the major types of contracts commonly adopted in the construction industry.
CO2: Ability to prepare and analyze the use of various construction documents and the administrative process.
CO3: Ability to decide the construction documents provided by a construction manager including the practice of value engineering & constructability.
CO4: Ability to recommend the principles of quality and safety management systems.

References

1. Sidney M. Levy (2007), "Project Management in Construction", 5th edition, McGraw Hill.
2. Michael O'Reilly (1999), "Civil Engineering Construction Contracts", 2nd edition, Thomas Telford.
3. John Murdoch & Will Hughes, Construction Contracts - Law and Management" Spon Press, Taylor & Francis Group.
4. Keith Collier, "Construction Contracts" Reston Publishing Company, Inc., Reston, Verginia.
5. Gould, Frederick E. & Joyce Nancy E., (2009), "Construction Project Management", 3rd ed., Pearson Education International.

PAT 308/3
FINANCIAL AND HUMAN RESOURCES MANAGEMENT

Course Synopsis

This course aims to provide the students' knowledge on how to apply the financial management skills and economic techniques in evaluating the cost of overall project. The role of engineering economics is to assess the appropriateness of a given project, estimate its value, and justify it from a technologist standpoint. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineers relating to financial management in the current economic scenarios. The syllabus comprises scope management including project authorization, scope definition, personnel control, human resources management 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 Outcome

CO1: Ability to discuss and describe the general project management
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. 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)
4. Stanley E. P., Samuel J. M., Jack R.M, Scot M.S, Margaret M. Sutton, Project Management : Planning, Scheduling, and Controlling Projects, John Wiley & Sons Inc. USA, 2008
5. Rajitha S. Kumar, M. Sarngadharan, Financial analysis for management decisions, PHI Learning, 2011

PAT 309/3
BUILDING SURVEY

Course Synopsis
The subject is to provide a structural survey, equipment required and information required for surveying of building on site. This include recording of data, preparation and presentation of reports, and legal obligations of a Building Surveyor. The subject is designed to provide to a rigorous

training to students with professional recognition in the specific field of Building Surveying. The professional Building Surveyor will play the major role as consultants in planning for maintenance of public and privately owned buildings to optimise their uses, safety and value thus, safeguarding the interest of the owners and the public.

Course Outcome

CO1: Ability to understand and identify structural survey, equipment and information required.
CO2: Ability to compare, discuss, and identify type of survey on site, method uses, recording data, preparation and presentation of reports and legal obligation of a Build
CO3: Ability to identify and evaluate and understand the identification of cause and defect in building structures, finishes and services and remedial action temporary supporting works. ing Suryevor.

References

1. Tomlinson, T. A. "Foundation Design and Construction" 5th edition, Longman 1986
2. Marshall**, D.,** Worthing**, D.,** Heath**, R. "**Understanding Housing Defects" 3rd edition, Estates Gazette, 2009.
3. Glover, P. "Building Surveys" 7th Edition. Routledge, 2008.
4. Birchall, S., Ramus, J., Griffiths, P. "Contract Practice for Surveyors". 4th Edition. Routledge, 2006.
5. Buchan, R. D., Fleming, F. W., Grant, F. "Estimating for Builders and Surveyors" 2nd Edition. Routledge, 2003.

PAT 351/3
STRUCTURAL DESIGN 2

Course Synopsis

The aim of this course is to introduce students to the fundamental principles about the structural behaviour and design criteria of Prestressed Concrete Structures and Timber Design. This course delivers knowledge and understanding of the principles of prestressed concrete, pertaining to both its analysis and design aspects. This course also introduces 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.

Course Outcome

CO1: Ability to identify the key aspects of design and material requirements for prestressed concrete.
CO2: Ability to apply code requirements on the design of prestressed concrete and gain knowledge on factors considered in design.
CO3: Ability to describe basic concept of timber members, connections and structures behavior.
CO4: Ability to design timber structures elements.

References

1. Mosley,W.H., Bungey, J.H. and Hulse, R. 1999. Reinforced Concrete Design. London : Palgrave.
2. Kong, F.C. and Evans, R.H. 1998. Reinforced and Prestressed Concrete. London. Spon Press.
3. Desch, H.E.," Timber, Its Structure, Properties and Utilisation," Mac Millan Press. (Latest Edition)
4. Lin, T.Y., Vennard, J., Burns, N.H. and Burns, N.D. 1981. Design of Prestressed Concrete Structures. John Wiley & Sons.
5. Mat Lazim Zakaria, "Rekabentuk Struktur Kayu Menurut MS544", Dewan Bahasa dan Pustaka

PAT 353/3
ENVIRONMENTAL MANAGEMENT

Course Synopsis

This course focuses on principal elements of environmental management, including Environmental Management System (EMS) and ISO 14000. Other important parts that will be taught are Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP). Both portions deal with the utilization of a common resource that is environment, and complied with the regulations and guidelines of Department of Environment for the project activity. Students will be also introduced to the measurement & calibration systems in environmental management, and learn the quantitative risk assessment.

Course Outcome

CO1: Ability to describe the requirements in implementing an ISO 14001, as well as EMS costing and audits
CO2: Ability to describe and outline the EIA process & methods in Malaysia
CO3: Ability to identify and describe the measuring instruments and calibration systems in environmental management
CO4: Ability to identify and explain the quantitative risk assessment

References

1. Morris, A.S. (2003) ISO 14000 Environmental Management Standards Engineering and Financial Aspects. New York, John Wiley & Sons
2. Aminatuzuhariah Megat Abdullah (2007) Introduction to Environmental Management, UTM Publisher.
3. Sheldon, C. and Yoxon, M. (2006) Environmental Management Systems: A Step-by-Step Guide to Implementation and Maintenance. Sterling, VA, Earthscan, 3rd Ed.
4. Fundamentals of environmental management / Steven L. Erickson, Brian J. King. Environmental management, Wiley Publication, 1999.
5. Environmental management and engineering / editors, Ahmad Farhan Mohd.Sadullah,T. W. Sam, Penerbit Universiti Sains Malaysia , 2004
6. Barrow, Christopher J. Environmental management for sustainable development 2nd ed. Routledge Publication, 2006.

PAT 352/3
CONSTRUCTION TECHNOLOGY 2

Course Synopsis

Construction Technology II is an instructional program that prepares an individual for employment or continued education in the occupation of Carpentry. Construction Technology II is a continuation of Construction Technology 1 and provides advanced instruction and practical applications in the Carpentry area.

Course Outcome

CO1: Explain the history of trade and apprentice program
CO2: Explain floor system and building materials.
CO3: Ability to explain about carpentry and electrical wiring tools and the scope of work in advanced.
CO4: Ability to explain about masonry and plumbing tools and the scope of work in advanced.

References

1. Roy Chudley and Roger Greeno(2005), Construction Technology.
2. Eric Fleming (2005), Construction Technology: An Illustrated Introduction.
3. M. Y. L. Chew, Construction technology for tall buildings, 4th revised ed. World Scientific Publishing, 2012.
4. Michael T. Kubal, Construction waterproofing handbook 2nd ed. McGraw-Hill, 2008.
5. Michael Chew Yit Lin, Construction technology for tall buildings 2nd ed. World Scientific , 2001

PAT 358/3
CONSTRUCTION TECHNOLOGY OF HIGHWAY AND BRIDGE

Course Synopsis

This course introduces the advance knowledge of highway technology including highway location, design and traffic system. Earthwork is also considered as sub-topics in this course apart from types of pavement, design, rehabilitation, culverts and drainage system. Course also covered the fundamental of bridge technology including conceptual of bridge design, superstructure, substructure, construction and maintenances of bridge.

Course Outcome

CO1: Ability to understand the transportation development process and earthwork for highway constructions and design
CO2: Ability to explain and analyze flexible and rigid pavement design
CO3: Ability to discuss the fundamental of bridge and bridge superstructure
CO4: Ability to explain the bridge substructure, bridge construction and its maintenance aspect

References

1. Roger L.Brockenbrough Kenneth J.Boedecker, Jr.," HIGHWAY ENGINEERING HANDBOOK", McGraw-Hill,2004.
2. Fred L. Mannering, Scott B. Washburn, Walter P. Kilareski "Principle Oh Highway Engineering and Traffic Analysis", John Wiley & Son, 2009.
3. C.A.O'Flaherty, "Transport Planning and Traffic Engineering", John Wiley & Son, 1997.
4. Ed. Wai-Fah Chen and Lian Duan, "Bridge Engineering Handbook", Boca Raton: CRC Press, 2000.
5. S. Ponnuswamy," Bridge Engineering", McGraw-Hill Education, 2008.

PAT 359/3
CONSTRUCTION RISK MANAGEMENT

Course Synopsis

This course introduces the concepts and principles of risk management in construction industry. Students will be exposed to the risks management and how to manage the risks during construction process. This course also

covered risk in development projects, risk analysis and identification, risk assessment and risk reduction in construction.

Course Outcome

CO1: Ability to understand and describe the definition of risk management, objectives of risk management and risk management process.
CO2: Ability to explain and analyze risk in development projects including risk management, risk of damage to the project and risks to the people
CO3: Ability to discuss the risk assessment, risk analysis and risk identification.
CO4: Ability to explain the risk reduction in construction stage including strategic planning and risk transfer.

References

1. Alias A., Hussin A.A., "Pengurusan Risiko Dalam Projek Pembinaan", Penerbit USM, 2002
2. Edward R. Fisk, Wayne D. Reynolds, "Construction Project Administration", Pearson Prentice-Hall, 2006
3. Carillion Services Limited. (2005). Defects in Buildings: Symptoms, Investigation, Diagnosis and Cure. The Statitionery Office Limited, Norwich.
4. Hilson, David, "Managing Risk in Projects", Ashgate Publishing Group, 2008
5. Roger Flanagan, George Norman,"Risk Management and Construction", Blackwell Science, 1993

PAT401/3
INDUTRALIZED BUILDING SYSTEM CONSTRUCTION TECHNOLOGY

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 project will be done to further strengthen their knowledge on subject matter.

Course Outcome

CO1: Ability to classify the concept of IBS modern construction technology.
C02: 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 element.

References

1. Sarja. "Open and Industrialized Building". Taylor & Francis. 2010
2. Abraham Warzaski. "Industralised 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.
4. Ram S. Gupta. "Principles of Structural Design: Wood, Steel, and Concrete". Taylor & Francis. 2010.
5. S.G.Bruggeling, G.F. Huyghe. "Prefabrication With Concrete". Taylor & Francis, 1991

PAT402/3
CONSTRUCTION TECHNOLOGY INTEGRATED PROJECT

Course Synopsis

In this course, student will work in group of five to solve a construction related project. This given project task is a capstone project. All the knowledge and practical skill like design, construction method, construction material, project management and so on, that they have gain from three years study in this program will be used in this course to accomplish the given project. At the end of the course, students, project proposal will be evaluate by experienced construction industry practitioner

Course Outcomes:

CO1: Ability to work in group effectively to accomplish a design project
CO2: Ability to propose design with the best construction method and the most effective cost and management
CO3: Ability to use effective communication skill and professional ethic

References

1. Kavanagh, B.F. and S.J. Glenn Bird. 1992. Surveying : Principles and Applications. 3rd. Edition. New Jersey: Prentice Hall.

2. Kennedy, M. 1996. The Global Positioning System and GIS: An Introduction. New York: Ann Abor Press Inc.
3. McCormac, J.C. 1991. Surveying : Fundamentals. 2nd. Edition. New Jersey: Prentice Hall.
4. Ahamd Abdullah. Anggaran kos bangunan, 2nd edition, Pearson Prentice hall 2011
5. Edition, Peurifoy, R.L. and Oberlander, G.D. Estimating Construction Cost, 5th Edition Mc Graw Hill (2002)

PAT408/3
ADVANCED STRUCTURAL DESIGN

Course Synopsis

This course is an extension of the structural design 1 and structural design 2. Student will be taught to design special civil engineering structures like water retaining structure, earth retaining structure, substructure and pre-stressed concrete structure. Since this course is an elective course, students who have interest in structural design are encouraged to choose this subject.

Course Outcomes

CO1: Ability to design earth retaining structures
CO2: Ability to design water retaining structure
CO3: Ability to design substructure
CO4: Ability to design pre-stressed concrete structure

References

1. Mosley, W. H., Bungey J.H. and Hulse R. (1999). Reinforced Concrete Design. 5th Edition. Palgrave
2. Chu-Kia W. and Salmon C.G. (2002). Reinforced Concrete Design. 6th Edition. John Wiley and Sons.
3. Sinha S.N. (2002). Reinforced Concrete Design. 2nd Edition. McGraw-Hill
4. McCormac J.C. and Nelson J.K. (2005). Design of Reinforced Concrete. 6th Edition. John Wley and Sons
5. Allen A.H. (1988). Reinforced Concerete Design to BS 8110: Simply Explained. Spon Press

PAT409/3
CONSTRUCTION TECHNOLOGY OF HIGHRISE BUILDING

Course Synopsis

This course is an introduction to the construction technology used to build highrise building. Besides that, this course also will touch on the best and new practices being used during construction to protect public and to mitigate overhead hazard. Analysis of highrise building also will be taught in this course.

Course Outcomes

CO1: Ability to determine type and function of each construction technology used to build highrise building
CO2: Ability to comprehend type and function of highrise building systems
CO3: Ability to identify and mitigate hazard during highrise construction
CO4: Ability to carry out structure analysis on the highrise building

References

1. Irwin A. W., “Design of shear walls buildings”, CIRIA Report No. 102, London, 1984.
2. Smith B S., “Analysis of tall concrete buildings”.
3. A K Marsono, “Tall Building System : Analysis and Design”, 2009.
4. OVE ARUP AND PARTNERS, “Design of deep beam”, CIRIA Report No. 42, London, 1987.
5. Kozak J, “ Steel concrete structure for multi storey building”.

PAT 454/3
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 Book of Technical Writing for Engineers and Scientist. 3rd Edition, McGraw Hill.
4. Kirkman, J. "Good Style: Writing for Sciences and Technology" E&FN Spon, 1992
5. Beer, D.F. and McMurrey, D."A Guide to Writing as an Engineer". 3rd Edition, John Willey and Sons, 2009

PAT 454/5
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 this programme combines the necessary skills in three important fields: Construction Management, Engineering and Entrepreneurship. These skills are necessary to successfully manage construction projects. In our program, students learn how to build projects, prepare construction estimates, generate project schedules, handle field operations, administer construction contracts, use surveying equipment, perform structural designs (wood, concrete, and steel structures), understand accounting principles, determine economical feasibility, and communicate with others effectively. These skills position our students to succeed employments as:

- Contractor
- Developer
- Survey contractor
- Construction inspector
- Materials tester
- Building inspector
- Estimator
- Sales engineer
- Installation supervisor
- Quality control supervisor
- Structural detailer
- Project coordinator/manager

BACHELOR OF CIVIL ENGINEERING TECHNOLOGY (Honours) (BUILDING)

PEO Bachelor of Civil Engineering Technology (Building)

PEO 1
Graduates who are theoretically and practically expert in the field of building construction technology

PEO 2
Graduates with technical skills and knowledge engineering technology which they will be applied in accordance with the current market demand

PEO 3
Graduates who are able to develop their knowledge on building engineering technology through continuous self-learning

PEO 4
Graduates who are able to demonstrate entrepreneurial skills in building and construction field

PO Bachelor of Civil Engineering Technology (Building)

PO 1
Ability to apply knowledge of mathematics, science, engineering fundamental and an engineering specialisation principles to defined and applied engineering procedures, processes, systems or methodologies

PO 2
Ability to solve broadly-defined engineering problems systematically to reach substantiated conclusions, using engineering techniques and tools appropriate and up to date in the field of building engineering technology

PO 3
Ability to design solutions for broadly-defined construction engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health safety, as well as cultural, societal, environmental and sustainability concerns

PO 4
Ability to plan and conduct experimental investigations for broadly-defined problems, using data from relevant sources

PO 5
Ability to select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations

PO 6
Ability to implement and effectively coordinate support services as individuals in a multidisciplinary and multi-ethnic group with the capacity to be a leader or manager

PO 7
Ability to communicate effectively with the engineering community and society at large

PO 8
Ability to demonstrate an awareness of and consideration for societal. Health, safety, legal and cultural issues and their consequent responsibilities

PO 9
Ability to demonstrate an understanding of professional ethics, responsibilities and norms of building engineering technology practices

PO 10
Ability to demonstrate knowledge in the field of building engineering technology for sustainable development

PO 11
Ability to apply the entrepreneurial and management skills in the field of building engineering technology

PO 12
Ability to recognise the need for professional development and to engage in independent and lifelong learning

CURRICULUM STRUCTURE BACHELOR OF CIVIL ENGINEERING TECHNOLOGY (Honours) (BUILDING)-RYXX

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VII
DISCIPLINE CORE (108)	PAT 111/3 Legal Studies	PAT 102/3 Physics Technology	PAT 205/3 Building Services 1	PAT 255/3 Building Services 2	PAT 311/3 Construction Technology	PAT 361/3 Building Pathalogy	PAT411/3 Maintainance and Facilities Management	PAT 450/12 Industrial Training
	PAT 204/3 Construction Material	PAT 161/3 Road Technology	PAT 211/3 Civil & Structural Analysis	PAT 261/3 Building Design	PAT 312/3 Building Control	PAT 362/3 Development and Building Regulation	PAT 412/4 Building Integrated Project	
	PAT 153/3 Geomatics	PAT 202/3 Hydrology & Hydraulics	PAT 212/3 Building Law	PAT 262/3 Total Asset Management	PAT 313/3 Facilities Management Contract and Procurement	PAT 454/3 Final Year Project 1	PAT 454/5 Final Year Project 2	
	PAT 154/2 Construction Drawing	PAT 253/2 Geotechnics	PAT 213/3 Environmental Technology	PAT 263/3 Financial and Human Resources Management	PAT 314/3 Building Information Modelling for Facility Management	PAT 363/3 Space Management		
				PAT 264/2 Fire Audit	PAT 318/3 PAT 319/3 Elective 1	PAT 368/3 PAT 369/3 Elective 2	PAT 418/3 PAT 419/3 Elective 3	
						PAT 364/3 Procurement for Building Maintenance		
COMMON CORE (15)	PQT 111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II	PQT 213/3 Mathematics for Engineering Technology III		PAT 333/3 Engineering Technology Management		PAT 444/3 Technologist in Society	
UNIVERSITY REQUIRED (19)	UUW 233/2 Islamic Civilization and Asia Civilization	UVW 410/2 University Malay Language	EUT 122/2 Skills and Technology in Communication	UUW 224/2 Engineering Entrepreneurship				
	UZW 1XX/1 Co-Curricular Activities	UZW 1XX/1 Co-Curricular Activities	UZW 1XX/1 Co-Curricular Activities	UUW 235/2 Ethnic Relation	UUW 322/2 Thinking Skill			
	UVWXXX/3** Foundation English	UVW112/2 English for General Purposes or UVW XXX/2 Option Subjects	UVW 312/2 English for Technical Communication					
142	17	19	20	18	20	18	18	12
Total Units for Graduation = 142								

Elective Courses:

Elective 1: PAT 318/3 Building Conservation Technology PAT 319/3: Facility Condition Assessment
Elective 2: PAT 368/3 Building Performance Evaluation / PAT369/3: Green Building Technology
Elective 3 PAT 418/3 Building Measurement and Analysis / PAT 419/3 Computerized Maintenance Management System

COURSE SYLLABUS FOR CIVIL ENGINEERING TECHNOLOGY (BUILDING) PROGRAMME

YEAR 1

PAT 111/3
LEGAL STUDIES

Course Synopsis

In order to achieve that objective, the students will be introduced to the legislative body and system in Malaysia. The students also will be exposed with information on the source of tort and contract law and the process in creating and terminating the contract according to the related law and the function as well as responsibility and tort based on enforcement perspective.

Course Outcome

CO1: Ability to explain the organizational systems of law in Malaysia
CO2: Ability to identify the provisions of the constitution and functions
CO3: Ability to justify the general principles in the field of law and proceedings

References

1. Lee Mei Pheng (2012). General Principles of Malaysian Law (6th Ed.), Penerbit Fajar Bakti Sdn Bhd., Shah Alam
2. Rau & Kumar (2005). General Principles of the Malaysia Legal System, International Law Book Services.,Petaling Jaya.
3. Vijayalakshmi Venugopal (2001). Introduction to Law in Malaysia, Sweet & Maxwell.
4. Laws of Malaysia: Federal Constitution (2012)
5. Contract Acts (1990)
6. Arbitration Acts (1992)

PAT 204/3
CONSTRUCTION MATERIAL

Course Synopsis

Introduction to construction industry, building construction principles, methods and processes for low rise building based on relevant regulation and standard. Students will be exposed to building works, building structures and elements, building materials and also finishes.

Course Outcome

CO1: Ability to identify types of material for most common and advanced building materials,
CO2: Ability to explain the typical and potential applications of building materials.
CO3: Ability to apply construction technology knowledge in the relevant field.

References

1. Mehta, Scarborough, Armpriest, “Building Construction: Principles, Materials, and Systems, Second Edition“. Pearson / Prentice Hall, 2013 ISBN-13: 978-0-13-214869-6
2. Spence, W.P., “Construction materials, methods and techniques: building for sustainable future”, 3rd Edition, Delmar/Cengage Learning, 2011
3. Popovics, S. “Concrete Materials: Properties, specifications and testing” Nayos Publication, 1992
4. Wright, P.H.”Highway Engineering” John Willey and Sons, 2004
5. Eisengh, V.D. “Steel: a Handbook for Materials Research and Engineering” Springer-Verlag, 2003

PAT 153/3
GEOMATICS

Course Synopsis

In this course student will be introduced basic surveying involved in engineering . Starting from linear measurement on plane, student will be exposed to do levelling and conducting different data logging, traversing and tacheometry.

Course Outcome

CO1: Ability to identify types of material for most common and advanced building materials,
CO2: Ability to explain the typical and potential applications of building materials.
CO3: Ability to apply construction technology knowledge in the relevant field.

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.
4. Barry F. Kavanagh. Geomatics ; Prentice Hall , c2003.
5. Kavanagh, B.F.” Geomatic” Prentice Hall, 2003

PAT 154/3
CONSTRUCTION DRAWING

Course Synopsis

The course equips students with the basic computer-aided drawing skill for general engineering drawing and especially for civil engineering profession. This includes plan, cross section drawing and structural detailing. Through lectures, students will learn the basic characteristics of professional civil engineering drawing. Through hand-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. Moreover, students will learn about bill of quantity through construction drawings.

Course Outcome

CO1: Ability to understand and construct CAD of architectural, mechanical and electrical symbols.
CO2: Ability to understand and construct CAD of Civil and Structural Engineering drawings.
CO3: Ability to analyze and design structural components using design software.
CO3: Ability to predict bill of quantity that used in tendering in construction industry.

References

1. Zurflieh, Thomas P, AutoCAD 2004: 3D drawing and solid modeling, Prentice-Hall, 2005
2. Shwarna Lockhart, A tutorial Guide to AutoCAD 2005, Prentice-Hall, 2005
3. Mark Dix & Paul Riley, Discovering AutoCAD 2002 One step at a time, Prentice-Hall, 2003
4. Seeley IH. (1998). Building Quantities Explained 5th Revised edition, Macmillan.
5. Terry D. Metz. Title AutoCAD 2002 a building approach, Prentice Hall , 2003
6. James A. Leach, AutoCAD 2002 instructor : a student guide to complete coverage of AutoCAD's commands and features, McGraw-Hill, 2002.

PAT 154/3
PHYSICS TECHNOLOGY

Course Synopsis

This course aims to teach students on understanding basic concept on physics towards technology and its applications especially in engineering. At the end of this course students must be able to calculate and solve basic physics problems that related to heat, lighting, electricity, magnetism and acoustics. The students must also be able to demonstrate the theory and its applications.

Course Outcome

CO1: Ability to explain fundamental physics concepts in technology.
CO2: Ability to solve basic physics calculation and formula.
CO3: Ability to apply concepts of physics in technology through understanding in lab experiments.
CO4: Ability to evaluate overall important physics phenomena related to building services.

References

1. Poh Liong Yong, "Physics" Oxford Fajar, 2012
2. Cebeci, T. "Convective Heat Transfer" 2nd Rev, Springer, 2002
3. Nichols, D. H. (2002). Physics for technology: with applications in industrial control electronics. Prentice Hall
4. Hunt, B. J. (2010). Pursuing power and light: technology and physics from James Watt to Albert Einstein. John Hopkins University Press
5. Muller, R. A. (2010). Physics and Technology for Future Presidents: An Introduction to the Essential Physics Every World Leader Needs to Know. Princeton University Press

PAT 161/3
ROAD TECHNOLOGY

Course Synopsis

This course focuses to equip the students basic knowledge about materials, the structural design and the maintenance of roads. Several tests related to industrial needs will be taught such as Sieve Analysis, Hydrometer Analysis, Atterberg Limits, Standard Proctor Compaction, Modified Proctor Compaction, Sand Cone, California Bearing Ratio (CBR), Loss Angeles Abrasion Value (LAAV), Aggregate Crushing Value(ACV) Flakiness Index (FI) .

Course Outcome

CO1: Ability to perform soil aggregate testing related to road and highway construction
CO2: Ability to perform calculations and road maintenance report writing.
CO3: Apply road technology knowledge in the relevant field.

References

1. Handbook of Road Technology, Fourth Edition M. G. Lay, 2009

2. Low-Volume Road Engineering: Design, Construction, and Maintenance, Robert A. Douglas, 2015
3. Pavement Engineering: Principles and Practice, Second Edition, Rajib B. Mallick, Tahar El-Korchi,2013.

PAT 202/3
HYDROLOGY AND HYDRAULICS

Course Synopsis

This course provides student knowledge in Uniform Flow; Chezy equation , Ganguillet-Kutter, Bazin and Manning. Student will be able to understand Open Design Channel and Energy and Momentum Principle. Student also will be able to differentiate between laminar flow and turbulent flow and to understand the theory of transportation of sediment.

Course Outcome

CO1: Ability to understand the Chezy equation , Ganguillet-Kutter, Bazin and Manning and to analyze open design channel
CO2: Ability to analyze the Energy and Momentum Principle
CO3: Ability to differentiate between laminar and Turbulent Flow
CO4: Ability to understand theory of sedimentation and analyze open channel design

References

1. V.T. Chow, 2007, *Open Channel Hydraulic*, Mc Graw Hill International Francis, J.R.D. dan P. Minton, 1986. Civil Engineering Hydraulics Arnold, Edward Arnold Ltd., London.
2. French, R.H., 2010. Open-Channel Hydraulics, McGraw-Hill, New York. Henderson, F.M.
3. Das, M.M. and Saikia, M.D."Hydrology", PHI Learning Private Limited, 2009
4. Musy, A. and Higy, C. "Hydrology: A Science of Nature" Taylor and Francis Group, 2011
5. Brooks, K. N.,"Hydrlogy and Management of Watersheds", Iowa State University Oxford, 2003

PAT253/2
GEOTECHNICS

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.

Course Outcome

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', Thomson, 2007.
2. Das, B.M. 'Principles of Foundation Engineering', Thomson, 2004.
3. Handy, R.L. 'Geotechnical Engineering, Soil and Foundation Principles and Practise', Mc Graw Hill, Fifth Edition, 2007.
4. Gofar, N. & Kassim, K.A., 'Introduction to Geotechnical Engineering', Prentice Hall, 2007.
5. Budhu, M., 'Soil Mechanics and Foundations', John & Wiley, 2nd Edition, 2007.

YEAR 2

PAT 205/3
BUILDING SERVICES I

Course Synopsis

An overview on overall building facilities and understanding towards its functionalities in building is the main objectives in this course. Students must be able to explain the function of building services and how it's important to a building. Student also need to produce a simple mechanical and electrical design that always been expected from a Building Technologist.

Course Outcome

CO1: Ability to understand the building facilities systems in modern buildings and problems related to design, operation and maintenance.
CO2: Ability to calculate fundamental design related to building facilities for an application.
CO3: Ability to determine fundamental mechanical and electrical design related to building facilities for an application.

References

1. David, V Chadderton" Building Services Engineering:4th Ed" Taylor & Francis, 2004

2. Hall, F. and Greeno, R. "Building Services Handbook" Elsevier/ Butterworth Heinemann, 2009
3. Fredrick, P.M. "Building Services Engineering" VDM Publishing House, 2009
4. Hall, F. and Greeno, R. "Building Services Handbook" Elsevier/ Butterworth Heinemann, 2005
5. Knight, J. And Jones, P. "Building Services Pocket Book" Burlington Mass, Newness, 2004

PAT 211/2
CIVIL & STRUCTURAL ANALYSIS

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. Besides that, it also introduce 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.

Course Outcome

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. 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.
4. Kassimali, A. "Structural Analysis", Second Edition, PWS, 1999

PAT 212/2
BUILDING LAW

Course Synopsis

The subject provides a broad outline within which the law operates together with its application to the Malaysian construction industry in general and building regulations in particular. Its provide understanding on UBBL, Strata title law 1985 and OSHA.

Course Outcome

CO1: Ability to describe the principles and working of specific legislative provisions in relation to land development and building
CO2: Ability to interpret the general principles in the field of law and proceedings
CO3: Ability to justify and apply the knowledge of building law to monitor compliance with Malaysia's legislation

References

1. National Land Code 1965
2. Local Government Act 1976
3. Town & Country Planning Act 1976
4. Federal Territory (Planning) Act 1982
5. Road,Drainage & Building Act 1974
6. Building and Common Properties Act 2007
7. Uniform Building By-Laws 1984
8. Strata Title Act 1985
9. National Heritage Act 2005
10. Building and Common Properties Act 2007

PAT 213/3
ENVIRONMENTAL TECHNOLOGY

Course Synopsis

This course will provide students the knowledge to conduct environmental assessment investigations, environmental sampling, data collection and monitoring, mapping and data management. With a focus on laboratory analysis and some field work, students will learn about biology, gather and study air and water samples, investigate environmental legislation and study the principles of waste management and meteorology.

Course Outcome

CO1: Demonstrate an in-depth knowledge and understanding of the concepts and methods used in the technological based solution of environmental problems.
CO2: Use a range of appropriate techniques and research methods to address the technical solution of environmental problems in complex and unpredictable situations involving both practical and theoretical contexts.
CO3: Investigate the impacts of environmental factors on the sustainability of a building.

References

1. Environmental Technology, Andrew Solway (2008)
2. The International Handbook on Environmental Technology, Dora Marinova, David Annandale, John Phillimore (2008)
3. Environmental Design of Urban Buildings, Mat Santamouris (2013)
4. Environmental Indicators for Building Design, O. Guerra Santin (2008)

PAT255/3
BUILDING SERVICES II

Course Synopsis

To highlight the importance of information and all building facilities such communication systems, electrical distribution system, building automation systems and public addressing systems in modern buildings. To summarize the understanding on mechanical services in building and ability to explains the operations and functionality of each service. Both services need to understand in a manner that considering energy efficiency spirit throughout building life cycles.

Course Outcome

CO1: Ability to understand the electrical distribution systems in modern buildings and problems related to design, operation and maintenance.
CO2: Ability to discuss, appreciates, and summarizes majority existing definitions of buildings terminologies and explains towards sustainability in building.
CO3: Ability to discuss the design,installataion and location of equipment in services system
CO4: Describe the needs and limitations of building services systems

References

1. David, V Chadderton" Building Services Engineering:4th Ed" Taylor & Francis, 2004
2. Fred Hall. "Building Services Handbook", Routledge, 2012
3. Bernhard Lenz et al. "Sustainable building services" Architektur-Dokumentation GmBH & Company. 2011.
4. Jim Wild. "Site management of building services contractors". E and FN Spoon. New York. 1996
5. Chartered institution of building services. "Building services engineering research and technology". Sage. Los Angeles.
6. Michael Barron."Auditorium Acoustic and Architectural Design". Spon Press. 2009

PAT 261/3
BUILDING DESIGN

Course Synopsis

The course is designed to provide the student with a basic understanding of the behavior of reinforced concrete members and structures; to provide a basic understanding of standards methods of analysis of building design. This course covers the design of reinforced concrete, timber and steel structures.

Course Outcome

CO1: Arrange structural plan for low-rise building.
CO2: Estimate loads and forces react on the building structures
CO3: Determine reinforcement in concrete and safe size for timber and steel structures
CO4: Prepare details drawing for reinforced concrete

References

1. Jack C.McCormac, James K. Nelson, "Design of Reinforced Concrete", Sixth Edition, John Wiley & Sons, Inc. 2005
2. William T. Segui,"Steel Design", 4th Edition, Thomson, 2007
3. Kong, F.C. and Evans, R.H.. Reinforced and Prestressed Concrete. London. Spon Press. (2008)
4. Desch, H.E.," Timber, Its Structure, Properties and Utilisation," Mac Millan Press. (2006)

PAT 262/3
TOTAL ASSET MANAGEMENT

Course Synopsis

This course links the strategic objectives of property ownership, investment and portfolios with the operations and functions of the individual asset. The course therefore includes strategies in asset management techniques, tenancy management, operational and facilities management, and the establishment and operation of service contracts. The course emphasises practical application and case studies and also addresses a range of contemporary issues faced by owners and managers, including changing tenant demands and profiles, workplace management and sustainability

Course Outcome

CO1: Communicate an understanding of property management and the process required to optimise asset and portfolio performance.
CO2: Demonstrate a social, environmental and economic, awareness of property as sustainable personal, financial and community assets.

CO3: Evaluate scholarly practices through disciplinary and interdisciplinary knowledge enabling the formulation of innovative solutions to property management.
CO4: Evaluate high standards of ethical behaviour, independence of thought and professionalism in the assessment of, and dealings with, property assets.

References

1. S. Park Chan, Fundamentals Engineering Economics, 2nd., Prentice-Hall. (2008)
2. Stanley E. P., Samuel J. M., Jack R.M, Scot M.S, Margaret M. Sutton; (2008); Project Management : Planning, Scheduling, and Controlling Projects, John Wiley & Sons Inc. USA
3. O'Sullivan / Sheffin, (2001), *Economics: Principles and Tools*, Prentice Hall

PAT 263/3
FINANCIAL AND HUMAN RESOURCES MANAGEMENT

Course Synopsis

At the end of the course, students will be able to identify and discuss issues and challenges faced by engineers relating to financial management in the current economic scenarios. The syllabus comprises scope management including project authorization, scope definition, personnel control, human resources management 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 Outcome

CO1: Ability to describe the key components of project management
CO2: Ability to analyze cash flow in construction projects
CO3: Ability to design cost competitive construction projects
CO4: Ability to analyse the needs and demands of the nation-building.

References

1. Nicholas Anthony John Hastings "Physical Asset Management" Springer ,2009
2. Duncan Hughes **"**Asset Management in Theory and Practice" New Age**,** 2005
3. Alexandre Adam "Handbook of Asset and Liability Management" Wiley, 2008
4. John D. Campbell, Andrew K.S. Jardine, Joel McGlynn "Asset Management Excellence", 2010

PAT 264/3
FIRE AUDIT

Course Synopsis

This course will introduce the students to the definition and types of active fire protection installed in building, its construction and different components that are susceptible to deterioration and damage. At the end of this courses student should be able to learn doing inspection or surveying regarding fire protection of the building.

Course Outcome

CO1: Ability to discuss the aspect of fire and safety in building.
CO2: Ability to identify majority existing fire safety devices based on requirements
CO3: Ability to determine the design,installation and location of equipment in fire system
CO4: Ability to evaluate the needs and limitations on the principle of fire safety assessment

References

1. Ganapathy Ramachandran, David Charters, "Quantitative Risk Assessment in Fire Safety" (2011)
2. E. Scott Dunlap, "Loss Control Auditing: A Guide for Conducting Fire Audit" (2011)
3. Vincent Dunn, "Collapse of Burning Buildings: A Guide to Fireground Safety" (2010)
4. Jonathan D. Kipp, Murrey E. Loflin Emergency Incident Risk Management Routledge (2007)
5. Malaysia Uniform Building By Law 1984:Fire Safety

Year 3

PAT 311/3
CONSTRUCTION TECHNOLOGY

Course Synopsis

Construction Technology is an instructional program that prepares an individual for employment or continued education in the occupations of Carpentry, Electrical Wiring, Masonry, or Plumbing. It is a basic course teaching fundamentals of safety, tools, math, and basic carpentry, electrical, masonry, and plumbing skills.

Course Outcome

CO1: Ability to understand and differentiate the scope of knowledge construction

CO2: Ability to understand the requirements and procedures of construction
CO3: Ability to understand the need to realize the master plan Malaysian construction

References

1. Osbourn, D. and Greeno, R., "Introduction to Building", Fourth Edition, Pearson, Prentice-Hall, 2007
2. Warszawski, A.,"Industrialized and Automated Building Systems: A managerial Approach", second edition, Taylor & Francis , 2000.
3. R.Barry, "The Construction of Buildings". Fifth Edition, Wiley-Blackwell, 2001
4. Malaysian CIMP Framework 2005 – 2015
5. David, V. Chadderton ,"Building Services Engineering", Taylor & Francis , 2000

PAT 312/3
BUILDING CONTROL

Course Synopsis

This course will provide students the knowledge when dealing with the legal and technical requirements of the construction process. The subtopics will cover standard regulations, guidance notes and other technical resources on Building Regulations and related matters.

Course Outcome

CO1: Ability to identify the technical and legal aspects of building.
CO2: Examine problems in building system which include its installation, operation and renovation based on by-law requirements and other guidelines.
CO3: Able to determine remediation specification.

References

1. Building Control , Bernhard Lenz " GmBH & Company(2011)
2. Uniform Building By Law, (2007)
3. Guide to Building Control ,Anthony Gwynne (2013)
4. The Building Regulations**:** Explained and Illustrated, M. J. Billington, Keith Bright, J. R. Waters (2007)

PAT 313/3
FACILITIES MANAGEMENT AND CONTRACT PROCUREMENT

Course Synopsis

This course will provide the knowledge of the system of facilities management in Malaysia and its relation to building design and operation. At the end of the course students will be able to identify procedures of facilities management evaluate the role of procurement in construction industry and to be able to use standard methods of quantification and specification.

Course Outcome

CO1: Ability to explain the system of facilities management in Malaysia
CO2: Ability to evaluate techniques of asset maintenance and facilities operations
CO3: Ability to explain standard methods of measurement in building works
CO4: The ability to estimate price for internal and external building measurement works

References

1. Frank Booty Facilities Management Handbook, Routledge, (2009)
2. Denise Bower ,Management of Procurement ,Thomas Telford (2003)
3. David G. Cotts , The Facility Management Handbook CFM, McGraw Hills (2007)
4. Malaysian Standard Method of Measurement 2nd Edition (SMM2)
5. Civil Engineering standard Method Of Measurement (CESMM)

PAT 314/3
BUILDING INFORMATION MODELLING FOR FACILITY MANAGEMENT

Course Synopsis

This course will enable the students to understand the basic of interoperability and open standards, knowledge sharing, and gathering data, to the BIM software suite, implementation planning, and project workflow, this authoritative volume provides a thorough understanding of key aspects of BIM

Course Outcome

CO1: Ability to explain the importance of building information modelling
CO2: The ability to assess the design tools and parametrics modelling
CO3: Ability to evaluate building information modelling for facility management
CO4: The ability to evaluate building information modelling for building works

References

1. O'Sullivan / Sheffin Building Information Modelling, Prentice Hall, (2001)
2. R. Logeswaran, Hairul Azhar, Pau Kiu Nai and Sim Hock Kheng, Building Information Modelling, Mc Graw Hill 2nd edition.
3. S. Park Chan, Facility Management 2nd., Prentice-Hall. (2008)

4. Stanley E. P., Samuel J. M., Jack R.M, Scot M.S, Margaret M. Sutton; (2008); Project Management: Planning, Scheduling, and Controlling Projects, John Wiley & Sons Inc. USA

PAT 318/3
BUILDING CONSERVATION TECHNOLOGY(ELECTIVE)

Course Synopsis

Preservation of historic buildings is an area that is growing in Malaysia. Many efforts have been made by various parties, including local authorities, government, non-government, private sector and individuals to continue to preserve the historic building for future generations.This course will introduce the techniques and methods that comply with Application of National Heritage Acts (2005).

Course Outcome

CO1: Ability to explain the cause of damage to buildings
CO2: The ability to assess the damage to the building.
CO3: Ability to propose conservation measures suitable building
CO4: The ability to assess the regulations involved in building conservation

References

1. Poul Beckman (2004) Structural Aspect of Building Conservation. McGraw-Hill International, UK
2. Bernard M Fielden (2003) Conservation of Historic Building. Elsevier. Burlington
3. Brian Ridout(2004)Timber Decay in Buildings. Spon Press. Abington
4. J Cameron Blackhall (2005) Planning Law and Practice. Cavendish Publishing Limited. Abington
5. Siti Norlizaiha Harun (2010) Pemuliharaan Bangunan Bersejarah. Pusat Penerbitan Universiti (UPENA) UiTM.

PAT 319/3
FACILITY CONDITION ASSESSMENT(ELECTIVE)

Course Synopsis

Preservation of historic buildings is an area that is growing in Malaysia. Many efforts have been made by various parties, including local authorities, government, non-government, private sector and individuals to continue to preserve the historic building for future generations.This course will introduce the techniques and methods that comply with Application of National Heritage Acts (2005).

Course Outcome

CO1: Ability to explain the extent of the damage of an element in building
CO2: The ability to assess the types of building defects
CO3: The ability to assess the repair of building defects
CO4: The ability to select suitable methods of repairing
CO5: Ability to provide Building Condition Assessment Report

References

1. Kaser (2003). The Facilities Audit: A Process for Improving Facilities Condition.
2. Poul Beckman (2004) Structural Aspect of Building Conservation. McGraw-Hill International, UK
3. Bernard M Fielden (2003) Conservation of Historic Building. Elsevier. Burlington
4. Brian Ridout(2004)Timber Decay in Buildings. Spon Press. Abington
5. J Cameron Blackhall (2005) Planning Law and Practice. Cavendish Publishing Limited. Abington

PAT 361/3
BUILDING PATHOLOGY

Course Synopsis

Knowledge and skills required in this course is an understanding of the basic construction technology and the way a building or material failure. The purpose of this course is to learn the principles of structural failure, the nature of the material structure of a building, and how the material is damaged the effects of various environmental factors, especially those related to water. In addition, students will be taught a variety of inspections carried out by professional building inspectors. Students will be exposed to the preparation of schedules of dilapidation and acted as an expert witness.

Course Outcome

CO1: Able to recognize the role and responsibilities of building technologist
CO2: Able to recognize The procedures and equipment required to carry out various types of surveys.
CO3: Able to examine the reasons for building regulation and the technical standards adopted including the inspection, testing and repair methodology.
CO4: Able to analyze defect in buildings and propose appropriate remedial measure

References

1. David Watt "Building Pathology: Principles and Practice", John Wiley & Sons, 2009
2. Samuel Y. Harris "Building Pathology: Deterioration, Diagnostics, and Intervention, ", John Wiley & Sons, 2001
3. James Douglas "Building Surveys and Reports" Wiley Blackwell,2011

PAT 362/3
DEVELOPMENT AND BUILDING REGULATION

Course Synopsis

In this course, students will be introduced to urban planning, planning theories and site analysis.Application of knowledge in Uniform Building By-Law 1984 and Road, Drainage and Building Acts 1995, Certificate of Fitness (CF) and Certificate of Completion and Compliance (CCC) approvals procedures; plans checking practice and inspection methods; Building design theories and concepts for building refurbishment, legal requirements, site and existing building analysis.

Course Outcome

CO1: Understanding aspects of planning theories and site analysis.
CO2: Apply process and procedures for building plan approval.
CO3: Able to examine the reasons for building regulation and the technical standards adopted including the inspection, testing and repair methodology.
CO4: Able to analyze defect in buildings and propose appropriate remedial measure

References

1. Oxley r. Poskitt J., Management Techniques Applied To The Cons. Industry, Granada.(2011)
2. Lock D., Gower Handbook Of project Management, 2nd Ed, Ower (2004)
3. Rusdi M., Pengurusan Projek Pembinaan, DBP, 1990.
4. Abdul Hakim M., Hishamuddin a., Pengurusan Projek Binaan, DBP, (2005).
5. Bennett J., International construction Project Management: General Theory And Practice, Butterworth Heinemann, (1991).
6. Cleland D.I., King W.R., Project Management Handbook, Van Nostrand Reinhold, (2001)

PAT 454/3
FINAL YEAR PROJECT 1

Course Synopsis

This an individual research project in connection with a special engineering technology 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 technology report, presents and demonstrates findings and results of the project work

Course Outcome

CO1: Identify and create research objective also problem statement.
CO2: Review information source then recognize, construct and justify the suitable research information.
CO3: Report and perform the information in the form of dissertation format.
CO4: Describe, explain and defend effectively in the form of proposal defends.

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 Book of Technical Writing for Engineers and Scientist. 3rd Edition, McGraw Hill.
4. Kirkman, J. "Good Style: Writing for Sciences and Technology" E&FN Spon, 1992
5. Beer, D.F. and McMurrey, D."A Guide to Writing as an Engineer". 3rd Edition, John Willey and Sons, 2009

PAT 363/3
SPACE MANAGEMENT

Course Synopsis

This course will provide guidance for students to study the space management and improving the space use. The study on management of improvement in space use in a complex area, coordination, space review and space forecast will be taught in this course.

Course Outcome

CO1: Able to evaluate accurate and real time information about facility space and its usage.
CO2: Able to analyze the space utilization in a variety of ways, including occupancy
CO3: Able to effectively manage space today and forcast the building space office for future use

References

1. Lamie E "Space Planning: Comprehensive Guide for Residential Interior Space Planning" Xlibris,2011
2. David G. Cotts ,Kathy O. Roper, Richard P. Payant "Facility Management Handbook" Amacom, 2010
3. Edmond P. Rondeau, Robert Kevin Brown, Paul D. Lapides " Facility Management" John Wiley & Sons, 2006
4. Bennett J., International construction Space Management: General Theory And Practice, Butterworth Heinemann, (1991).
5. Cleland D.I., King W.R., Space Management Handbook, Van Nostrand Reinhold, (2001)

PAT 368/3
BUILDING PERFORMANCE EVALUATION (ELECTIVE)

Course Synopsis

This course is to introduce the systematic investigation of buildings and building problems and to develop appropriate technical skills involved in carrying out such work. This practical module helps on diagnosis and gives an indication of the remedy for the situation discovered.

Course Outcome

CO1: Able to assess the study on building defects
CO2: Able to investigate building problems and develop appropriate solutions
CO3: Able to evaluate the techniques and materials involve to diagnose and propose remedial actions

References

1. Housing Association Maintenance Training: Part 1-House Construction For Non-Technical people, The National Building (2012)
2. Common Building Defects-diagnosis and Remedy, The National Building Agency.(2003)
3. Barry A. Ricardson, Defects And Deterioration In Building, Spon Press, London (2001)
4. David S. Watt, Building Pathology; Principles and Practice, Blackwell Publishing.(2004)
5. Susan Mc Donald, Concrete Building Pathology, Blackwell Publishing.(2005)
6. Tony Bryan, Construction Technology: Analysis and Choice, Blackwell Publishing.(2006)
7. Edward Noy, Building Surveys and report, Prentice Hall. (2005)
8. Martin E. Weaver, Conserving Buildings: A Manual of Techniques and Materials, Revised Edition, John Wiley. (1998)Bennett J., International construction Space Management: General Theory And Practice, Butterworth Heinemann, (1991).
9. Cleland D.I., King W.R., Space Management Handbook, Van Nostrand Reinhold, (2001)

PAT 369/3
GREEN BUILDING TECHNOLOGY (ELECTIVE)

Course Synopsis

This course approaches sustainable development for buildings by examining building components and performance. They will be taught about sustainable development in building starting with site planning and evaluation, and proceeds through construction, commissioning, and occupancy phases. The course may include many case studies of historic and contemporary structures exemplifying various sustainability features.

Course Outcome

CO1: Able to define the concept of green building design
CO2: Able to assess a wide range of effective strategies for influencing the process at the right stages for the purpose of integrating sustainability
CO3: Able to evaluate the importance of site selection and various techniques for sustainable site planning and site management during construction.
CO4: Able to apply the method and specifications within green building technology scope

References

1. Charles J. Kibert , "Sustainable Construction: Green Building Design and Delivery", John Wiley and Sons 2005
2. Jerry Yudelson "The Green Building Revolution", Island Press 2008
3. Ross Spiegel, Dru Meadows "Green Building Materials: A Guide to Product Selection and Specification 3rd Edition" 2010
4. Tony Bryan, Construction Technology: Analysis and Choice, Blackwell Publishing.(2006)
5. Edward Noy, Building Surveys and report, Prentice Hall. (2005)
6. Martin E. Weaver, Conserving Buildings: A Manual of Techniques and Materials, Revised Edition, John Wiley. (1998)

PAT 364/3
PROCUREMENT FOR BUILDING MAINTENANCE

Course Synopsis

This course will provide the knowledge of the system of procurement in Malaysia. At the end of the course students will be able to identify procedures of separated and integrated procurement system and should be able to identify the procedure of successful building procurement selection in Malaysia

Course Outcome

CO1: Ability to explain the concept of building procurement system
CO2: The ability to identify procedures of separated procurement system
CO3: The ability to evaluate the role of integrated procurement in construction industry
CO4: The ability to identify the procedure of successful building procurement selection in Malaysia

References

1. J. W. E. Masterman An Introduction to Building Procurement Systems, Taylor & Francis (2008)
2. Barrie Chanter Peter Swallow, Building Maintenance Management,Wiley (2009)
3. Christopher Marsh Building Services Procurement ,Routledge (2003)

YEAR 4

PAT 411/3
MAINTENANCE AND FACILITIES MANAGEMENT

Course Synopsis

In order to carry a proper maintenance work, it is essential to have good management skills. The course is to introduce effective aftercare strategies for properties and to develop appropriate practical skills in managing such work. The module comprises on maintenance policy, maintenance manual, the management studies and the facilities management.

Course Outcome

CO1: Able to identify the principles of maintenance and facilities management
CO2: Able to assess maintenance information and providing improvement and strategy
CO3: Able to synthesis a performance management system for maintenance
CO4: Able to evaluate maintenance approaches to achieve continuous improvement

References

1. Peter Barnett, *Facilities Management*, Blackwell Publishing (2009)
2. Barrie Chanter & Peter Swallow, *Building Maintenance Management*, Prentice Hall.(2006)
3. Palmer, *Maintenance, Planning and Scheduling Handb*ook, McGraw Hill. (2003)
4. *Housing Association Maintenance Training: Part 1-House Construction For Non-Technical people*, The National Building Agency.(2005)
5. Barry A. Ricardson, *Defects And Deterioration In Building*, Spon Press, London.(2006)
6. David S. Watt, *Building Pathology; Principles and Practice*, Blackwell Publishing.(2005)
7. Sunil Shah, *Sustainable Practice for Facilities Manager*, Blackwell Publishing.(1998)

PAT 412/3
BUILDING INTEGRATED PROJECT

Course Synopsis

In order to carry a proper maintenance work, it is essential to have various skills. The course is introduced to combine some of the subjects taught in previous semesters which includes application of practice,process and procedures of building inspection and students are needed to prepare a complete project report that contains all knowledge required to be a building technologist.

Course Outcome

CO1: Able to critically analyse problem of practical applications in building technology
CO2: Able to apply appropriate methods and processes
CO3: Able to evaluate the application of theoretical concepts in practical context.

References

1 Lincoln H. Forbes, Syed M. Ahmed Modern Construction: Lean Project Delivery and Integrated, (2010)
2. Brian J.B. Wood:Building Maintenance (2009)
3. Barrie Chanter, Peter Swallow, Building Maintenance Management (2008)

PAT 454/5
FINAL YEAR PROJECT 2

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.

Course Outcome

CO1: Critically analyse problems of an academic or practical significance in building technology fields.
CO2: Apply appropriate methods and processes
CO3: Evaluate the application of theoretical concepts in practical context.

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 Book of Technical Writing for Engineers and Scientist. 3rd Edition, McGraw Hill.
4. Kirkman, J. "Good Style: Writing for Sciences and Technology" E&FN Spon, 1992
5. Beer, D.F. and McMurrey, D."A Guide to Writing as an Engineer". 3rd Edition, John Willey and Sons, 2009

PAT 418/3
BUILDING MEASUREMENT ANALYSIS (ELECTIVE)

Course Synopsis

This course will enhance students' knowledge and competencies in carrying out building measurement work. It allows students to learn measurement techniques using appropriate apparatus and various remediation technique.It is also helps to provide the knowledge to the students to provide am analysis based on inspection report based on scientific information obtained.

Course Outcome

CO1: Able to describe building defects measurement techniques
CO2: Determine remediation analysis and propose new specification
CO3: Write suggestions and advice based on the analysis conducted

References

1. Paul K. Marsden (2012). Building Measurement. UNSW Press Book. Sydney
2. David Watt (2009). Building Pathology: Principles and Practice
3. James Douglas (2010) Building Surveys and Reports

PAT 419/3
COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEM (ELECTIVE)

Course Synopsis

Computerized Maintenance Management System (CMMS) are utilized by facilities maintenance organizations to record, manage and communicate their day-to-day operations. The system can provide reports used in managing the organization's resources, preparing facilities key performance indicators (KPIs)/metrics to use in evaluating the effectiveness of the current operations and for making organizational and personnel decisions. In today's maintenance world the CMMS is an essential tool for the modern facilities maintenance organization.

Course Outcome

CO1: Ability to explain the setup steps CMMS
CO2: The ability to evaluate CMMS system
CO3: Ability to apply the CMMS system
CO4: Ability to evaluate and optimize the use of CMMS

References

1. Dave Bertolini (2013) CMMS Explained- Made Simple
2. Terry Wireman (2011) Succesfully Utilizing CMMS/EAM systems
3. Paul K. Marsden (2002). Computerized Maintenance Management Systems Made Easy: How to Evaluate, Select, and Manage CMMS
4. Daryl Marther (2002) CMMS A Time Saving Implementation Process. CRC Press. Florida

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (INDUSTRIAL CHEMICAL PROCESS)

Programme Educational Objectives (PEO)

PEO 1
Graduates who are able to apply knowledge and technical skills in providing practical engineering solutions

PEO 2
Graduates who are able to demonstrate professionalism and leadership and contribute to team success and manage projects in a multi-disciplinary environment.

PEO 3
Graduates who are able to advance in their career through adopting the advancements in engineering and technology as part of life-long learning experiences through ever changing environment.

PROGRAMME OUTCOMES (PO)

PO 1
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialization principles to define and applied engineering procedures, processes, systems or methodologies.

PO 2
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their disciplines or area of specialization.

PO 3
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns.

PO 4
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources.

PO 5
Select and apply appropriate techniques, resources and modern engineering tools with an understanding of their limitations.

PO 6
Function effectively as individuals, and as members or leaders in diverse technical teams.

PO 7
Communicate effectively with the engineering community and society at large.

PO 8
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities.

PO 9
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices.

PO 10
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development.

PO 11
Demonstrate an awareness of management, business practices and entrepreneurship.

PO 12
Recognise the need for professional development and to engage in independent and lifelong learning.

CURRICULUM STRUCTURE BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (HONOURS) (INDUSTRIAL CHEMICAL PROCESS)

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
Discipline Core (105)	PCT 111/3 Engineering Skills	PGT 106/3 C Programming	PTT 242/3 Introduction to Process Instrumentations	PTT 247/3 Heat Transfer	PTT 326/4 Process Control & Dynamics	PTT 328/4 Final Year Project 1	PTT 426/6 Final Year Project 2	INDUSTRIAL TRAINING (LI) PIT304/12(0+12)
	PTT 136/3 Electrical Technology	PTT137/3 Engineering Graphic	PTT 243/4 Material and Energy Balance	PTT248/4 Reactor Engineering	PTT349/4 Utility Design	PTT 329/3 Safety & Loss Prevention	PTT 427/4 Process Plant Design II	
	PTT 140/3 Physical Chemistry	PTT 139/3 Organic Chemistry	PTT 244/4 Thermodynamics	PTT 249/3 Mass Transfer	PTT 350/4 Separation Engineering	PTT 330/4 Process Plant Design I	PTT 429/3 Industrial Waste Treatment	
		PTT141/3 Analytical Chemistry	PTT245/3 Fluid Mechanics		PTT XXX/3 Elective I/3	PTT XXX/3 Elective II/3	PTT XXX/3 Elective III/3	
						PTT 332/3 Process Equipment Mechanical Design		
Common Core (18)	PQT111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II		PQT 213/3 Mathematics for Engineering Technology III		PTT 333/3 Engineering Technology Management	PTT444/3 Engineering Technologist in Society	
	PDT 180/3 Engineering Science							
University Required (19)	UVW 410/2 University Malay Language	UUT 122/2 Skills & Technology in Communication	UUW 224/2 Engineering Entrepreneurship	UVW 312/2 English for Technical Communication	UUW 322/2 Thinking Skills			
	UZW 1XX/1 Co-Curricular Activity	UZW 1XX/1 Co-Curricular Activity	UUW 233/2 Islamic & Asian Civilizations	UVW XXX/ Option Subjects	UUW 235/2 Ethnic Relation			
			UZW 1XX/1 Co-Curricular Activity					
142 (12 LI)	18	18	19	17	19	20	19	12
University Required	University English, Engineering Entrepreneurship, TITAS, Ethnic Relation, Thinking Skill, University Malay Language, Co-Curiculum, Option Subject							
Total Units for Graduation 142								

Elective I, Elective II, Elective III
PTT 327/3 Oleochemical Process & Products; PTT331/3 Petroleum & Gas Processing Technology; PTT 428/3 Green Technology & Sustainable Waste Management; PTT430/3 Food Processing Technology

COURSE SYLLABUS

PTT 136/3
Electrical Technology

Course Synopsis

This course is offered to non-electrical engineering background. This course introduces the basic electrical circuit theory, DC and AC circuits, basic principles of 3-phase AC circuits, and magnetic circuits. The course also covers the fundamental of electronic components such as semiconductors, diodes and transistors. The laboratory sessions cover the concepts being discussed in lectures.

Course Outcomes

1. Ability to demonstrate the application of the principle elements of DC and AC circuits, principles of electricity including Kirchhoff's of currents and voltages.
2. Ability to explain parameters of three phase AC system for Wye and Delta connection, and also the basic concept of electronic components.
3. Ability to explain the basic concept of magnetism and electromagnetism and its application in DC and AC machines.

References

1. Bird, J. Electrical Circuit Theory and Technology. 4th Edition. Elsevier. 2010.
2. Boylestad, R. Introductory Circuit Analysis. 12th Edition. Pearson. 2010.
3. Bishop, O. Electronic Circuits and Systems. 3rd Edition. Elsevier. 2010.
4. Donald. C. Standard Handbook of Electronic Engineering. McGraw-Hill Professional. 2004.
5. Gustafson, R.J and Morgan, M.T. Fundamentals of Electricity for Agriculture. 3rd Edition. ASAE. 2004.

PTT 137/3
Engineering Graphic

Course Synopsis

This course covers principles and methods useful to modern engineering and technology which are used in determining space relations of points, lines, planes, and their combination. It will exposed on the development of drafting skills and introduction to sketching, drafting instruments, computer software for graphic representations and problem solving. Particularly, emphasize on graphical analysis, orthographic projection, auxiliary views, pictorial drawings, dimensioning methods, and sectioning with adherence to drafting standards. All drawing used AutoCAD software or similar computer-aided drafting.

Course Outcomes

1. Ability to describe and demonstrate the use of drafting tools, adherence to drafting standards
2. Ability to apply 2D and 3D AutoCAD commands and proper use of AutoCAD software.
3. Ability to construct 2D and 3D AutoCAD drawing of related engineering discipline.

References

1. Bertoline R.G. and Wiebe N.E. Fundamentals of Graphics Communication. New York: McGraw Hill International. 2007.
2. Ibrahim Zeid. CAD/CAM Theory and Practice. New York: McGraw Hill International. 2010.
3. James R. C. Chemical Process Equipment: Selection and Design. Texas: Gulf Professional Publishing. 2005.
4. Calmettes J.M. Best of 3D Virtual Product Design. Singapore: Page One Publishing Pte. Ltd. 2005
5. Dnaher S. The Complete Guide to Digital 3D Design. Cambridge: ILEX. 2004.
6. Hannah B. Becoming a Product Designer. New York: John Wiley and Sons. 2004.

PTT 139/3
Organic Chemistry

Course Synopsis

This course covers the theories, structure, bonding, nomenclature, properties, reaction mechanisms of synthesis and preparation of various classes of organic compounds. This course emphasizes the chemistry of the principal functional groups, differences between related reactions, introduction of organic chemistry laboratory techniques and application of organic chemistry in the chemical process industries.

Course Outcomes

1. Ability to apply the chemical and physical properties of each functional group carry out theoretical reaction mechanism at the molecular level.
2. Ability to propose the chemical reaction and mechanism of each functional group.
3. Ability to analyze the knowledge of organic chemistry in the chemical process industries.

References

1. Bruice P.Y. Organic Chemistry 7th Edition. Pearson Prentice Hall. 2014.
2. William H.B., Brent L.I., Eric V.A. and Christopher S.F. Organic Chemistry 7th Edition. Brooks/Cole, Changes Learing. Singapore. 2014.
3. Solomons T.W.G. and Fryhe C.B. Organic Chemistry. 10th Edition. John Wily and Son. Inc. 2011.
4. Smith J.G. Organic Chemistry. 4th Edition. McGraw Hill. New York. 2014.
5. Bruice P.Y. Essential Organic Chemistry. Pearson International. Prentice Hall. 2006.
6. John Macmurray. Organic Chemistry. 5th. Brooks/Cole. 2000.

PTT 140/3
Physical Chemistry

Course Synopsis

This course describes the fundamental knowledge in physics, chemistry and combination of both such as the laws of thermodynamics, chemical equilibrium, reaction equilibrium, chemical kinetics, calculation of thermodynamics and equilibrium properties of matter, reaction equilibrium of ideal gas and mixed gas and phase diagram. The laboratory session covers the concepts being discussed in lectures.

Course Outcomes

1. Ability to distinguish the phenomena, basic concepts, laws and principles in physical chemistry.
2. Ability to calculate problems concerning physical chemistry.
3. Ability to write various fundamental laws in physical chemistry.

References

1. Engel, T. and Reid, Philip., Physical Chemistry. 3rd Edition. Pearson. USA., 2014.
2. Levine I. N., Physical Chemistry. 6th Edition. McGraw Hill. Singapore, 2009.
3. Atkins, P. and Julia de Paula., Physical Chemistry. 8th Edition. Oxford University Press. USA.2010.
4. Atkins, P. and Julia de Paula., Physical Chemistry for the life sciences. 2nd Edition. Oxford University Press. USA., 2011.
5. Atkins, P., Julia de Paula and Freidmn, R., Physical Chemistry. 2nd Edition. Oxford University Press. USA., 2009.

PTT 141/3
Analytical Chemistry

Course Synopsis

This first part of the course covers the basic principle of analytical chemistry which includes data analysis and its interpretation. The second part provides an introduction and application of classical analytical methods such as gravimetry and titrimetry as well as modern methods in analytical chemistry such as chromatographic and spectroscopic technique.

Course Outcomes

1. Ability to employ statistical methods to assess analytical measurement data quality and interpret their significance, validate analytical methods and results
2. Ability to understand and apply basic principle of different analytical techniques and to calculate and solve analytical problems by integrating different analytical techniques.
3. Ability to propose the use of different analytical techniques.

References

1. Christian, G. D., Analytical Chemistry. 7th Edition. Wiley. USA., 2014.
2. Harris, Daniel C., Quantitative Analytical Chemistry. 8th Edition. W. H. Freeeman. USA., 2010.
3. Skoog. D. A., West, D. M., Holler, F. J., Fundamental of Analytical Chemistry. 9th Edition. Saunders College Publication. USA. 2013.
4. Harvey, D., Modern Analytical Chemistry. McGraw-Hill. USA., 2000.
5. Keeley, D. and Haines, P.J., Analytical Chemistry. Oxford:Bio Scientific. USA., 2002.
6. Khopkar, S. M., Basic concept of Analytical Chemistry. 3rd Edition. New Age International Publisher. USA., 2008.

PTT 242/3
Introduction to Process Instrumentations

Course Synopsis

The course deals with the knowledge and understanding of the equipment and process documentations in modern industrial instrumentation and control systems. The course begins with an introduction to process measurements involved in the process industries, followed by introduction to the fundamentals of industrial valves, pumps, compressors, fans and blowers. This is complemented with the ability to employ and analyze the ISA (The Instrumentation Systems and Automation Society) symbology and tagging systems, which covers identification letter as well as the tag numbers for unit operation and piping. This course also

discusses the design and development of the process flow diagram, and the piping and instrumentation diagram of a simple and complex system. These concepts are applied in control and optimization in unit operations in chemical systems.

Course Outcomes

1. Ability to interpret the functions of different types of valves; apply and employ the operational aspects of the valves.
2. Ability to analyze the ISA symbology for the process flow diagram (PFD), and piping and instrumentation diagram (P&ID); apply appropriate symbols and sketch the process flow diagram and piping and instrumentation diagram.
3. Ability to apply and evaluate the concepts in control and optimization in unit operations in chemical system.

References

1. Liptak, B.G.. Process Control and Optimization. 4th Edition, CRC Press, Florida. 2005.
2. Smith, C.A and Corripio, A. Principles and Practice of Automatic Process Control, 3rd Edition, John Wiley & Sons, New York. 2006.
3. McCabe, W.L., Smith, J.C. and Harriot, P. Unit Operations of Chemical Engineering, 7th Edition. McGraw-Hill. New York. 2005.
4. Patience, G. S. Instrumentation Method and Instrumentation for Chemical Engineers.1st Edition, Elsevier, Oxford, UK. 2013.
5. Towler, G. and Sinnott, R. Chemical Engineering Design: Principle, Practice and Economics of Plant and Process Design 2nd Edition, Butterworth-Heinemann, Oxford, UK. 2013.
6. McAcinew T. and Mulley R. Control System Documentation: Applying Symbols and Identification 2nd Edition .ISA Press. 2005.

PTT 243/4
Material & Energy Balance

Course Synopsis

The course highlights the basic concept of material and energy balance in different systems. The aims are to teach students how to formulate and solve materials balances in various processing systems. Exposure on the concept and understanding of material and energy balances are emphasized which covers single and multiphase systems and nonreactive and reactive processes. These concepts are applied to analyze and solve problems in chemical systems.

Course Outcomes

1. Ability to apply knowledge of engineering fundamentals to define and solve, engineering processes and methodologies, together with basic engineering calculations.Ability to solve broadly using tools and technique appropriate to material and energy balance discipline.
2. Ability to calculate and analyze information broadly, using appropriate tools and technique related to materials and energy balance.
3. Ability to analyze design material and energy processes to meet specified needs with appropriate consideration for chemical systems.
4. Ability to compose data given in a system investigation on material and energy balance.

References

1. Felder, R.M and Rousseau, R.W. Elementary Principles of Chemical processes. 3rd ed. John Wiley & Sons, Inc. New York. 2005.
2. Himmelblau, D.M., and Riggs, J.B. Basic Principles and Calculations in Chemical Enginering. Prentice Hall, New Mexico. 2004.
3. Towler, G. and Sinnott, R. Chemical Engineering Design; Principles, Practice and Economics of Plant and Process Design, Elsevier Inc. Amsterdam. 2008.
4. Hanyak Jr, M. E. Chemical Process Simulation. MEH, New York. 2012.
5. Ghasem, N. Computer Method in Chemical Engineering. CRC Press, Florida. 2012.

PTT 244/4
Thermodynamic

Course Synopsis

This course covers the first and second laws of thermodynamics, substance properties, mass and energy analysis, entropy, refrigeration and gas mixture. It also covers the evaluation of the theory of the solution thermodynamics and the equation of state for pure and mixed fluids, the phase equilibrium and chemical reaction equilibrium calculations.

Course Outcomes

1. Ability to analyze the fundamental properties of thermodynamics and the law of thermodynamics in engineering systems.
2. Ability to evaluate heat, work and thermodynamic properties relations.
3. Ability to evaluate the theory of the solution thermodynamics and chemical reaction equilibriums.

References

1. Cengel, Y.A. and Boles, M.A. Thermodynamics-An engineering Approach, 7th edition, McGraw-Hill, 2010.
2. Smith, J.M., Van Ness, H.C. and Abbort, M.M. Introduction to Chemical Engineering Thermodynamics, 7th Edition, McGraw-Hill, 2005.
3. Narayanan, K.V. A Text Book of Chemical Engineering Thermodynamics, Prentice-Hall India, 2010.
4. Halder, G. Introduction to Chemical Engineering Thermodynamics, PHI Learning Private Limited, 2009.
5. Stanley I. Sandler, Chemical, biochemical, and engineering thermodynamics, Volume 1, 4th edition, John Wiley & Sons, 2006.

PTT 245/3
Fluid Mechanics

Course Synopsis

This course emphasizes fundamental concepts and problem-solving techniques. This course covers properties of fluids, pressure, fluid statics and kinematics, mass, Bernoulli and energy equations, momentum analysis of the flow system, dimensional analysis and modelling, internal flows (pipe flows), differential analysis of fluid flow, external flows (lift and drag) and compressible flow.

Course Outcomes

1. Ability to analyze the essential parameters describing a fluid system and dimensional analysis and homogeneity.
2. Ability to evaluate pressures, forces and stability in static fluid systems and the link between conserved quantities and the equations of fluid mechanics.
3. Ability to evaluate control volumes and surfaces for developing the equations of fluid mechanics and phenomena associated with external flow.

References

1. Cengel, Y. A., and Cimbala, J. M. Fluid Mechanics: Fundamental and Applications, 3rd Edition, McGraw-Hill, 2014.
2. Mott, R.L. Applied Fluid Mechanics, 6th Edition, Prentice Hall, 2006.
3. Crowe, C.T., Elger, D.F., and Robertson, J.A. Engineering Fluid Mechanics, 8th Edition, John Wiley, 2005.
4. Das, M.M. Fluid Mechanics and Turbomachines, Prentice-Hall of India Private Limited, 2008.
5. Levi, M. The Mathematical Mechanic: Using Physical Reasoning to Solve Problems, Princeton University Press, 2009.

PTT 247/3
Heat Transfer

Course Synopsis

This course emphasizes the fundamental concepts and problem-solving techniques related to heat transfer in process engineering, the fundamental theoretical concepts and mechanisms of conduction, convection and radiation of heat transfer and the design fundamentals of basic industrial heat exchangers. The use of various equations to estimate total heat capacity and overall heat transfer coefficient, subsequently to be applied to calculate the duty of heat transfer equipments are also presented and discussed.

Course Outcomes

1. Ability to apply the basic principles and to calculate steady state and unsteady state conduction heat transfer.
2. Ability to apply and analyze the concept of convection and radiation heat transfer.
3. Ability to evaluate the appropriate heat transfer equipment (e.g., in terms of performance etc.) by applying the principles of heat transfer.

References

1. Holman J.P. Heat Transfer. 10th Edition, McGraw-Hill, New York . 2010.
2. Incropera F.P & De Witt D.P. Fundamentals of heat and mass transfer, 6th Edition, Wiley, New York. 2006.
3. Coulson J.M. and Richardson J.F. Coulson and Richardson's Chemical Engineering Volume 1. 6th Edition, Elsevier. 2008.
4. McCabe W.L, Smith C.S. & Harriot P. Unit Operations of Chemical Engineering, McGraw Hill, New York. 2005.
5. Geankoplis C.J. Transport Processes and Separation Process Principles: Includes Unit Operations. 4th Edition, Prentice Hall, New Jersey. 2003.

PTT 248/4
Reactor Engineering

Course Synopsis

This course is concern with the exploitation of reactions on a commercial scale. It emphasizes fundamental concepts and problem-solving techniques. Topics to be covered include mole balance, conversion and reactor sizing, rate law and stoichiometry, isothermal reactor design, collection and analysis of rate data, multiple reaction, catalysis and catalytic reaction mechanism, and distributions of residence time for reactors.

Course Outcomes

1. Ability to categorize design equation for most common industrial reactors and reactor sizing.
2 Ability to analyze rate law and isothermal reactor design.
3 Ability to analyze rate data and multiple reaction.
4. Ability to evaluate catalysis and catalytic reaction mechanism and analyze Residence Time Distribution (RTD) functions in reactors.

References

1. Fogler, H. S., Elements of Chemical Reaction Engineering. 6th Edition. Prentice Hall Inc. U.S., 2011.
2. Davis, M. E and Davis, R. J., Fundamentals of Chemical Reaction Engineering. 1st Edition. Mc Graw Hilll, U.S., 2002
3. Fogler, H. S., Essentials of Chemical Reaction Engineering. 1st Edition. Prentice Hall. U.S., 2010.
4. Doraiswamy, L.K and Deniz Uner, Chemical Reaction Engineering: Beyond the Fundamental. CRC Press, 2014.
5. Bruce Nauman, E., Chemical Reactor Design, Optimization and Scale up. 2nd Edition. John Wiley & Sons, 2008.
6. Levenspiel, O., Chemical Reaction Engineering. 3rd Edition. Wiley India Pvt Limited, 2006.

PTT 249/3
Mass Transfer

Course Synopsis

This course emphasizes the fundamental concepts and problem-solving techniques on mass transfer operations and principles. This course provides the knowledge on mass transfer operations at basic to an intermediate level that covers with the theoretical and analytical background to solve the mass transfer operations problems. Topics to be covered include mass transfer mechanism which is diffusion, Ficks Law, Maxwell Law, and principles of absorption, evaporation and drying.

Course Outcomes

1. Ability to demonstrate the diffusion mass transfer principles.
2. Ability to apply the general knowledge in mass transfer analyses to solve the engineering problem.
3. Ability to calculate the absorption problems.
4. Ability to evaluate the concept of evaporation and drying.

References

1. Geankoplis, C.J., Transport Processes and Separation Process Principles: Includes Unit Operations. 4th Edition, Prentice Hall, New Jersey, 2003.
2. Treybal, R.E., Mass Transfer Operations. McGraw Hill, USA, 2000.
3. McCabe, W.L., Smith, J. and Harriot, P., Unit Operation of Chemical Engineering. McGraw Hill International Edition, 6th Edition, 2001.
4. Seader, J.D. and Henley, E.J., Separation Process Principles. 2nd Edition, John Wiley & Sons, 2006.
5. Theodore, L. and Ricci, F. Mass Transfer Operations for the Practicing Engineer. Wiley-Interscience, 2010.
6. Benitez, J. Principles and Modern Applications of Mass Transfer Operations. Wiley-Interscience, 2nd Edition, 2011.

PTT 326/4
Process Control & Dynamic

Course Synopsis

The course aim to introduce the concept of process control, theoretical models of chemical processes: Unsteady-state models (dynamic model) of chemical processes from physical and chemical principles. Topics to be covered such as the dynamic behavior of processes, including Laplace transform, transfer function models, dynamic behavior of first-order and second-order processes, and development of empirical models from process data. Introduction to feedback control also will be learned in this course, including feedback controllers, control system instrumentation, overview of control system design and dynamic behavior of closed-loop control system, PID controller design, tuning, and troubleshooting. The theories are supported by performing laboratory experiments.

Course Outcomes

1. Ability to apply theoretical model of chemical processes, ANALYZE Laplace transform techniques to simplify first order and second order processes and EXAMINE transfer functions and state space models.
2. Ability to derive dynamic behavior of first and second order processes, and development of empirical models from process data.Ability to analyze control system instrumentation and propose feedback control system for bioprocess and chemical processes.
3. Ability to evaluate feedback and feedforward control system for chemical processes; analyze control system instrumentation and PID controller; and evaluate dynamic behavior of closed-loop control system.

References

1. Seborg, D.E., Edgar, T.F., Mellicamp D.A. Process Dynamic and Control. John-Wiley, 3rd Edition. 2011.
2. Riggs, J.B. Chemical and Bioprocess Control. Pearson. 2006.
3. Bequette, B.W. Process Control; Modelling, Design, and Simulation. Prentice Hall. 2003.
4. Marlin, T. Process Control: Designing Processes and Control System for Dynamic Performance McGraw-Hill. 2002.
5. Coughonowr . Process system, Analysis and Control. 3rd edition, McGraw-Hill. 2001.

PTT 327/3
Oleochemical Process & Products

Course Synopsis

This course emphasize to the palm oil and oleochemical industries in Malaysia, processes involved in the palm oil mills, palm oil refineries and any related process to production of oil from various plants. Besides that, this course also discusses the major olechemical products in the industry, application of the products and formulation, the quality management and troubleshooting.

Course Outcomes

1. Ability to define and write the oleochemical basic concept.
2. Ability to analyze the important processes in oleochemical industry.
3. Ability to evaluate the oleochemical products and formulations.

References

1. O'Brien, R.D. Fats and Oils Formulating and Processing for Application. CRC Press. 2009.
2. Shahidi, F. Bailey's Industrial Oil and Fat Products. 6th Edition. John Wiley & Son Inc. 2005.
3. O'Brien, R.D. Farr, W.E. and Wan, P.J. Intoduction to Fats and Oils Technology. Third Revised Edition. AOCS Press. 2008.
4. Gunstone, F.D. The Lipid Handbook. Blackwell Pub. 2004.
5. Erhan, S.Z. Industrial Uses of Vegetable Oils. AOCS Press. 2005.

PTT 328/4
Final Year Project 1

Course Synopsis

This is 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/or software development, device fabrication. In this subject, the students will be taught on how to prepare the research proposal. Besides that, the student will be also exposed to an earlier part of thesis writing such as introduction, literature review and methodology.

Course Outcomes

1. Identify and create research objective also problem statement.
2. Review information source then recognizes, construct and justify the suitable research information.
3. Perform and report the information in the form of dissertation format.
4. Describe, explain and defend effectively in the form of proposal defends.

References

1. Donald H. McBurney & Theresa L. White. Research Methods, 7th Edition. Thomson Wadsworth. 2007.
2. Daniel Holtom & Elizabeth Fisher. Enjoy Writing Your Science Thesis or Dissertation. Imperial College Press. 1999.
3. Leo Finkelstein, Jr. Pocket Book of Technical Writing for Engineers and Scientist. 3rd Edition. McGraw Hill. 2008.
4. Academic Journals.

PTT 329/3
Safety & Loss Prevention

Course Synopsis

This course covers the fundamental of process of safety specifically toxicology, industrial hygiene, source model, fires and explosions as well as relief concept design. The students are also exposed to hazard identification, risk assessment and accident investigation. The course will be concluded with hazard and safety.

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 analyze relief concepts as well as calculated or sizing the relief system.
4. Ability to analyze and evaluate process safety to identify the hazard and risk in the industry.

References

1. Crowl, D.A., Louvar, J.F. Chemical Process Safety; Fundamentals with Applications. Prentice Hall, Second Edition. New Jersey. 2002.
2. Frank, P.L. Loss and Prevention in the process industries, Volume 1&2, London, Butterworth. 1980.
3. Coulson, J.M & Richardson, J.F. Chemical Engineering, Volume 6, Pergamon Press, Oxford. 1983.
4. Sanders, R.E. Chemical Process Safety; Leaning From Case Histories. Elsevier Butterworth Heinemann, Third Edition. Amsterdam. 2005.
5. Marshall, V. & Ruheman, S. Fundementals of Process Safety. Rugby; ICehmE, UK. 2001.

PTT 330/4
Process Plant Design 1

Course Synopsis

This course contains the synthesis and preliminary design of chemical process plant. It focuses on general design information, material and energy balance analysis of the real chemical plant system, process flow sheeting, selection of process equipment (upstream and downstream), specifications of process equipment, process sizing design of equipment, heat transfer and mass transfer equipment, design considerations for maintaining sterility of process streams and also materials of construction for chemical plants. Simulation Software will be used as the main feature and implemented throughout the course in the process flow sheeting and equipment design. The design project report then will be implemented based on the previous concepts of the Bioprocess plan design system exposed.

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 justify, synthesize and 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. Coulson, J.M., Richardson, J.F., Sinnott, R.K. Chemical Engineering Vol. 6: An Introduction to Chemical Engineering Design. Pergamon Press: Maxwell Macmillan Int. Edition. 1983.
2. Douglas, J. M. Conceptual Design of Chemical Process. New York: McGraw-Hill. 1988.
3. Turton, R., Bailie, R. C., Whiting, W.B. & Shaeiwitz, J. A. Analysis, Synthesis and Design of Chemical Processes. New Jersey: Prentice Hall. 1998.
4. Peters, M. S. & Timmerhaus, K. D. Plant Design and Economics for Chemical Engineers. Ed. ke New York: McGraw-Hill. 1991.
5. Crowl, D. A. & Louvar, J. F. Chemical Process Safety: Fundamentals with Applications. New Jersey: Prentice Hall Inc. 1990.

PTT 331/3
Petroleum & Gas Processes Technology

Course Synopsis

This course introduces the students to processes and technology involved in oil and gas production field. Topics covered include the history and background of refinery process, separation of produced fluids and treatment of crude oil. Apart from that, student will also be exposed to the field processing and treatment of natural gas as well as petroleum refinery process.

Course Outcomes

1. Ability to recognize and explain background, formation and production of oil and gas and explain the basic refinery process.
2. Ability to describe and compare the separation process of produced fluids and treatment process of crude oil and natural gas.
3. Ability to demonstrate understanding and distinguish process and technology involved to process products from each level of petroleum refining.

References

1. Abdel Aal, H. K., Mohamed Aggour & Fahim, M. A. Petroleum & Gas Processing, Marcel Dekker. 2003.

2. Robert E. Maples. Petroleum Refinery Process Economics. 2nd Edition. Pennwell Corp. 2000.
3. Robert A. Meyers. Handbook of Petroleum Refining Processes. 3rd Edition. McGraw Hill. 2004.
4. Ozren Osic. Oil Refineries in the 21st Century. John Wiley. 2005.
5. William C. Lyons, Joseph Zaba. Standard Handbook of Petroleum and Natural Gas Engineering. 1996.

PTT 332/3
Process Equipment Mechanical Design

Course Synopsis

This course develops the principles of engineering mechanics. Students calculate the geometrical properties of cross sections, analyze loads on engineering structures, determine support reactions, and distribution of forces and moments in members. The students also analyze problems involving particle and rigid body motion.

Course Outcomes

1. Ability to interpret the basic principles of statics and dynamics on mechanism and bodies.
2. Ability to solve systems/problems related to forces, loads, displacement of bodies at rest.
3. Ability to solve systems/ problems related to forces, loads, displacement, velocity and acceleration of bodies in motion.

References

1. Hibbler R.C. Engineering Mechanics: Statics, 11th Edition, Peason Prentice Hall. 2006.
2. Hibbler R.& Fowler. Engineering Mechanics: Statics and Dynamics, 5th Edition, Pearson-Prentice Hall. 2007.
3. Tongue B. Statics. Analysis and design of systems in equilibrium, Wiley. H. 2005.
4. Tongue B.H. & Sheppard S.D. Dynamics. Analysis and design of systems in motion, Wiley. 2005.
5. Bedford and Fowler. Engineering Mechanics: Statics and Dynamics, 5th Edition, Pearson-Prentice Hall. 2007.

PTT 349/4
Utility Design

Course Synopsis

This course covers process equipment design of various types of utilities such as heat exchanger, condenser, reboiler and vaporiser which are applied in chemical plant industry. Apart from that, exposure on heat exchanger networks and heat integration will be emphasized as well. Economics of utilities also covered in this course.

Course Outcomes

1. Ability to explain various types of utilities applied in chemical plant.
2. Ability to design heat exchanger, condenser, reboiler and vaporiser.
3. Ability to analyze heat exchanger network, heat integration and economic of uitilties.

References

1. Sinnott, R.K. Coulson and Richardson's Chemical Engineering Volume 6 - Chemical Engineering Design, 4th Edition, 2005.
2. Robin M. Smith. Chemical Process: Design and Integration, John Wiley and Sons Ltd., 2005.
3. Kuppan tulukkanam. Heat Exchanger Design Handbook. CRC Press, 2013.
4. Towler, Gavin Sinnott, Ray K.. Chemical Engineering Design - Principles, Practice and Economics of Plant and Process Design, 2nd Edition, 2013.
5. Serth, Robert W. Lestina, Thomas G.. Process Heat Transfer - Principles, Applications and Rules of Thumb, 2nd Edition, 2014.

PTT 350/4
Separation Engineering

Course Synopsis

This course emphasizes the theory and basic principles of separation processes based on equilibrium stage concepts and mass transfer rate control. This course provides the knowledge of basic design criteria required for binary and multi component separations processes. Topics to be covered include liquid-liquid extraction, vapour-liquid extraction (distillation), solid-fluid extraction (leaching, crystallization and adsorption), mechanical-physical separation process (filtration and centrifugation), and membrane separation technology.

Course Outcomes

1. Ability to apply principles and theory to examine basic design/operation of liquid-liquid extraction, leaching and crystallization equipment.
2. Ability to apply and calculate based on principles of mechanical-physical separation process and membrane separation process.
3. Ability to apply principles and theory to develop basic design/operation of adsorption tower, and distillation column.

References

1. Seader, J.D., Henley, E. and Roper, D.K., Separation Process Principles: Chemical and Biochemical. 3rd Edition, Wiley, 2010.
2. Coulson, J.M. and Richardson, J.F., Chemical Engineering Volume 2. 5th Edition, Elsevier-Science, 2002.
3. Geankoplis, C.J., Transport Processes and Separation Process Principles: Includes Unit Operations. 4th Edition, Prentice Hall, New Jersey, 2003.
4. Wankat, P.C., Separation Process Engineering. 2nd Edition, Prentice Hall, New Jersey, 2006.
5. Seader, J.D. and Henley, E.J., Separation Process Principles. 2nd Edition, John Wiley & Sons, 2006.

PTT 426/6
Final Year Project 2

Course Synopsis

This is 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/or software development, device fabrication. In this subject, the students will be taught on how to discuss the research findings and determine the conclusion based on findings. In the end of this course, students will present the research findings and submit hardcover thesis.

Course Outcomes

1. Identify the methodology of the research then organize and demonstrate experiments to collect research data.
2. Choose the suitable research data and synthesize the data.
3. Explain the data findings then describe, discuss and justify based on academic source.
4. Originate, explain and defend effectively in the form of the thesis requirement.

References

1. Donald H. McBurney & Theresa L. White. Research Methods, 7th Edition. Thomson Wadsworth. 2007.
2. Daniel Holtom & Elizabeth Fisher. Enjoy Writing Your Science Thesis or Dissertation. Imperial College Press. 1999.
3. Leo Finkelstein, Jr. Pocket Book of Technical Writing for Engineers and Scientist. 3rd Edition. McGraw Hill. 2008.
4. Academic Journals.

PTT 427/4
Process Plant Design 2

Course Synopsis

This course encompasses modern strategies for the design of chemical process 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 a group.

Course Outcomes

1. Classify and recommend safety and risk assessment of the chemical process plant system.
2. 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. Apply the technique used for estimation of plant economics and comparative economic feasibility of the process plant for project evaluation and process optimization.

References

1. Coulson, J.M., Richardson, J.F., Sinnott, R.K. Chemical Engineering Vol. 6: An Introduction to Chemical Engineering Design. Pergamon Press: Maxwell Macmillan Int. Edition. 1983.
2. Douglas, J. M. Conceptual Design of Chemical Process. New York: McGraw-Hill. 1988.
3. Turton, R., Bailie, R. C., Whiting, W.B. & Shaeiwitz, J. A. Analysis, Synthesis and Design of Chemical Processes. New Jersey: Prentice Hall. 1998.
4. Peters, M. S. & Timmerhaus, K. D. Plant Design and Economics for Chemical Engineers. Ed. ke 4. New York: McGraw-Hill. 1991.
5. Crowl, D. A. & Louvar, J. F. Chemical Process Safety: Fundamentals with Applications. New Jersey: Prentice Hall Inc. 1990.

PTT 428/3
Green Technology And Sustainable Waste Management

Course Synopsis

The aim of this course is to introduce the concept of Green Chemistry principles in chemical processes and waste management in order to develop methods

which are more environmentally-friendly that are both economically and technologically feasible. This course is divided into two parts. The first part of this course emphasizes on the application of emerging chemical technologies based on Green Chemistry in design, manufacture, and use of chemical and processes which can lead to a reduction of pollution sustain and maintain the ecology system. The second part of the course concentrates on the various sustainable waste management with different methods and fields of expertise for each. This includes issues of reduce or prevent waste arising, reuse waste, recycle, energy recovery and disposal in landfill sites.

Course Outcomes

1. Ability to demonstrate knowledge and comprehesive of essential facts, concepts, principals and theories related to areas of chemistry.
2. Ability to recognize and analyze environmental problems related to chemical processes and establish strategies to solve them.
3. Ability to interpret, justify, and propose the common waste management practice in industry and local authorities and describe the legal framework structure.

References

1. Anastas, P.T. & Warner, J.C. Green Chemistry: Theory and Practice, Oxford University Press. 1998.
2. Davis, M.L. & Cornwell, D.A. Introduction to Environmental Engineering, 3rd Ed. Mc Graw-Hill. 1998.
3. Lancaster, M. Green Chemistry: An Introductory Text, Cambridge, UK, Royal Society of Chemistry. 2004.
4. Clark, J.H. Handbook of Green Chemistry and Technology, Malden, MA, Blackwell Science. 2002.
5. Paul T. Williams. Waste Treatment and Disposal, 2nd Ed. John Wiley. 2005.

PTT 429/3
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 designed. This course also analyzes the importance of an integrated waste handling systems including source reduction, recycling and reuse, composting, land filling, incineration and combustion. Also give an understanding of 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 demonstrate knowledge,comprehensive and calculate of essential facts, concepts, principals and theories related to areas of chemistry,physical and biological industrial waste treatment.
2. Ability to recognize, calculate, analyze and design basic structure of waste treatment unit operation and establish strategies to solve them.
3. Ability to interpret, justify, and propose the common waste management practice in industry and local authorities and describe the legal framework structure.
4. Ability t interpret compares, justify and choose the correct method for particular industrial waste treatment.

References

1. Metcalf & Eddy. Wastewater Engineering: treatment and reuse, Inc, 4th Ed.(or latest edition if available) Mc Graw-Hill. 2003.
2. Davis, M.L. & Cornwell, D.A. Introduction to Environment Engineering. 3rd Ed. Mc Graw-Hill. 1998.
3. Wang, L.K., Hung, Y.T., Lo, H.H., Yapijakis, C. Taylor &Francis. Waste Treatment in the Process Industries. 2006.
4. Paul T. Williams. Waste Treatment And Disposal, 2nd Ed., John Wiley. 1997.
5. Industrial Waste Treatment, Nelson Leonard Nemerow, Elsevier Science & Technology Books. 2006.

PTT 430/3
Food Processing Technology

Course Synopsis

This course covers the multidisciplinary field of applied physical sciences which combines science, microbiology, and engineering education for the food and related industries. Topics to be covered include an 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 analyze the problem that involved in food engineering operation.

References

1. Paul Singh, Dennis R. Heldman. Introduction to Food Engineering, Fourth Edition (Food Science and Technology). Academic Press. Elsevier. 2009.
2. Side, Catherine. *Food* Product Development: Based on Experience, Wiley-Blackwell.
3. Barbosa-Cánovas, Gustavo V. Schmidt, Shelly Fontana, Anthony. 2008. Water Activity in Foods:Fundamentals and Application. Wiley-Blackwell. 2008.
4. Williams, C. Improving the Fat Content of Foods. Woodhead Publishing, Limited. 2006.
5. Sharma, S.K., Mulvaney, S.J. and Rizvi, S.S.H. Food Process Engineering Theory and Laboratory Experiments. Wiley Interscience. 2000.

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (Honours) (AGROFOOD)

Programme Educational Objectives (PEO) for Bachelor of Chemical Engineering Technology (Agrofood)

PEO 1
Graduates who are able to apply knowledge and technical skills in providing practical engineering solutions

PEO 2
Graduates who are able to demonstrate professionalism and leadership and contribute to team success and manage projects in a multi-disciplinary environment.

PEO 3
Graduates who are able to advance in their career through adopting the advancements in engineering and technology as part of life-long learning experiences through ever changing environment.

Program Outcomes (PO) for Bachelor of Chemical Engineering Technology (Agrofood)

PO 1
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialization principles to define and applied engineering procedures, processes, systems or methodologies.

PO 2
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their disciplines or area of specialization.

PO 3
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns.

PO 4
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources.

PO 5
Select and apply appropriate techniques, resources and modern engineering tools with an understanding of their limitations.

PO 6
Function effectively as individuals, and as members or leaders in diverse technical teams.

PO 7
Communicate effectively with the engineering community and society at large.

PO 8
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities.

PO 9
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices.

PO 10
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development.

PO 11
Demonstrate an awareness of management, business practices and entrepreneurship.

PO 12
Recognise the need for professional development and to engage in independent and lifelong learning.

CURRICULUM STRUCTURE BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (Honours) (AGROFOOD) -RYXX

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
Discipline Core (96) & Elective (9)	PTT 150/3 Electrical & Electronic Technology	PTT 154/2 Computer Aided Drafting	PTT 250/3 Thermodynamics	PTT 255/3 Process Heat and Mass Transfer	PTT 350/3 Unit Operations in Food Industries	PTT 357/4 Final Year Project I	PTT 450/6 Final Year Project II	INDUSTRIAL TRAINING (LI) PIT XXX
	PTT 151/3 Organic Chemistry	PTT 155/3 Material and Energy Balance	PTT 251/3 Fluid Mechanics	PTT 256/3 Reaction Kinetics and Reactor Design	PTT 351/2 Halal Food Production	PTT 358/3 Food Engineering Facility Design	PTT 451/3 Post-Harvest Technology	
	PTT 152/2 Introduction to Food Science	PTT 156/4 Crop, Livestock and Fishery Science	PTT 252/3 Engineering Properties of Biological Materials	PTT 257/3 Instrumentation and Process Control in Food	PTT 352/3 Food Process Engineering	PTT 359/3 Food Waste Management and Utilization	Elective 3/3 (A3 or B3)	
	PTT 153/3 Food Microbiology	PTT 157/3 Food Chemistry	PTT 253/2 Food Product Development and Commercialization	PTT 258/2 Food Packaging Technology	PTT 353/3 Industrial Safety and Health in Food Processes	PTT 360/3 Quality Management System in Food Production		
			PTT 254/2 Food Biotechnology		PTT 354/3 Food Sensory and Evaluation	Elective 2/3 (A2 or B2)		
					Elective 1/3 (A1 or B1)			
Common Core (18)	PQT 111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II		PQT 213/3 Mathematics for Engineering Technology III		PTT 333/3 Technologist in Engineering Management	PTT 444/3 Technologist in Society	
	PDT 180/3 Engineering Science							
University Required (19)		UUW XXX/2 Option Subjects	UUW 233/2 Islamic & Asian Civilizations	UUW 224/2 Technology Entrepreneurship	UVW 312/2 English for Technical Communication		UVW 410/2 University Malay Language	
	UZW XXX/1 Co-Curricular Activity	UZW XXX/1 Co-Curricular Activity	UUT 122/2 Skills & Technology in Communication	UUW 235/2 Ethnic Relation				
			UZW XXX/1 Co-Curricular Activity	UUW 322/2 Thinking Skills				
142 (12 LI)	18	18	19	20	19	19	17	12
University Required	English for Technical Communication, Technology Entrepreneurship, TITAS, Ethnic Relation, Thinking Skill, University Malay Language, Co-Curricular Activity, Option Subject							
Total Units for Graduation 140								

Elective A (Food Technology)
1. PTT 355/3 (3+0) Natural Products, Nutraceutical, and Functional Food
2. PTT 361/3 (3+0) Agrofood Processing Technology
3. PTT 452/3(3+0) Fermentation and Enzyme Technology

Elective B (Food Engineering)
1. PTT356/3 (3+0) Process Modeling and Simulation in Food Engineering
2. PTT362/3 (3+0) Design and Optimization in Food Processing
3. PTT453/3 (3+0) Food Storage and Shelf-life

COURSE SYLLABUS

PTT 150/3
Electrical & Electronic Technology

Course Synopsis

This course introduces basic electrical circuit theory and analogue electronics. It enables students to analyze basic DC and AC circuits in addition to familiarizing with fundamental electronic components such as operational amplifiers and semiconductor diodes.

Course Outcomes

1. Ability to demonstrate application of the key principles of DC circuit theory including Kirchhoff's laws of current and voltage, and rules for current and voltage division.
2. Ability to explain the operation of ideal and non-ideal operational amplifier circuits and design simple operational amplifier applications.
3. Ability to describe simple AC series and parallel circuits using phasors and complex numbers.
4. Ability to explain the operation of simple semiconductor devices.

References

1. Bird, J. (2013). Electrical and Electronic Principles and Technology. 5th Edition. Routledge.
2. Bird, J. (2010). Electrical Circuit Theory and Technology. 4th Edition. Elsevier.
3. Boylestad, R. L. (2010). Introductory Circuit Analysis. 12th Edition. Pearson.
4. Boylestad, Robert L. (2007). Introductory Circuit Analysis. 11th Edition. Prentice Hall.
5. Hughes, E. (2006). Electrical and Electronic Technology. Longman.

PTT 151/3
Organic Chemistry

Course Synopsis

This course introduces the fundamental theories (atomic orbital, molecular orbital and hybridization theories) and its application in reactions involving alkynes, alkenes. Then, focusing on conformational analysis of alkanes and emphasizing on the nucleophilic substitution reactions of alkylhalides. The course also provides extensive coverage 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 food engineering technology application.

Course Outcomes

1. Ability to apply the basic concepts (such as the atomic orbital theory and molecular orbital theory) and identify the functional groups like alkanes, alkenes and aromatic compounds.
2. Ability to differentiate the chemical and physical properties of each functional groups and carry out theoretical reaction mechanism at molecular level.
3. Ability to analyse the chemical, physical properties and reactions of alcohol, ether, aldehyde, ketone and carboxylic acids.
4. Ability to design the knowledge of organic chemical process in food engineering technology application.

References

1. Solomons, T. W. G., Fryhle, C. B. and Snyder, S. A. (2013). Organic Chemistry. 11th Edition. Wiley.
2. Klein, D. R. (2011). Organic Chemistry. Wiley.
3. McMurry, J. E. (2011). Organic Chemistry. 8th Edition. Cengage Learning.
4. Smith, J. (2010). Organic Chemistry. McGraw-Hill.
5. Vollhardt, K. P. C. and Schore, N. E. (2010). Organic Chemistry. 6th Edition. W. H. Freeman.

PTT 152/2
Introduction to Food Science

Course Synopsis

The subject covers a broad spectrum of food sciences from food constituents, applications of processing techniques in food production, food safety and goverment regulation. The emphasis is on discussion on properties, significance and nutritive aspects of food constituents such as carbohydrates, proteins, fats and oils and additional food constituents; quality factors that influence the food deterioration and food packaging during processing and shelf life; emerging of new processing technologies, food products such as milk, beverages, meats, poultry and eggs, cereals and confectionery, food safety issues and goverment regulation that involved in food science and technology.

Course Outcomes

1. Ability to discuss the constituents of foods in terms of properties, significance and nutritive aspects.
2. Abilitity to choose quality factors in foods to prevent food deterioration and its control including food packaging.
3. Ability to analyze the new processing technology of food products, food safety issues and goverment regulation related to food engineering technology.

References

1. Haghi, A. K. (2012). Food Science: Research and Technology. CRC Press.
2. Campbell-Platt, G. (2009). Food Science and Technology. Wiley-Blackwell
3. Vaclavik, V. and Christian, E. W. (2007). Essentials of Food Science. 3rd Edition. Springer.
4. Mehas, K. and Rodgers, S. (2005). Food Science: The Biochemistry of Food & Nutrition. 5th Edition. McGraw Hill.
5. Bower, J. A. (2013). Statistical Methods for Food Science: Introductory Procedures for the Food Practitioner. 2nd Edition. John Wiley & Sons.

PTT 153/3
Food Microbiology

Course Synopsis

The subject covers a broad spectrum of food microbiology in food industry. The emphasis is on discussion of the history, habitats, taxonomy, and growth parameters of microorganisms in food; interpret types of microorganisms and/or their products in foods. Food preservation and some properties of psychrotrophs, thermophiles, and radiation-resistant bacteria and distinguish indicators of food safety and quality, principles of quality control, microbial criteria and foodborne diseases.

Course Outcomes

1. Able to discuss the history, habitats, taxonomy, and growth parameters of microorganisms in food.
2. Able to interpret types of microorganisms and/or their products in foods. Food preservation and some properties of psychrotrophs, thermophiles, and radiation-resistant bacteria.
3. Able to distinguish indicators of food safety and quality, principles of quality control, microbial criteria and foodborne diseases.

References

1. Montville, T. J. and Matthews, K. R. (2012). Food Microbiology An Introduction. 3rd Edition. ASM Press.
2. Doyle, M. P. and Buchanan, R. L. (2012). Food Microbiology: Fundamentals and Frontiers. 4th Edition. ASM Press.
3. Ray, B. and Bhunia, A. (2013). Fundamental Food Microbiology. 5th Edition. CRC Press.
4. Garg, N. and Garg, K. L. (2010). Laboratory Manual of Food Microbiology. K G Mukerji.
5. Adams, M. R. and Moss, M. O. (2007). Food Microbiology. 3rd Edition. The Royal Society of Chemistry.

PTT 154/2
Computer Aided Drafting

Course Synopsis

This course introduces the use of technical drawing in an effective way for communicating and integrating with engineering concept. Students will learn engineering drawing to interpret design, using graphics method such as geometry, parallel projections, sectional drawing, machines drawing and working drawing. The primary software used in this course is AutoCAD.

Course Outcomes

1. Ability to apply geometric construction techniques for engineering drawings.
2. Ability to apply completes 2-D and 3-D drawings pertaining to geometric transformations, projections and multiple views.
3. Ability to evaluate use of engineering drawings for curve, surfaces and geometric models.

References

1. Santos,J. (2013). Autodesk AutoCAD 2013 Practical 3D Drafting and Design. Packt Publishing.
2. Larkin, J. and Duval, C. (2012). Practical Problems in Mathematics for Drafting and CAD. 4th Edition. Cengage Learning.
3. Cecil, J. J., Helsel, D. and Dennis R. S. (2008). Engineering Drawing & Design. 7th Edition. McGraw Hill.
4. Dimian, A. C. and Bildea, C. S. (2008). Chemical Process Design: Computer-Aided Case Studies. Wiley.
5. Achenie, L., Venkatasubramanian, V. and Gani, R. (2002). Computer Aided Molecular Design: Theory and Practice (Computer Aided Chemical Engineering). Elsevier Science.

PTT 155/3
Material and Energy Balance

Course Synopsis

The aims for this course to teach students how they should formulate and solve materials balances in various processing systems. Essentially, the material which goes into the process will be converted by physical and chemical processes, whilst some may remain

unconverted. The task for the chemical technologies engineer to create a process statement which identifies all the materials entering, remaining and leaves the systems.

Course Outcomes

1. Ability to calculate mass balance in chemical and biological process.
2. Ability to solve broadly using tools and technique appropriate to material and energy balance discipline.
3. Ability to design material and energy processes to meet specified needs with appropriate consideration for public health and safety.

References

1. Demirel, Y. (2014). Nonequilibrium Thermodynamics: Transport and Rate Processes in Physical, Chemical and Biological Systems. 3rd Edition. Elsevier Science.
2. Denn, M. (2011). Chemical Engineering: An Introduction. Cambridge University Press.
3. Ghasem,N. (2011). Computer Methods in Chemical Engineering. CRC Press.
4. Felder, R. M. and Rousseau, R. W. (2005). Elementary Principles of Chemical Processes. 3rd Edition. John-Wiley & Sons.
5. Reklaitis, G. V. (1983). Introduction to Material and Energy Balances. Wiley.

PTT 156/4
Crop, Livestock and Fishery Science

Course Synopsis

The subject covers a broad spectrum of an introductory foundation of crops, animals and fisheries sciences and technology. The emphasis is on fundamental aspects of horticulture science and discusses systematically the topics like anatomy and morphology of crops, plant nutrition, soil fertility, methods of plant propagation, various horticultural practices, some basic biology of animals including cell function, genetics, anatomy and physiology, reproduction, nutrition, animal health and disease, animal products, and animal behavior, fish eggs and larvae makes a number of unique contributions to fishery sciences that are crucial for accurate assessment and management of fish populations.

Course Outcomes

1. Ability to apply fundamental of horticulture science and discusses the topics like anatomy and morphology, plant nutrition, soil fertility, plant propagation.
2. Abilitity to distinguish basic biology of animals including cell function, genetics, anatomy and physiology, reproduction, nutrition, animal health and disease, animal products, and animal behavior.
3. Ability to analyze from fish eggs and larvae to a number of contributions to fishery sciences for accurate assessment and management of fish populations.

References

1. Arteca, R. N. (2014). Introduction to horticultural Science. 2nd Edition. Cengage Learning.
2. Damron, W. S. (2012). Introduction to animal science. 5th Edition. Prentice Hall.
3. Sheaffer, C. C. and Moncada, K. M. (2011). Introduction to Agronomy: Food, Crops, and Environment. . 2nd Edition. Cengage Learning.
4. Simson, S. P. and Straus, M. C. (2010). Basic of Horticulture. Oxford Book Company.
5. Fuiman, L. A. and Werner, R. G. (2002). Fishery Science: The Unique Contributions of Early Life Stages. Blackwell Science.

PTT 157/3
Food Chemistry

Course Synopsis

This course is designed to demonstrate and illustrate the chemical and physical properties of foods composition and the effects of processing, ingredients, and storage on food quality and nutrient retention. The study of one food chemistry will enhance our understanding of the food products.

Course Outcomes

1. Ability to classify the individual food components contributes to the overall quality of foods.
2. Ability to evaluate the chemical changes that take place with food components during processing and storage.
3. Ability to recognize reactions and mechanisms important in food chemistry

References

1. Belitz, H. D., Grosch, W. and Schieberle, P. (2009). Food Chemistry. 4th Edition. Springer.
2. Velisek, J. (2014). The Chemistry of Food. Wiley-Blackwell.
3. Brady, J. W. (2013). Introductory Food Chemistry. Comstock Publishing Associates
4. Duncan, A. W. (2011). The Chemistry of Food and Nutrition. CreateSpace Independent Publishing Platform.

5. Coultate, T. (2008). Food: The Chemistry of its Components. 5th edition. Royal Society of Chemistry.

PTT 250/3
Thermodynamics

Course Synopsis

This course introduces students to the basic thermodynamics for engineering application and problem solving. The course covers first and second laws of thermodynamics, substances properties, closed system energy, entropy and engineering applications of gas power cycles, refrigeration, compression and heat pumps, and chemical reactions.

Course Outcomes

1. Ability to recognize and apply the fundamental basic properties, as well as the law of thermodynamics.
2. Ability to calculate heat, work and other thermodynamics properties ideal fluid in given processes.
3. Ability to solve problems for real fluids using volumetric equations of state.
4. Ability to apply thermodynamics properties from available data by using appropriate tools

References

1. Cengel, Y. and Boles, M. (2014). Thermodynamics: An Engineering Approach. 8th Edition. McGraw-Hill.
2. Murugan, S. (2014). Engineering Thermodynamics. Alpha Science Intl Ltd.
3. Borgnakke, C. and Sonntag, R. E. (2012). Fundamentals of Thermodynamics. 8th Edition. Wiley.
4. Moran, M. J., Shapiro, H. N. and Boettner, D. D. (2010). Fundamentals of Engineering Thermodynamics. 7th Edition. Wiley.
5. Smith, J.M., Van Ness, H.C. and Abbott, M. M. (2005). Introduction to Chemical Engineering Thermodynamics. 7th Edition. McGraw Hill.

PTT 251/3
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 demonstrate 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 distinguish the link between conserved quantities and the equations of fluid mechanics.
3. Ability to calculate control volumes and surfaces for developing the equations of fluid mechanics.

References

1. Cengel, Y. and Cimbala, J. (2013). Fluid Mechanics Fundamentals and Applications. 3rd Edition. McGraw-Hill.
2. Munson, B. R., Rothmayer, A. P., Okiishi, T. H. and Huebsch, W. W. (2012). Fundamentals of Fluid Mechanics. 7th Edition. McGraw-Hill.
3. White, F. (2010). Fluid Mechanics. McGraw-Hill.
4. Mott, R. L. (2006). Applied Fluid Mechanics. 6th Edition. Prentice Hall.
5. Crowe, C. T., Elger, D. F. and Robertson, J.A. (2005). Engineering Fluid Mechanics. 8th Edition. John Wiley.

PTT 252/3
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 explain physical attributes of materials required for analysis and design of microorganism, food and biological systems
2. Ability to illustrate concept and techniques of thermal and rheological properties of biological materials.
3. Ability to calculate thermal and electromagnetic properties of biological materials.
4. Ability to illustrate concepts and principles of water activity, handling, storage and moisture management of biological materials.

References

1. Kassama, L. S. and Rosenstrater, K. A. (2014). Physical Properties: Applications and Effects on Processing Foods and Biological Materials (Contemporary Food Engineering). CRC Press.
2. Sahin,S. and Sumnu, S.G. (2006). Physical Properties of Foods. Springer Science.
3. Barbosa-Canovas, G.V., Juliano, P. and Peleg, M. (2008). Engineering Properties of Foods. Encyclopedia of Life Support System (EOLSS) UNESCO.
4. Aguilera, J. M. and Lilliford, P. J. (2008). Food Materials Science. Berlin: Springer.
5. Figura, L. O. and Teixera, A. A. (2007). Food Physics : Physical Properties-Measurement and Applications. Berlin: Springer.

PTT 253/2
Food Product Development and Commercialization

Course Synopsis

This course studies the different categories of new food products, identifies past reasons for product success and product failure and teach student to identify some of the specific reasons for product success and product failure in food company. Its also will touch on the Developing an innovation strategy, PD Process(es), Knowledge base for product development and consumer in product development.

Course Outcomes

1. Able to analyze the different categories of new food products by identifying specific aspects of product development in the food industry.
2. Able to create new knowledge in design, development and commercialization and manage the need to ensure the necessary product, processing, distribution and marketing knowledge in the food company.
3. Able to assess on evaluating and improving product development include the collection of knowledge from the project, analysis of the knowledge and setting improvements for future projects

References

1. M. Earle, R. Earle and A. Anderson, Food Product Development, First Edition, Woodhead Publishing Limited, 2001.
2. G. W. Fuller. New food product development: from concept to marketplace. CRC Press, 2004
3. J. Smith and E. Carter. Functional Food Product Development. Wiley and Blackwell, 2009.
4. J. H. Beckley. Accelerating new food product design and development. IFT and Blackwell Publishing, 2007
5. C. Side. Food product development based on experience, Blackwell Publishing, 2002

PTT 254/2
Food Biotechnology

Course Synopsis

The subject covers a broad spectrum of food biotechnology from food microbiology, fermentation technologies and food safety and goverment regulation. The emphasis is on application on the basic principles of microbiology, fermentation technologies, aspects of genetic engineering for production of various food ingredients, and several other specialized topics involving microbial systems, examination on the plant tissue culture techniques, genetic engineering of plants and animals, functional food ingredients and their health benefits, probiotics, antibody production for oral vaccines, and several topics on enzyme technologies and management of several aspects of food safety issues, bioprocessing, and fermentation biotechnologies used across the globe.

Course Outcomes

1. Ability to apply the basic principles of microbiology, fermentation technologies, aspects of genetic engineering for production of various food ingredients, and several other specialized topics involving microbial systems.
2. Abilitity to examine the plant tissue culture techniques, genetic engineering of plants and animals, functional food ingredients and their health benefits, probiotics, antibody production for oral vaccines, and several topics on enzyme technologies.
3. Ability to manage several aspects of food safety issues, bioprocessing, and fermentation biotechnologies used across the globe.

References

1. Joshi, V. K. and Singh, R. S. (2012). Food Biotechnology. K International Publishing House.
2. Shetty, K., Paliyath, G., Pometto, A. and Levin, R. E. (2006). Food Biotechnology. 2nd Edition. Taylor & Francis Group LLC.
3. Stahl, U., Donalies, U. E. B., Nevoigt, E. (2008). Food Biotechnology. Springer.

4. Hui, Y. H. and Sherkat, F. (2006). Handbook of Food Science, Technology, and Engineering, Taylor & Francis Group LLC.
5. Bielecki, S., Tramper, J. and Polak, J. (2000). Food Biotechnology. Elsevier.

PTT 255/3
Process Heat and Mass Transfer

Course Synopsis

This course introduces mechanisms by which heat is transferred from one body to another. This course introduces the principles of steady and unsteady heat conductions; radiation phenomena; natural and force convections; heat transport coefficients; dimensional analysis and boundary layer. The course covers heat conduction, convection and radiation, also mass transfer with special address on food systems. Emphases are placed on formulation and application of respective mathematical models of heat and mass transfer across both physical and biological bodies.

Course Outcomes

1. Ability to illustrate the conservation laws that control mass and heat transfer.
2. Ability to solve the temperature distributions in solids and in laminar flow with independent variables and radiation heat transfer.
3. Ability to calculate the concentration distributions in solids and laminar flow with independent variables

References

1. Cengel, A. and Ghajar, A. (2014). Heat and Mass Transfer: Fundamentals and Applications. 5th Edition. McGraw-Hill.
2. Incropera, F. P., Bergman, T. L. and Lavine, A. S. (2011). Fundamental of Heat and Mass Transfer. 7th Edition. John Wiley & Sons.
3. Rajput, R. K. (2008). Heat and Mass Transfer. Revised Edition. India: Chand (S.) & Co Ltd.
4. Bird, R. B., Steward, W.E., and Lightfoot, E. N. (2002). Transport Phenomena, 2nd Edition, John Wiley & Sons.
5. Thompson, W. J. (2000). Introduction to Transport Phenomena. Prentice Hall.

PTT 256/3
Reaction Kinetics and Reactor Design

Course Synopsis

This course integrates the concepts of reaction kinetics with those of conservation of energy and mass to form a basis for designing common types of reactors for operation under both isothermal and non-isothermal conditions. The design of reactor is emphasized on the homogenous type reactor and an introduction to heterogeneous reactor design.

Course Outcomes

1. Ability to employ reaction kinetics and mechanism of chemical reaction in homogeneous systems.
2. Ability to examine the mechanism of chemical reactions on surface.
3. Ability to analyze the chemical reactor theory and design real reactors.
4. Ability to examine the thermal effects in the real reactors and identify reactions in heterogeneous systems.

References

1. Charles, G. H. and Thatcher, W. R. (2014). Introduction to Chemical Engineering Kinetics and Reactor Design. 2nd Edition. Wiley.
2. Hayes, R. E. and Mmbaga, J. P. (2012). Introduction to Chemical Reactor Analysis. 2nd Edition. CRC Press.
3. Richard, T. and Wallace, B. W. (2012). Analysis, Synthesis and Design of Chemical Processes. 4th Edition. Prentice Hall.
4. Max, P. and Ronald, W. (2002). Plant Design and Economics for Chemical Engineers. Mcgraw-Hill.
5. Butt, J. B. (2000). Reaction Kinetics and Reactor Design. United States. Marcel Dekker Inc.

PTT 257/3
Instrumentation and Process Control in Food

Course Synopsis

The course deals with a number of engineering skills, flow injection analysis and monitoring. The students also study the valves system implemented in food industries, the related Process flow diagram and analyze and use the methods and software in piping and instrumentation diagram.

Course Outcomes

1. Ability to illustrate the working principles of hardware sensors commonly used in biotechnological processes.
2. Ability to interpret model based-process diagnosis in biotechnological processes modeling.
3. Ability to use and analyze adaptive and predictive Control techniques in biotechnological processes.

References

1. Manabendra Bhuyan. (2006). Measurement and Control in Food Processing. CRC Press.
2. Kevin James. (2000). PC Interfacing and Data Acquisition: Techniques for Measurement, Instrumentation and Control. Newnes.
3. Walt Boyes. (2009). Principal in Spitzer and Boyes LLC, Instrumentation Reference Book, 4th Edition. Butterworth-Heinemann.
4. Smith, C.A. and Corripio, A. (2006). Principles and Practice of Automatic Process Control. 3rd Edition. John Wiley.
5. Skousen, P.L. (2004). Valve Handbook. 2nd Edition. McGraw-Hill.

PTT 258/2
Food Packaging Technology

Course Synopsis

The course provides the students with the basic knowledge regarding food packaging materials, equipments and technology. It provides an overview of the packaging science and technology applied to the preservation and shelf life, distribution and marketing of various food products. This course also explains the different procedures and food safety requirements for developing, evaluating and testing of food packages in accordance to international standards.

Course Outcomes

1. Ability to Demonstrate the importance and functions of a packaging system in relation to food preservation.
2. Ability to Analyze the properties, economic use and manufacture of packaging materials (glass, plastic, paper and aluminum) .
3. Ability to Analyze how packaging materials interact with diverse food products to maximize quality and shelf-life of the products.

References

1. Coles, R. and Kirwan, M.J. (2011). Food and Beverage Packaging Technology. 2nd Edition. Wiley-Blackwell.
2. Robertson, G.L. (2006). Food packaging: Principles and practice. CRC Press.
3. Morris, S.A. (2011). Food and Package Engineering. Wiley-Blackwell.
4. Kerry, J. and Butler, P. (2008). Smart Packaging Technologist for fast moving consumer. Wiley.
5. Robertson, G. L. (2009). Food Packaging and Shelf Life: A Practical Guide. CRC Press.

PTT 350/3
Unit Operations in Food Industries

Course Synopsis

This course covers the application of basic knowledge of engineering principles such as momentum, heat and mass transfer on the design a variety of food processes equipments. It also covers in detail the most common food engineering unit operations, including guidance for students in carrying out specific design calculations. The theory is supported by performing several laboratory experiments.

Course Outcomes

1. Ability to apply engineering principles in order to develop a basic design of momentum transfer unit operations
2. Ability to apply engineering principles in order to develop a basic design of heat and mass transfer unit operations
3. Ability to apply and calculate any related problems regarding unit operations in food industries based on basic engineering principles

References

1. Ibarz A. and V. Barbosa-Canovas, G. (2003). Unit Operations in Food Engineering, CRC Press
2. Guine, R. P. F. (2013). Unit Operations For The Food Industry: Volume I: Thermal Processing & Nonconventional Technologies. Lambert Academic Publishing
3. Guine, R. P. F. (2013). Unit Operations for the Food Industry: Volume II: Equilibrium Processes & Mechanical Operations. Lambert Academic Publishing
4. Vieira, M. M. C. and Ho, P. (2008). Experiments in Unit Operations and Processing of Foods. Springer
5. Saravacos, G. D. and Maroulis, Z. B. (2011). Food Process Engineering Operations. CRC Press

PTT 351/2
Halal Food Production

Course Synopsis

This course discusses the fundamentals to be considered in halal food production. There is a wealth of information about halal food laws and regulations, general guidelines for halal food production, domestic and international halal food markets, and trade and import requirements for different countries. This course also covers specific halal production requirements for meat, poultry, dairy products, fish, seafood, cereal, confectionary,

and food supplements. The role of gelatin, enzymes, alcohol, and other questionable ingredients for halal food production is addressed in some detail. Guidelines with examples of labeling, packaging, and coatings for halal food are also presented. The new topic of biotechnology and genetically modified organisms (GMOs) in halal food production is discussed.

Course Outcomes

1. Ability to analyze halal food laws and regulations, general guidelines for halal food production, international and domestic trade in halal products and import requirements for different countries
2. Ability to prepare halal production requirements for meat and poultry, dairy products, fish and seafood, cereal and confectionary and nutritional food supplements.
3. Ability to assess on gelatin, enzymes, alcohol and food ingredients in halal food production.
4. Ability to choose labeling, packaging, and coatings for halal food, compare biotechnology and GMO ingredients in halal food, animal feed and halal food, select comparison of kosher, halal, and vegetarian and select how to get halal certified

References

1. Riaz and Chaudry. (2004). Halal Food Production. CRC Press.
2. Qaradawi. (2001). The Lawful and the Prohibited in Islam, 2nd Edition, Al-Falah Foundation
3. Blech, Z. (2004). Kosher Food Production. Iowa State Press
4. Ali, N. (2012). Healthy and Halal Choice. Xlibris Publishing
5. Sandikci, O. and Rice, G. (2012). Handbook of Islamic Marketing. Edward Elgar Publishing Limited

PTT 352/3
Food Process Engineering

Course Synopsis

This course covers multidisciplinary field of applied physical sciences combines science, microbiology, and engineering education for food and related industries. Topics to be covered include introduction to food engineering, preservation processes, refrigeration, freezing, evaporation, dehydration, membrane separation, extrusion and packaging.

Course Outcomes

1. Ability to apply the basic chemical engineering principles in food processing
2. Ability to design the process involved in food engineering operations
3. Ability to evaluate the problems involved in food engineering operations

References

1. Singh, R. L. and Heldman D. R. (2009). Introduction to Food Engineering, 4th Edition. Academic Press, Elsevier.
2. Berk, Z. (2013). Food Process Engineering and Technology. Academic Press, Elsevier.
3. Saravacos, G. D. and Maroulis, Z. B. (2011). Food Process Engineering Operations. CRC Press
4. Smith, P.G. (2011). Introduction to Food Process Engineering 2nd Edition. Springer Science & Bussiness Media, LLC
5. Toledo, R. T. (2007). Fundamentals of Food Process Engineering 3rd Edition. Springer Science & Bussiness Media, LLC

PTT 353/3
Industrial Safety and Health in Food Processes

Course Synopsis

This course covers the regulatory procedure dealing with food process. The students are also exposed to hazard identification, risk assessment, biosafety level and health surveillance program. Besides, the students also will be taught on fundamental aspect in emergency response plan relevant to food process

Course Outcomes

1. Ability to categorize the different laboratory levels and class of biosafety.
2. Ability to analyze process safety to identify the biohazard and risk in the industry
3. Ability to write and describe health surveillance program
4. Ability to use emergency response plan and food waste decontamination guideline relevant to biological process

References

1. US Department of Health and Human Services. (2009). Biosafety in Microbiological and Biomedical laboratories (5th edition)
2. Biosafety Manual for Texas Tech Univeristy (2005).
3. Martha J. Boss, Dennis W. Day (2003). Biological risk engineering handbook: infection control and decontamination. Lewis Publication.
4. Biological Safety: Principles and Practices, (2000) Third Edition. do Fleming & dl Hunt, Eds. ASM Press
5. Sanders, R. E. (2005). Chemical Process Safety; Learning From Case Histories. Elsevier Butterworth Heinemann, Third Edition. Amsterdam

PTT 354/3
Food Sensory and Evaluation

Course Synopsis:
This course introduces the sensory sciences and evaluation of food based on human senses which affected by factors of nature and presentation of specific food matrix, the age, gender, background, sensory sensitivity of the consumer and the conditions under the test is carried out. The introduction of statistical method in evaluation establishes the credibility of a potential new food product or the effectiveness of a modification to a new food product.

Course Outcomes

1. Ability to describe the fundamental requirements and procedures of food sensory evaluation.
2. Ability to demonstrate practical proficiency in food sensory evaluation laboratory
3. Ability to select the appropriate test methods when presented with a practical problem and apply statistical principles to food sensory evaluation

References

1. Lawless, H. T. and Heymann, H. (2010). Sensory Evaluation of Food, Principle and Practices, 2nd Edition. Springer.
2. Stone, H, Bleibaum, R. and Thomas, H. A. (2012). Sensory Evaluation Practices, 4th Edition, Elsevier.
3. Kemp, S., Hollowood, T. and Hort. J. (2011). Sensory Evaluation: A Practical Handbook. Wiley-Blackwell.
4. Meilgaard, M.C., Carr, B. T. and Civille, G. V. (2006). Sensory Evaluation Techiques 4th Edition. CRC Press.
5. Moskowitz, H. R, Beckley, J. H. and Resurreccion, A. V. A. (2012). Sensory and Consumer Research in Food Product Design and Development. Blackwell Publishing Ltd

PTT 355/3
Natural Products, Nutraceutical and Functional Food

Course Synopsis

The subject covers a broad spectrum of functional foods and nutraceuticals from biological material, applications of engineering techniques in functional food production, process engineering and modeling, functional food bioavailability, to product quality.

Course Outcomes

1. Ability to apply techniques in the processing of functional foods and nutraceuticals.
2. Abilitity to analyze stability of bioactive components and antioxidative properties during processing and shelf life.
3. Ability to analyze and test Bioprocessing Technology for Production of Nutraceutical Compounds.

References

1. Aluko, R. E. (2012). Functional Foods and Nutraceuticals Springer.
2. Coles, L. (2013). Functional Foods: The Connection Between Nutrition, Health, and Food Science. Apple Academic Press.
3. Prakash, D. and Sharma, G. (2014). Phytochemicals of Nutraceutical Importance. CABI.
4. Mine, Y., Li-Chan, E. and Jiang, B. (2010). Bioactive Proteins and Peptides as Functional Foods and Nutraceuticals. Wiley-Blackwell.
5. Lockwood, B. (2007). Nutraceuticals. 2nd Edition. Pharmaceutical Pr.

PTT 356/3
Process Modeling and Simulation in Food Engineering

Course Synopsis

This course covers the process modeling and management in food production. Firstly, the course will discuss about the deductive modeling and optimization as well as the problem decomposition in the information technology. Secondly, it will cover the kinetic modeling and heat and mass transfer modeling using various related equations. Lastly, this course will analyze the modeling of yields and management of vegetables and fruits productions.

Course Outcomes

1. Ability to analyze the food modeling and management with the information technology.
2. Ability to develop kinetic modeling of food production and the heat and mass transfer in food processing.
3. Ability to evaluate the combined discrete and/or continuous modeling and the data mining of input and output characteristics.
4. Ability to develop the process modeling for vegetables and fruit processing and productions.

References

1. Knopf, C. (2011). Modeling, Analysis and Optimization of Process and Energy Systems. Wiley.

2. Kutz, M. (2013). Handbook of Farm, Dairy and Food Machinery Engineering. 2nd Edition. Academic Press.
3. Irudayaraj, J. M. (2001). Food Processing Operations Modeling: Design and Analysis. CRC Press.
4. Hertog M., Tijskens M. M. (2000). Food Process Modelling. CRC Press.
5. Mittal. (1996). Computerized Control Systems in the Food Industry (Food Science and Technology). CRC Press.

PTT 357/4
Final Year Project 1

Course Synopsis

This course emphasizes fundamental concepts and problem-solving techniques. Topics to be covered include heat transfer mechanism which is conduction, convection and radiation also analyze heat transfer knowledge and designing heat transfer equipment such as evaporator, dryer and agitated vessel.

Course Outcomes

1. Ability to identify and create research objective also problem statement**.**
2. Ability to review information source then recognize, construct and justify the suitable research information.
3. Ability to report and perform the information in the form of dissertation format
4. Ability to describe, explain and defend effectively in the form of proposal defends.

References

1. Donald H. McBurney and Theresa L. White, (2007). Research Methods, 7th Edition, Thomson Wadsworth.
2. Daniel Holtom & Elizabeth Fisher, (1999). Enjoy Writing Your Science Thesis or Dissertation, Imperial College Press.
3. Leo Finkelstein, Jr., (2008). Pocket Book of Technical Writing for Engineers and Scientist. 3rd Edition, McGraw Hill.
4. Vicki Urquhart & Monette McIver, Teaching Writing in the Content Areas, Association for Supervision and Curriculum Development
5. Cash, S. (1989). Effective literature searching for students. Aldershot: Gowers

PTT 358/3
Food Engineering Facility Design

Course Synopsis

This course gives complete overview on the food engineering facilities design. Topics included in this course are the economical evaluation, reasons to design new or extended facility, process and equipment selection, project management and operation. This course also introduces Good Manufacturing Practices (GMP), regulatory features affecting process and building design and documentation for validation of food engineering facilities.

Course Outcomes

1. Ability to discuss the current and future food facility based on industry demand and economic evaluation.
2. Ability to apply GMP regulations, project management and operation in food facility design.
3. Ability to design a food engineering facility based on process and equipment selection, problem identification and solution.

References

1. Clark, J. P. (2008). Practical Design, Construction and Operation of Food Facilities. Academic Press, Elsevier.
2. Lopez-Gomez, A and Barbosa-Canovas, G. V. (2005). Food Plant Design. CRC Press
3. Maroulis, Z. B. and Saravacos, G. D. (2008). Food Plant Economics. CRC Press
4. Robberts, T. C. (2013). Food Plant Engineering Systems 2nd Edition. CRC Press
5. Cramer, M. M. (2013). Food Plant Sanitation: Design, Maintenance, and Good Manufacturing Practices. CRC Press

PTT 359/3
Food Waste Management and Utilization

Course Synopsis

This course covers the food sources of pollution, their effect on the environment and properties of food waste materials. Also covers the physical, chemical and biological treatment processes of food wastes in relation to pollution control and waste utilization in relation to pollution problems and technologies for utilization for sustainable environmental.

Course Outcomes

1. To decide and recommend the suitable physical, chemical and/ or biological treatment of industrial and organic food wastes.

2. To analyze and design systems for the collection, handling, treatment and utilization of wastes.
3. To plan and proposed the suitable utilization technique for food waste and wastewater to sustain an environmental.

References

1. Liu. S (2008) Food and Agricultural Wastewater Utilization and Treatment, Wiley-Blackwell
2. Wang, L. K (2006) Waste Treatment in the Food Processing Industry, Taylor & Francis
3. Joshi, V. K. (2011). Food Processing Waste Management: Treatment and Utilization Technology. New India Publication
4. Arvanitoyannis, I. S. (2010). Waste Management for Food Industries. Academic Press, Elsevier.
5. Kosseva, M. and Webb, C. (2013). Food Industry Wastes: Assessment and Recuperation of Commodities. Academic Press, Elsevier

PTT 360/3
Quality Management System in Food Production

Course Synopsis

This course covers the integration of all functions and processes within an organization in order to achieve continuous improvement of the quality of food production. The main area to be covered are hazard analysis critical control point (HACCP), good manufacturing practice (GMP), pest control, allergen, weight control, inspection, sanitation, foreign object detection, regulatory inspection, lot coding, product traceability, customer feedback, shipping and receiving, product specifications, product withdrawal, supplier certification, defective material and other non-food-safety issues such as bio-security policy and registration, environmental policy, and kosher, organic, vegan and halal certifications.

Course Outcomes

1. Ability to identify any quality-based problems with having a strong affective set of quality management systems in food production resources.
2. Ability express the basic knowledge of food chemistry, allergens, food law, sanitation, microbiology, engineering, packaging technology, environmental science, safety practices, product development and computer application
3. Ability to implement and manage Kosher, organic, vegan and Halal certification or any combination thereof.

References

1. Clute, M. (2008). Food Industry Quality Control Systems, CRC Press.
2. Sun, D. (2012). Handbook of Food Safety Engineering. Wiley-Blackwell
3. Lelieveld, H., Holah, J. And Napper, D. (2014). Hygiene in Food Processing: Principles and Practices. Woodhead Publishing Limited
4. Vasconcellos, J. A. (2004). Quality Assurance for the Food Industry, A Practical Approach, CRC Press.
5. Inteaz Alli. (2003). Food Quality Assurance, Principles and Practice, CRC Press.

PTT 361/3
Agrofood Processing Technology

Course Synopsis

This course studies the improvement and development of cereal products and processes require an understanding of the impact of processing and storage conditions on the physical properties and structure of pre- and post-processed materials. It will focus on techniques used to characterize the influence on the physical properties of cereal flours of several cereal processing technologies, including baking, pasta extrusion, and high-temperature extrusion, as well as cookie and cracker production.

Course Outcomes

1. Able to calculate the thermally induced transitions (glass, melting, gelatinization) in cereal flours as a function of conditions relevant to cereal processing technologies.
2. Able to develop the influence of moisture on the processing conditions and the physical properties of the product.
3. Able to estimate knowledge as a predictive tool for evaluating the performance of cereal flour during processing, and, ultimately, for adjusting, in a rational fashion, the formulation of raw materials and processing parameters so as to achieve desired end-product attributes.

References

1. Gonul Kaletung and Kenneth J. Breslauer. (2003). Characterization of Cereals and Flours- Properties, Analysis, and Applications. Marcel Dekker, Inc.

2. Serna-Saldivar, S. O. (2012). Cereal Grains: Laboratory Reference and Procedures Manual (Food Preservation Technology). CRC Press.
3. Panesar, P. S. and Marwaha, S. S. (2013). Biotechnology in Agriculture and Food Processing: Opportunities and Challenges. CRC Press.
4. Thompson, R. P. (2011). Agro-Technology: A Philosophical Introduction. Cambridge University Press.
5. Delcour, J. A. and Hoseney, R. C. (2010). Principles of Cereal Science and Technology. 3rd Edition. Amer Assn of Cereal Chemists.

PTT 362/3
Design and Optimization in Food Processing

Course Synopsis

This course covers in first part, is the design and quality determination of food processing and the control vector parameterization with sensitivity. In the second part, the course covers the optimization, statistical optimization and multi-objective optimization in food engineering.

Course Outcomes

1. Ability to analyze the conceptual design methodology for food process and the food quality development using design optimization.
2. Ability to develop the control vector parameterization with sensitivity based refinement applied to baking optimization.
3. Ability to evaluate the optimization and statistical optimization in food processing.

References

1. Ferruh Erdogdu. (2008). Optimization in Food Engineering: Contemporary Food Engineering. CRC Press.
2. Aguilera, J. M., Simpson, R. and Welti-Chanes, J. (2010). Food Engineering Interfaces. Springer.
3. Singh, R. K. (1995). Food Process Design and Evaluation. CRC Press.
4. Clark, S., Jung, S. and Lamsal, B. (2014). Food Processing: Principles and Applications. 2nd Edition. Wiley.
5. Fellows, P. J. (2009). Food Processing Technology: Principles and Practice. 3rd Edition. Woodhead Publishing.

PTT 450/6
Final Year Project 2

Course Synopsis

This is 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/or software development, device fabrication. In this subject, the students will be taught on how to discuss the research findings and determine the conclusion based on findings. In the end of this course, students will present the research findings and submit hardcover thesis.

Course Outcomes

1. Ability to identify the methodology of the research then organize and demonstrate experiments to collect research data.
2. Ability to choose the suitable research data and synthesize the data.
3. Ability to explain the data findings then describe, discuss and justify based on academic source
4. Ability to originate, explain and defend effectively in the form of thesis requirement.

References

1. Donald H. McBurney and Theresa L. White, (2007). Research Methods, 7th Edition, Thomson Wadsworth.
2. Daniel Holtom & Elizabeth Fisher, (1999). Enjoy Writing Your Science Thesis or Dissertation, Imperial College Press.
3. Leo Finkelstein, Jr., (2008). Pocket Book of Technical Writing for Engineers and Scientist. 3rd Edition, McGraw Hill.
4. Vicki Urquhart & Monette McIver, Teaching Writing in the Content Areas, Association for Supervision and Curriculum Development
5. Cash, S. (1989). Effective literature searching for students. Aldershot: Gowers

PTT 451/3
Post-Harvest Technology

Course Synopsis

This course provides the overview on postharvest handling technology of food and agricultural produce. The course emphasizes the basic of post harvest handling technology, pre-harvest and harvest factors affecting on post harvest quality, packaging operation and appropriate equipment that relates to package the biological products, quality assurance and preparation of fresh cuts, and post harvest socio-economics.

Course Outcomes

1. Ability to analyze the chemical and physical properties of agricultural and food products in order to apply the appropriate post-harvest handling technology.
2. Ability to demonstrate the preharvest and harvest factors that affects on postharvest quality
3. Ability to analyze the socio-economic factors and impact to prevent loss in post-harvest operation.

References

1. Kader. A (2002). Post Harvest for Horticultural Crops 3rd Edition, University of Carlifornia.
2. Paliyath, G., Murr, D. P., Handa, A. K. and Lurie, S. (2008). Postharvest Biology and Technology of Fruits, Vegetables, and Flowers. Wiley Blackwell.
3. Wills, R.B.H., McGlasson, W.B. and Graham, D. (2007). Postharvest**:** An Introduction to The Physiology and Handling of Fruit, Vegetables And Ornamentals. University of New South Wales Press
4. Florkowski, W. J., Shewfelt, R. L., Prussia, S. E. and Brueckner, B. (2009). Postharvest Handling: A Systems Approach, Academic Press, Elsevier
5. Bartz J. A. and Brecht J. K. (2003). Postharvest Physiology and Pathology of Vegetables 2nd

PTT 452/3
Fermentation and Enzyme Technology

Course Synopsis

This course covers both theoretical and practical aspects of fermentation and enzyme in bioprocess technology. It describes several fermentation processes involved in the production of industrial chemical metabolites such as alcohol, organic acids, proteins, enzymes and antibodies. This course also introduces principles and techniques of enzyme extraction and purification. Topic on utilization of enzymes in industrial and medical field will also be introduced.

Course Outcomes

1. Ability to differentiate various fermentation methods including the control parameters.
2. Ability to evaluate sterilization process, design batch, fed-batch and continuous fermentations and up-steam and down-stream processing.
3. Ability to demonstrate the current and future trends of enzymes applications in bio-analysis, biotechnology and industrial sectors..
4. Ability to design appropriate techniques for extraction, purification, immobilization and characterization of immobilized enzymes.

References

1. Buchholz, K. Kasche, V. and Bornscheuer, U. T. (2012). Biocatalysts and Enzyme Technology. 2nd Edition. Wiley-Blackwell.
2. Srivastava, M. L. (2007). Fermentation Technology. Alpha Science Intl Ltd.
3. Micheal L. Shuler & Fikret kargi. (2006). Bioprocess Engineering; basic Concepts. 2nd Edition. Prentice Hall.
4. Stanbury, P.F., Whitacker, A. and Hall, S.J. (1999). Principle of Fermentation Technology. 3rd Edition. Pergamon Press.
5. Ahmad, I., Ahmad, F. and Pichtel, J. (2011). Microbes and Microbial Technology: Agricultural and Environmental Applications. Springer.

PTT 453/3
Food Storage and Shelf-Life

Course Synopsis

The subject covers a broad spectrum of food packaging and shelf life involve in food technology. The emphasis is on the role of food packaging, food packaging materials and factors controlling shelf life, shelf life testing methodology and data analysis methods suitable for the analysis of shelf life data and estimate shelf life and types of packaging suitable to be used in food products for food industry.

Course Outcomes

1. Able to analyze the role of food packaging, food packaging materials and factors controlling shelf life.
2. Able to arrange shelf life testing methodology and data analysis methods suitable for the analysis of shelf life data.
3. Able to estimate shelf life and types of packaging suitable to be used in food products for food industry.

References

1. Nicoli, M. C. (2012). Shelf Life Assessment of Food (Food Preservation Technology). CRC Press.
2. Kilcast, D. and Subramaniam, P. (2011).Food and Beverage Stability and Shelf Life. Woodhead Publishing.

3. Robertson, G. L. (2010). Food Packaging and Shelf Life A Practical Guide. Taylor and Francis.
4. Steele, R. (2004). Understanding and measuring the shelf-life of food. CRC Press.
5. Eskin, M. and Robinson, D. S. (2000). Food Shelf Life Stability: Chemical, Biochemical, and Microbiological Changes. CRC Press.

Career Opportunities

Careers for Chemical Engineering Technology (Agrofood) Program in related industries :-

- Food Technology
- Food Quality Assurance
- Food Processing
- Agricultural Food Production
- Agricultural Tecnology
- Agrochemical
- Natural resources

PROGRAM ENGINEERING TECHNOLOGY: BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (Honours) (INDUSTRIAL BIOTECHNOLOGY)

Programme Educational Objectives (PEO) for Bachelor of Chemical Engineering Technology (Industrial Biotechnology)

PEO 01
Graduates who are highly skilled engineering technologist who have successful careers in the field of industrial biotechnology or other bio-related fields;

PEO 02
Graduates who are knowledgeable in science and engineering principles in biotechnology and pursue continuing and lifelong learning

PEO 03
Graduates who are serving the society by promoting ethical values, professionalism, sensitive and responsible to the needs of sustainable development.

Program Outcomes (PO) for Bachelor of Chemical Engineering Technology (Industrial Biotechnology)

PO 1
Apply Knowledge of mathematics, science, engineering fundamentals and engineering specialization principles to defined and applied engineering procedures, processes, systems or methodologies.

PO 2
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their disciplines or area of specialization.

PO 3
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns.

PO 4
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources.

PO 5
Select and apply appropriate techniques, resources and modern engineering tools with an understanding of their limitations.

PO 6
Function effectively as individuals, and as members or leaders in diverse technical teams.

PO 7
Communicate effectively with the engineering community and society at large.

PO 8
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities.

PO 9
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices.

PO 10
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development.

PO 11
Demonstrate an awareness of management, business practices and entrepreneurship.

PO 12
Recognise the need for professional development and to engage inindependent and lifelong learning.

STRUCTURE CURRICULUM BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (Honours) (INDUSTRIAL BIOTECHNOLOGY) – RY21

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
DISCIPLINE CORE (105)	PTT 136/3 Electrical Technology	PTT 105/3 Engineering graphic	PTT 201/4 Thermodynamics	PTT 204/3 Applied Fluid Mechanics	PTT 301/3 Safety and Health in Biological Process	PTT 308/4 Final Year Project I	PTT 401/6 Final Year Project II	INDUSTRIAL TRAINING PIT 304
	PTT 102//3 Organic Chemistry 1	PTT 106/3 Microbiology	PTT 202/3 Organic Chemistry for Biotechnology	PTT 205/4 Heat & Mass Transfer	PTT 302/3 Downstream Processing Technology	PTT 309/3 Food Technology	PTT 402/3 Biotechnology Facility Design	
	PTT 103/3 Biochemistry	PTT 107/3 Physical chemistry	PTT 203/3 Biochemical Engineering	PTT 206/2 Instrumentation, Measurement and Control	PTT 303/2 Process Modeling and Simulation	PTT 310/2 Waste Management and Utilization	PTT 403/2 Biotechnology Products Commercialization	
	PTT 104/2 Introduction to Biotechnology	PTT 108/4 Material & Energy Balance		PTT 207/4 Biomolecular and Genetic Engineering	PTT 304/3 Fermentation Technology	PTT 311/3 Enzyme Technology	Elective III/3 Elective A (A3) / Elective B (B3)	
					PTT 305/3 Cell & Tissue Culture Technology	Elective II/3 Elective A (A2) / Elective B (B2)		
					Elective I/3 Elective A (A1) / Elective B (B1)			
COMMON CORE (18)	PQT 111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II	PQT 213/3 Mathematics for Engineering Technology III					
	PTT 110/3 Engineering Material					PTT 333/3 Engineering Technology Management	PTT 444/3 Technologist in Society	
UNIVERSITY REQUIRED (19)	UVW 312/2 English for Technical Communication	UVW 410/2 University Malay Language	EUT122/2 Skills & Technology in Communication	UUW 224/2 Engineering Entrepreneurship				
	UZW 1XX/1 Co-Curricular Activity	UZW 1XX/1 Co-Curricular Activity	UUW 233/2 Islamic Civilization and Asia Civilization	UUW 235/2 Ethnic Relation				
			UUW 322/2 Thinking Skill	EUW XXX/2 Option subjects				
			UZW 1XX/1 Co-Curricular Activity					
142	21	18	19	19	17	18	17	12
Total Units for Graduation 142								

Elective A (Specialty Products)
A1: Nutraceuticals Processing Technology PTT 306/3
A2: Bioactive Compounds ExtractionTechnology PTT 312/3
A3: Biopharmaceutical Technology PTT 404/3

Elective B (Bio-catalysts)
B1: Industrial Microbiology PTT 307/3
B2: Bioenergy Production Technology PTT 313/3
B3: Bioremediation PTT 405/3

COURSE SYLLABUS

PTT 102/3
ORGANIC CHEMISTRY 1

Course Synopsis

This course covers the theories, structure, bonding, nomenclature, properties, reaction, synthesis and the importance of the various classes of organic compounds. The course then builds upon this information and explores the mechanisms of a number of organic reactions involving the studied functional groups. It provides a firm foundation for further studies in organic, biological, and biochemistry. The central theme of this course is the chemistry of the principal functional groups. The application of organic chemical process is discussed in terms of biotechnology industry.

Course Outcomes

1. Ability to explain and differentiate the chemical and physical properties of each functional groups carry out theoretical reaction mechanism at molecular level.
2. Ability to explain and differentiate the chemical, physical properties and reactions of alcohol, ether, aldehyde, ketone and carboxylic acids.
3. Ability to apply the knowledge of organic chemical process in biotechnology industry.

References

1. Bruice, P.Y. (2007). Organic Chemistry 5th Edition. Pearson Prentice Hall.
2. John Macmurray. (2000). Organic Chemistry 5th . Brooks/Cole.
3. T.W.G. Solomon and C.B.Fryhe. (2008). Organic Chemistry. 9th Edition. John Wuley and Son. Inc.
4. George, T. Austin, Shreve. (2006). Chemical Process Industries. 5th Edition. McGraw Hill International.
5. Bruice, P.Y. (2006). Essential Organic Chemistry. Pearson International. Prentice Hall.
6. Groggins, P.H. (2001). Unit Processes in Organic Chemistry Synthesis, Tata McGraw Hill.

PTT 103/3
BIOCHEMISTRY

Course Synopsis

The topics covered in this course include the properties and structure of water, classification and function of biomolecules such as carbohydrates, lipids and amino acids, role of proteins and enzymes in biochemistry, electron transport, citric acid cycle and photosynthesis.

Course Outcomes

1. Ability to differentiate basic structure, properties, functions and classification of important biomolecules.
2. Ability to discuss structure, function and kinetic properties of enzymes and their roles in metabolism
3. Ability to illustrate electron transport, citric acid cycle and photosynthesis.
4. Ability to describe enzymes and nucleic acids extraction and isolation.

References

1. Campbell, M.K. & Farrell, S.O. (2011). Biochemistry 7th Edition. Brooks/Cole.
2. McKee, T. & McKee, J. (2003). Biochemistry, 3rd Edition, McGraw Hill. New York.
3. Voet D. & Voet, J.G. (2004). Biochemistry 3rd Edition, Wiley International Edition, New York.
4. Elliott, W.H. & Elliott, D.C. (2005). Biochemistry 3rd Edition. Oxford University Press
5. Zarina Zakaria, Harbant Singh, Muhammad Syarhabil Ahmad, Noorulnajwa Diyana Yaacob, Syazliana Aizee, Rozaini Abdullah, Syazni Zainul Kamal, Khadijah Hanim, Mohd Fahrurrazi Tompang, Huzairy Hassan. (2011). Biochemistry: Essential for Engineers. Universiti Malaysia Perlis.

PTT104/2
INTRODUCTION TO BIOTECHNOLOGY

Course Synopsis

This course provides an overview of biotechnology industry, from the traditional to the recent high-technology industries. The course also highlights important and recent advances in methods and applications of biotechnology with regards to microorganisms and plants. The importance major biotechnological streams; industrial biotechnology, agricultural biotechnology, medical biotechnology and environmental biotechnology will be discussed, including recent advances and modern processes. Aspects on ethical implications, safety and intellectual will also be covered.

Course Outcomes

1. Ability to explain foundations of modern biotechnology.
2. Ability to demonstrate important recent advances in methods and applications of biotechnology with regards to microorganisms and plants.

3. Ability to differentiate scopes and importance of various biotechnological streams.
4. Ability to demonstrate understanding on ethical implications of biotechnology.

References

1. William J.T. and Michael A.P. (2009). Introduction to Biotechnology. 2nd Edition. Pearson Benjamin Cummings.
2. Susan R. Barnum. (2005). Biotechnology an introduction. 2nd edition. Thomson, Brooks/Cole Publication.
3. Acquaah, G. (2004). *Understanding Biotechnology.* Pearson. Prentice Hall.
4. Bougaize, D., Jewell, T.R. and Buiser, R.G. (2000). *Biotechnology; Demystifying the Concept*. Benjamin-Cummings Publication.
5. Rene Fester Kratz PhD, Donna Rae Siegfried**.** (2010). Biology For Dummies. Second Edition.
6. R.C. Sobti and Suparna S. Pachauri (2009). Essential of biotechnology. CRC press, US.

PTT105/3
ENGINEERING GRAPHIC

Course Synopsis

This course introduces the use of technical drawing in an effective way for communicating and integrating with engineering concept. Students will learn engineering drawing to interpret design, using graphics method such as geometry, parallel projections, sectional drawing, machines drawing and working drawing. The primary software used in this course is AutoCAD.

Course Outcomes

1. Ability to use the computer to produce complete drawing based on well define technical graphic standard.
2. Ability to apply basic geometric construction techniques to create engineering drawing using computer aided design (CAD).

References

1. Cecil,J.J., Helsel, D., and Dennis R. S. (2008). Engineering Drawing & Design, 7th ed. McGraw-Hill.
2. Wai-Kai Chen. (2009).Computer Aided Design and Design Automation (The Circuits and Filters Handbook), CRC.
3. Alexandre C. Dimian, Costin Sorin Bildea. (2008).Chemical Process Design: Computer-Aided Case Studies, Wiley-VCH.
4. Luke Achenie, Venkat Venkatasubramanian, Rafiqul Gani. (2002). Computer Aided Molecular Design: Theory and Practice (Computer Aided Chemical Engineering), Elsevier Science.
5. Lee Ambrosius. (2007).AutoCAD 2008 3D Modeling Workbook For Dummies, For Dummies Publ.

PTT106/3
MICROBIOLOGY

Course Synopsis

This course introduces to student the microbial world and its relationship with man and the environment. Emphasizing on the basic concepts in microbiology, aseptic techniques and microscopy. It also encompasses bacteria, fungi and virus groups, and their taxonomy. Structure and function of prokaryote and eukaryote cells, metabolism of microbes and microbial growth kinetics and fermentation process are featured in the course. Food and industrial microbiology are also featured with reference to factors contributing to productivity, spoilage and preservation.

Course Outcomes

1. Ability to categorize classes of microorganisms according to diversity.
2. Ability to use practical skills in fundamental microbiological techniques.
3. Ability to demonstrate microbial growth and metabolism, and compare physical and chemical methods to control growth.
4. Ability to compare the role of microorganisms in industrial, food and medical biotechnology.

References

1. Lansing M. Prescott, John S. Harley and Donald A. Klein. (2005). Microbiology**,** McGraw Hill.
2. Robert Bauman. (2006). Microbiology With Diseases by Taxonomy Second 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. Pelczar, M.J., Chan, E.C.S. and Krieg, N.R. (1993). Microbiology: concepts and applications. McGraw-Hill, Boston.

PTT107/3
PHYSICAL CHEMISTRY

Course Synopsis

A one-semester course designed to prepare engineering students for advance knowledge in physical chemistry such as thermodynamics, chemical equilibria and chemical kinetics.

Course Outcomes

1. Ability to explain and calculate the basic concepts, laws and principles in physical chemistry.
2. Ability to calculate and solve a problem concerning material equilibrium, standard thermodynamic function and reaction equilibrium in ideal gas mixture.
3. Ability to illustrate and solve problems concerning chemical kinetics, phase diagrams and electrochemistry.

References

1. Levine I. N. (2002). Physical Chemistry, McGraw Hill, 5th Edition.
2. Atkins, P and de Paula, Julia. (2006). *Physical Chemistry*. Oxford University Press, 8th Edition.
3. Bahl, B.S.; Bahl, Arun & Tuli, G.D. (2006). *Essentials of Physical Chemistry*. S. Chand, New Delhi.
4. Paul Monk. (2004). *Physical Chemistry*, John Wiley & Sons.
5. Silbey R. J., Alberty R. A., Bawendi M. G. (2005). Physical Chemistry, 4th edition. John Wiley & Son, Inc.
6. Thomas, E & Reid P. (2010). Physical Chemistry. Pearson Prentice Hall, Second Edition.

PTT108/4
MASS AND ENERGY BALANCE

Course Synopsis

The aims of this course is to expose students on the knowledge of how they should formulate and solve materials balances in various processing systems. Essentially, the material and energy which goes into the process will be converted by physical and chemical processes, whilst some may remain unconverted. The task for the chemical and biological technologies engineer to create a process statement which identifies all the materials and energy entering, remaining and leaves the systems.

Course Outcomes

1. Ability to calculate mass balance in chemical and biological process
2. Ability to calculate energy balance of in chemical and biological process; calculate heat of reaction for bioprocess reaction.
3. Ability to calculate mass balance in recycle, multistage and fed-batch system
4. Ability to calculate mass and energy balances unsteady state condition

References

1. Himmelblau, M. D. & Riggs, J. B. (2004).“Basic Principles and Calculations in Chemical Engineering”, 7th edition.Upper Saddle River : Prentice Hall.
2. Doran, P. M.(2006). “Bioprocess Engineering Principles” London: Academic Press.
3. Felder, R. M. & Rousseau, R. W. (2005).“Elementary Principles of Chemical Processes” John-Wiley, 3rd Update Edition.
4. Richardson J.F.(1994). “Chemical Engineering, Volume 3” Prentice Hall.
5. Reklaitis G.V. (1983).“Introduction to Material and Energy Balance” John Wiley.

PTT 201/4
THERMODYNAMICS

Course Synopsis

This course introduces students to the basic thermodynamics for engineering application and problem solving. The course covers first and second laws of thermodynamics, substances properties, closed system energy, entropy and engineering applications of gas power cycles, refrigeration, compression and heat pumps, and chemical reactions.

Course Outcomes

1. Ability to recognize and apply the fundamental basic properties, as well as the law of thermodynamics.
2. Ability to calculate heat, work and other thermodynamics properties ideal fluid in given processes.
3. Ability to solve problems for real fluids using volumetric equations of state.
4. Ability to apply thermodynamics properties from available data by using appropriate tools.
5. Ability to examine specific equations of state or correlations that are appropriate for treating given problems.

References

1. Cengel, Y.A. and M.A.Boles, (2007). Thermodynamics-An engineering Approach, 36th edition, McGraw-Hill.

2. Wark,K.,and Richards,D.E.,(1999), Thermodynamics, 6th Edition., McGraw-Hill.
3. Smith, J.M., Van Ness, H.C., Abbott, M. M. (2005). "Introduction to Chemical Engineering Thermodynamics", 7th Edition,McGraw – Hill
4. Sandler, S., Chemical, Biochemical, and Engineering Thermodynamics, Wiley, 2006
5. Theodore, L., Ricci, F.,Van Vliet, T. (2009). Thermodynamics for the Practicing Engineers, Wiley.

PTT 202/3
ORGANIC CHEMISTRY FOR BIOTECHNOLOGY

Course Synopsis

This course covers the bioorganic compound and analytical techniques commonly used in biochemical works and categorized under spectroscopy, chromatography and electro analytical methods. This course also discusses proteins, lipid and other substances which may be necessary to detect and measure bioorganic compound or which can be very useful in variety of analytical methods. This course is complemented by explanation on chemical nature and methods of analysis of carbohydrates, amino acids, proteins and lipids.

Course Outcomes

1. Ability to demonstrate the mechanism and synthesis of bio organics compound.
2. Ability to describe the utilization of biological materials for analytical purposes.
3. Ability to discuss analytical methods for the isolation and purification of biomolecules.

References

1. Bruice, P.Y.(2007). Organic Chemistry 5th Edition. Pearson Prentice Hall.
2. A. Manz, N. Pamme and D. Iossifidis. (2004). Bioanalytical Chemistry, Imperial College Press.
3. T. G. M. Schalkhammer (Ed.). (2002). Analytical Biotechnology, 1st Edition, Birkhäuser Basel.
4. R. H. Garrett and C. M. Grisham. (2010). Biochemistry, 4th Edition, Thomson Brooks/Cole.
5. D. J. Holme and H. Peck. (1998). Analytical Biochemistry, 3rd. Edition, New York, Addison Wesley Longman.

PTT 203/3
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. Kinetics of growth, death and metabolism are also covered. Batch and continuous fermentation and enzyme technology are included. The laboratory exercises introduce students to the fundamental practices in biochemical engineering.

Course Outcomes

1. Ability to differentiate types of enzymes and calculate enzyme kinetics Ability to interpret ingredients and nutrition in food.
2. Ability to illustrate the immobilization of enzyme process and discuss application of enzyme catalysis.
3. Ability to calculate the microorganism growth kinetics in batch and continuous culture.
4. Ability to calculate the stoichiometry of growth and product formation.

References

1. Shuler, Michael L., and Fikret Kargi. (2001). Bioprocess Engineering: Basic Concepts. 2nd ed. Upper Saddle River, NJ: Prentice Hall PTR. ISBN: 0130819085.
2. Henry C. Vogel and Celeste C. Tadaro, William Andrew. (2007). Fermentation and Buochemical Engineering Handboo,2 edition.
3. Jens N., John E. and Gunner L. (2003). Bioreaction Engineering Principles. New York, Kluwer Academics/Plenum Publisher.
4. Blanch, Harvey W., and D. S. Clark, eds. (1997). Biochemical Engineering. New York, NY: Marcel Dekker Incorporated. ISBN: 0824700996.
5. Shigeo Katoh and Fumitake Yushida. (2009). Biochemical Engineering: A Textbook for Engineers, Chemist and Biologist, Wiley-VCH.

PTT 204/3
APPLIED 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 demonstrate 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 distinguish the link between conserved quantities and the equations of fluid mechanics.
3. Ability to calculate control volumes and surfaces for developing the equations of fluid mechanics.

References

1. Cengel, Y. A. Cimbala, J. M. (2006). "Fluid Mechanics: Fundamental and Applications, First edition in SI units" McGraw-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. R. Gatignol, R. Prud'Homme. (2001). **Mechanic and Thermodynamic Modeling of Fluid Interfaces, World Scientific Publishing Company.**
5. Mark Levi. (2009). The Mathematical Mechanic: Using Physical Reasoning to Solve Problems Princeton University Press.

PTT 205/4
HEAT AND MASS TRANSFER

Course Synopsis

This course introduces mechanisms by which heat is transferred from one body to another. This course introduces the principles of steady and unsteady heat conductions; radiation phenomena; natural and force convections; heat transport coefficients; dimensional analysis and boundary layer. The course covers heat conduction, convection and radiation, also mass transfer with special address on biological systems. Emphases are placed on formulation and application of respective mathematical models of heat and mass transfer across both physical and biological bodies.

Course Outcomes

1. Ability to illustrate the conservation laws that control mass and heat transfer.
2. Ability to solve the ordinary and partial differential equations that result from the application of the conservation laws in biological systems.
3. Ability to apply and solve mathematical models for physical and biological situations.

References

1. Incropera, F. P., DeWitt, D. P. (2002), Fundamental of Heat and Mass Transfer, John Wiley & Sons, Inc.
2. Cengel, Yunus A. (2003), Heat Transfer, A Practical Approach, McGraw-Hill, Inc.
3. Bird, R. B., Steward, W.E., Lightfoot, E. N. (2002), Transport Phenomena, Second Edition, John Wiley & Sons, Inc.
4. Thompson, W. J. (2000), Introduction to Transport Phenomena, Prentice Hall, Inc.
5. Yunus Cengel. (2006). Heat and Mass Transfer: A Practical Approach , McGraw-Hill Science/ Engineering/Math.

PTT 206/2
INSTRUMENTATION, MEASUREMENT AND CONTROL

Course Synopsis

The course deals with a number of advanced techniques, data interpretation and control of biotechnological processes. It covers modern on-line hardware sensors such are FIA, viable biomass measurement, membrane inlet mass spectrometry, flow cytometry, microcalorimetry. It also discusses model-based process diagnosis and control techniques including advances in bioprocess modeling and identification, data processing, software sensor design, and on-line control algorithms.

Course Outcomes

1. Ability to illustrate the working principles of hardware sensors commonly used in biotechnological processes.
2. Ability to interpret model based-process diagnosis in biotechnological processes modelling.
3. Ability to use and analyze adaptive and predictive *Control techniques* in biotechnological processes.

References

1. Manabendra Bhuyan. (2006). Measurement and Control in Food Processing, CRC.
2. Kevin James. (2000). **PC Interfacing and Data Acquisition: Techniques for Measurement, Instrumentation and Control,. Newnes.**
3. Walt Boyes Principal in Spitzer and Boyes LLC. (2009). **Instrumentation Reference Book, Fourth Edition Butterworth-Heinemann.**

4. Paul Regtien, F. van der Heijden, M. J. Korsten, W Otthius. (2004). Measurement Science for Engineers Butterworth-Heinemann.
5. John Park, Steve Mackay. (2003). Practical Data Acquisition for Instrumentation and Control Systems (IDC Technology), Newnes.

PTT 207/4
BIOMOLECULAR AND GENETIC ENGINEERING

Course Synopsis

The course focuses on the molecular mechanisms that underlie the regulated expression of genes, including transcription and translation, as well as basic mechanisms of DNA replication, mutations and repair. Emphasize will be on the molecular mechanisms of DNA replication, repair, transcription, protein synthesis, and gene regulation in different organisms. Facilitates basic knowledge in gene manipulation based on current researches and development in the field of genetic engineering. Characterization and development of cloning vector will also be covered. Among other things to be included will be DNA isolation, the types of enzymes used in molecular biology, insertion of foreign DNA, preparation of host cell, transformation and screening of cloned DNA as well as the making of genomic and cDNA library.

Course Outcomes

1. **A**bility to differentiate **the mechanisms of DNA replication**, transcription, and translation in prokaryotic and eukaryotic cells.
2. Ability to demonstrate types of mutations and their repair mechanisms as well as to discuss gene regulation activity in prokaryotes and eukaryotes.
3. Ability to analyze relevant information and experimental data in genetic engineering.

References

1. Malacinski, G. M. (2003) Essentials of Molecular Biology. 4th edition. Jones and Bartlett Publishers.
2. Karp, G. (2002) Cell and Molecular Biology- Concepts and Experiments. 3rd edition. John Wiley & Sons, Inc.
3. Walker, J. M. and Rapley, R. (2009) Molecular Biology and Biotechnology. 5th edition. RSC Publishing.
4. Brown, T. A. (2006). Gene Cloning: an introduction. 3rd edition. Stanley Thornes (Publishers) Ltd.
5. J.D. Watson, N.H. Hopkins, J.W Roberts, J. A. Seitz & A.M. Weiner. (2007). Molecular Biology of the Gene, 6th Edition, Benjamin Cummings Publishing Company Inc.

PTT 301/3
SAFETY AND HEALTH IN BIOLOGICAL PROCESS

Course Synopsis

This course covers the regulatory procedure dealing with biological process. The students are also exposed to hazard identification, risk assessment, biosafety level and health surveillance program. Besides, the students also will be taught on fundamental aspect in emergency response plan relevant to biological process.

Course Outcomes

1. Ability to categorize the different laboratory levels and class of biosafety.
2. Ability to analyze process safety to identify the biohazard and risk in the industry.
3. Ability to write and describe health surveillance program.
4. Ability to use emergency response plan and biological waste decontamination guideline relevant to biological process.

References

1. US Department of Health and Human Services. (2009). Biosafety in Microbiological and Biomedical laboratories.5th edition.
2. Biosafety Manual for Texas Tech Univeristy (2005).
3. Martha J. Boss, Dennis W. Day (2003). Biological risk engineering handbook: infection control and decontamination. Lewis Publication.
4. Biological Safety: Principles and Practices, (2000) Third Edition. do Fleming & dl Hunt, Eds. ASM Press.
5. Sanders, R. E. (2005). *Chemical Process Safety; Learning From Case Histories*. Elsevier Butterworth Heinemann, Third Edition. Amsterdam

PTT 302/3
DOWNSTREAM PROCESSING TECHNOLOGY

Course Synopsis

This course introduces basic and advanced skills in separation technology related to biotechnology. The course covers common separation techniques which include precipitation, centrifugation, solvent extraction and different types of chromatographic

techniques. Other important separation processes will also be covered.

Course Outcomes

1. Ability to demonstrate methods to purify biologically processed materials.
2. Ability to choose equipment and steps required in bio separation systems.
3. Ability to analyze and compare alternative separation approaches and systems.
4. Ability to choose appropriate instrumentation for bio separation applications.

References

1. McCabe, W. L., Smith, J. C. and Harriott, P. (2004). Unit Operations of Chemical Engineering, McGraw-HilL.
2. Harrison, R.G. Todd, P., Rudge S.R. and Petrides D.P. (2003). Bioseparations Science and Engineering, Oxford University Press.
3. Geankoplis, C.J. (2003). Transport Processes and Separation Process Principles, Prentice Hall.
4. Sivasankar, B. (2006). Bioseparations: Principles and Technique, Prentice Hall.
5. Ladisch, M. R. (2001). Bioseparations Engineering: Principles, Practice and Economics, Wiley-Interscience.

PTT 303/2
PROCESS MODELLING AND SIMULATION

Course Synopsis

The course covers material and energy balances, equipment sizing, and costing, environmental impact assessment and process design for single and continuous processes. Students are exposed to the usage of SuperPro design software for modeling and simulation purposes. Subsequently, sustainability assessment, emphasizing on economic and profitability analysis will also be covered.

Course Outcomes

1. Ability to solve engineering calculation like mass and energy balance, stoichiometry, and kinetics of the bioprocess.
2. Ability to apply process and differentiate unit operation in bioprocess using simulation software
3. Ability to analyze economic data and apply environmental impact and 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.
4. Biegler, L. T., Grossmann, E. I. & Westerberg, A. W. (1997). Systematic Methods of Chemical Process Design. London: Prentice-Hall International.
5. Coulson, J.M.(John Metcalfe), Richardson, Jon Francis and Sinnott, R.K. (1999). Chemical Engineering Design" Vol.6, 3rd Edition, Butterworth-Heinemann.

PTT 304/3
FERMENTATION TECHNOLOGY

Course Synopsis

This course covers both theoretical and practical aspects of fermentation and bioprocess technology. It also describes several fermentation processes involved in the production of industrial chemical metabolites such as alcohol, organic acids, proteins, enzymes and antibodies.

Course Outcomes

1. Ability to differentiate various fermentation methods including the control parameters
2. Ability to calculate mass balances stoichiometry and microbial growth kinetics in batch, fed-batch and continuous fermentations.
3. Ability to calculate sterilization times, aeration requirement and capacities of batch, fed-batch and continuous fermentation.
4. Ability to illustrate the principles of up and down-scaling of fermentation processes and primary recovery methods.

References

1. Elmansi E.M.T, Bryce C.F.A, Demain and A.L, Allman A.R (2007). Fermentation Microbiology and Biotechnology. 2nd edition CRC.
2. Stanbury, P.F., Whitacker, A. and Hall, S.J. (1999) Principle of Fermentation Technology. 3rd ed. Pergamon Press.
3. Scragg, A.H. (1991) Bioreactors in Biotechnology: A Practical Approach. 1st ed. Ellis Horwood Limited.
4. Micheal L. Shuler & Fikret kargi (2006).Bioprocess Engineering; basic Concepts 2 Ed. Prentice Hall.

5. Stanbury, P.F, S Whitake, A. (1984). Principles of Fermentation Technology. Pergamon Press: Oxford.

PTT 305/3
CELL AND TISSUE CULTURE TECHNOLOGY

Course Synopsis

This course will introduce the students to the basic knowledge of plant and animal cell culture. The course will cover on the media preparation, aseptic techniques and sterilization, techniques of cultivation as well as applications of plant and animal cell culture.

Course Outcomes

1. Ability to operate laboratory equipments, media and sterilization methods for plant and animal culture.
2. Ability to differentiate techniques involved in animal and plant tissue culture.
3. Ability to apply the principle of plant and animal tissue culture technology in industrial biotechnology.

References

1. Sathyanarayana, B. N. and Varghase, D. B. (2007) Plant tissue culture: Practices and new experimental protocols. I. K. International Pvt. Ltd.
2. Razdan, M. K. (2003) Introduction to plant tissue culture. Science Publishers.
3. Freshney, R. I. (2000) Culture of animal cells: A manual basic techniques, fifth edition. New Jersey.
4. Karl-Hermann Neumann, Ashwani Kumar, Jafargholi Imani. (2009). Plant Cell and Tissue Culture - A Tool in Biotechnology: Basics and Application (Principles and Practice), Springer.
5. Edwin F. George, Michael A. Hall, Geert-Jan De Klerk (Editors). 92007). Plant Propagation by Tissue Culture, Springer.

PTT 306/3
NUTRACEUTICALS PROCESSING TECHNOLOGY

Course Synopsis

The subject covers a broad spectrum of functional foods and nutraceuticals from biological material, applications of engineering techniques in functional food production, process engineering and modeling, functional food bioavailability, to product quality. The emphasis is on (1) applications of various techniques such as high pressure, supercritical fluid, membrane, microencapsulation, and molecular distillation in the processing of functional foods; (2) stability of bioactive components and antioxidative properties during processing and shelf life; (3) improvement in bioavailability of bioactive components by physical and chemical methods; and (4) mechanisms of antioxidant action and clinical and epidemiological evidence of functionality.

Course Outcomes

1. Ability to apply techniques in the processing of functional foods and nutraceuticals.
2. Abilitity to analyze stability of bioactive components and antioxidative properties during processing and shelf life.
3. Ability to analyze and test bioprocessing technology for production of nutraceutical compounds**.**

References

1. Shi.J. (2007).Functional food ingredients and nutraceuticals, Taylor & Francis Group LLC.
2. Lambert M. Surhone, Miriam T. Timpledon, Susan F. Marseken. (2010). Nutraceutical, Betascript Publishers.
3. Francisco Delgado-Vargas, Octavio Paredes-López. (2003). Natural colorants for food and nutraceutical uses, CRC Press.
4. Yoshinori Mine, Fereidoon Shahidi. (2006). Nutraceutical proteins and peptides in health and disease, CRC/Taylor and Francis.
5. Vazhiyil Venugopal. (2008). Marine products for healthcare: functional and bioactive nutraceutical compounds from the ocean, CRC Press/Taylor & Francis.

PTT 307/3
INDUSTRIAL MICROBIOLOGY

Course Synopsis

This course explores microbiological industry development, scope of microbiological industries, microbes in microbiological industries, biomass and metabolite production, microbes in bioremediation and in waste treatment industries. The course also refreshes microbial fundamentals and strain improvement for new products and productivity improvement.

Course Outcomes

1. Ability to apply fundamentals of microbial physiology and metabolisms in the production processes of industrial products.
2. Ability to classify microbiological processes involved in applications production of a range of industrial products.
3. Ability to illustrate current development trends in the field of industrial microbiology and biotechnology.

References

1. Waites, M. J., Morgan, N. L., Rockey, J. S. and Higton, J. (2001). Industrial Microbiology: An Introduction. Ist Edition, Blackwell Science
2. Dolye, M. P., Beuchat, L. R. and Montville, T. J. (2007). Food Microbiology: Fundamentals and Frontiers 3rd Edition. American Society Microbiology.
3. Pepper, I. L. and Gerba, C.P. (2004). Environmental Microbiology: a Laboratory Manual. 2nd Edition, Academic Press.
4. Nduka Okafor. (2007). Modern Industrial Microbiology and Biotechnology, Science Publishers.
5. James M. Jay. (2000). **Modern Food Microbiology (Aspen Food Science Text Series), Springer.**

PTT 308/4
FINAL YEAR PROJECT 1

Course Synopsis

A short-termed research project that inclined towards engineering operations for producing new biotechnological products is necessary for a 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 mainly on fermentation, enzyme technology, bioconversion and natural products and nutraceuticals technologies.

Course Outcomes

1. Ability to apply and integrate theory and practical to solve the engineering problems.
2. Ability to develop suitable research methodology for the project.
3. Ability to present and defend effectively project proposal to selected audience.
4. Ability to identify commercialization potential for proposed project.

References

1. Lydersen, B. K., D'elia, N.A., and Nelson, K.L., (1994)Bioprocess Engineering: System, Equipment and Facilities. John Wiley and Sons, Inc., USA.
2. Stephanopolous, G., (1993) Biotechnology. Vol. 3 (Bioprocessing). VCH, Germany.
3. Andrew A. Signore and Terry Jacobs (2005). Good Design Practices for GMP Pharmaceutical Facilities. Taylor & Francis.
4. Anurag Singh Rathore, Gail Sofer, G. K. Sofer.(2005).Process Validation in Manufacturing og Biopharmaceuticals: guidelines, current practices, and industrial case studies. Taylor & Francis.
5. Vogel, H.C., and Tadaro, C.L. (1997). Fermentation and Biochemical Engineering Handbook: Principles, Process Design, and Equipment. 2nd Edition. Noyes Publications. New Jersey.

PTT 309/3
FOOD TECHNOLOGY

Course Synopsis

This course covers multidisciplinary field of applied physical sciences 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, freezing, texturization, mechanical separation and food biotechnology.

Course Outcomes

1. Ability to differentiate the principles of food engineering operations.
2. Ability to interpret ingredients and nutrition in food.
3. Ability to analyze problems involved in food engineering operations.
4. Ability to analyze genes involved in plant development and reproduction and improvement of quality and productivity of food materials.

References

1. Food Processing Technology: Principles & Practice. Ellis-Harwood Ltd., Chichester, England. 2nd Edition 2000
2. Heller.K.J, Genetically Engineered Food :Methods and Detection. Second, Updated and Enlarged Edition, WILEY-VCH Verlag GmbH & Co. KgaA, Weinheim, 2006
3. M. Angela A. Meireles, Extracting bioactive compounds for food products, CRC Press, 2009
4. Jose L. Martinez., Supercritical fluid extraction of nutraceuticals and bioactive compounds, CRC Press, 2008.

5. Food Process Engineering - Heldman, D. R. and Singh, R. P.

PTT 310/2
WASTE MANAGEMENT AND UTILIZATION

Course Synopsis

The subject covers the main aspects of utilization of the food industry waste and the treatments necessary to discard waste to environmental acceptors. Emphasize will be on the exigency for utilization and treatment of food waste according to the ISO 14001. The technology of anaerobic fermentation for biogas production, specific degradation of solid wastes including their direct practical applicability, as well as composting of agricultural and food waste are will be addressed accordingly.

Course Outcomes

1. Ability to demonstrate methods to purify biologically processed materials.
2. Ability to choose equipment and steps required in bio separation systems.
3. Ability to analyze and compare alternative separation approaches and systems.
4. Ability to choose appropriate instrumentation for bio separation applications.

References

1. McCabe, W. L., Smith, J. C. and Harriott, P. (2004). Unit Operations of Chemical Engineering, McGraw-Hill.
2. Harrison, R.G. Todd, P., Rudge S.R. and Petrides D.P. (2003). Bioseparations Science and Engineering, Oxford University Press.
3. Geankoplis, C.J. (2003). Transport Processes and Separation Process Principles, Prentice Hall.
4. Sivasankar, B. (2006). Bioseparations: Principles and Technique, Prentice Hall.
5. Ladisch, M. R. (2001) Bioseparations Engineering: Principles, Practice and Economics, Wiley-Interscience.

PTT 311/3
ENZYME TECHNOLOGY

Course Synopsis

The course covers basic enzymology, including properties, classification, kinetics and action mechanisms and immobilization of enzyme. This course also introduces principles and techniques of enzyme extraction and purification. Topic on utilization of enzymes in industrial and medical field will also be introduced.

Course Outcomes

1. Ability to explain fundamentals of enzyme kinetics.
2. Ability to discuss the current and future trends of enzymes applications in bio-analysis, biotechnology and industrial sectors.
3. Ability to choose appropriate techniques for extraction and purification of enzymes/proteins.
4. Ability to demonstrate methods for enzyme immobilization and the characterization of immobilized enzymes kinetics.

References

1. Wolfgang Aehle. (2007) Enzymes in Industry. John Wiley & Sons.
2. Andr´es Illanes (2008) Enzyme Biocatalysis. Springer Science + Business Media B.V.
3. Marangoni A.G. (2003) Enzyme Kinetics: A Modern Approach. John Wiley and Sons Incoperation. New York.
4. Bisswanger, H (2004) Practical Enzymology Wiley-VCH. Weinheim, Germany.
5. Cook, P.F. and Cleland, W.W (2007) Enzyme Kinetics and Mechanism. Garland Publishing Inc, US.

PTT 312/3
BIOACTIVE COMPOUNDS EXTRACTION TECHNOLOGY

Course Synopsis

The course discusses different types of extraction methods for extraction of bioactive compounds from plants. It also covers overview of the fundamentals of heat and mass transfer as well as the thermodynamics of the processes of steam distillation, distillation, low-pressure solvent extraction (solid–liquid) from vegetable matrices, high-pressure extraction from vegetable matrices, and liquid–liquid extraction and adsorption, which are processes used to obtain high-quality bioactive extracts and purified compounds from botanical sources.

Course Outcomes

1. Ability to distinguish different extraction methods of bioactive compounds from plant materials.
2. Ability to analyze and test various types of extraction methods
3. Ability to demonstrate various bioactive compound extraction methods.

References

1. M. Angela A. Meireles. (2009). Extracting bioactive compounds for food products, CRC Press.
2. Jose L. Martinez. (2008). Supercritical fluid extraction of nutraceuticals and bioactive compounds, CRC Press.
3. Steven M. Colegate, Russell J. Molyneux. (2007). Bioactive Natural Products: Detection, Isolation, and Structural Determination, Second Edition, CRC.
4. Manuel Aguilar, Jose Luis Cortina. (2008). Solvent Extraction and Liquid Membranes: Fundamentals and Applications in New Materials (Ion Exchange and Solvent Extraction), CRC.
5. EugÃ¨ne Vorobiev. (2008) Electrotechnologies for Extraction from Food Plants and Biomaterials (Food Engineering Series), Springer.

PTT 313/3
BIOENERGY PRODUCTION TECHNOLOGY

Course Synopsis

The course explains in detail global energy sources, fossil fuels, and renewables, Biomass Feedstocks, biofuels. processing conditions and alternative applications of biorenewable feedstocks. Liquid and Gaseous Biofuels, including main liquid biofuels such as bioethanol, biodiesel, biogas, biohydrogen, liquid and gaseous fuels from the Fischer–Tropsch synthesis are addressed in detail. Discussion on Thermochemical Conversion Processes covers the utilization of biorenewables, Biofuel Economy and Biofuel Policy are also included.

Course Outcomes

1. Ability to differentiate different sources and types of bioenergy.
2. Ability to analyze economic and environmental impact of bioenergy.
3. Ability to demonstrate production process of bioenergy.

References

1. Ayhan Demirbas. (2009). Green Energy and Technology, Springer-Verlag London Ltd.
2. Caye M.Drapcho, Nghiem Phu Nhuan, Terry H. Walker. (2008) Biofuels Engineering Process Technology, The McGraw-Hill Companies.
3. Wilfred Vermerris. (2008). Genetic Improvement of Bioenergy Crops, Springer.
4. Frano Barbir, Sergio Ulgiati. (2008). **Sustainable Energy Production and Consumption: Benefits, Strategies and Environmental Costing, Springer.**
5. Dwight Tomes, Prakash Lakshmanan, David Songstad. (2010). Biofuels: Global Impact on Renewable Energy, Production Agriculture, and Technological Advancements, Springer.

PTT 333/3
ENGINEERING TECHNOLOGY MANAGEMENT

This course aims to teach students on how to apply the project management skills and economic techniques in evaluating the design. The role of economics is to assess the appropriateness of a given project, estimate its value, and justify it from an engineering technology standpoint. At the end of the course, students will be able to identify and discuss issues and challenges faced by engineering technologist relating to project management in the current economic scenarios.

Course Outcomes

1. Ability to evaluate the process of project management, develop work plans, do cost estimation and perform project evaluation.
2. Ability to evaluate economic scenarios and apply decision making process to engineering project and business venture.

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. (2006).
3. S. Park Chan, Fundamentals Engineering Economics, 2nd ., Prentice-Hall. (2008)
4. Stanley E. P., Samuel J. M., Jack R.M, Scot M.S, Margaret M. Sutton; (2008); Project Management : Planning, Scheduling, and Controlling Projects, John Wiley & Sons Inc. USA

PTT 401/6
FINAL YEAR PROJECT II

Course Synopsis

A short-termed research project that inclined towards engineering operations for producing new biotechnological products is necessary for a 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 mainly on fermentation, enzyme technology, bioconversion and natural products and nutraceuticals technologies.

Course Outcomes

1. Ability to apply and integrate theory and practical to solve the engineering problems.
2. Ability to develop suitable research methodology for the project.
3. Ability to present and defend effectively project proposal to selected audience.
4. Ability to identify commercialization potential for proposed project.

References

1. Lydersen, B. K., D'elia, N.A., and Nelson, K.L., (1994) Bioprocess Engineering: System, Equipment and Facilities. John Wiley and Sons, Inc., USA.
2. Stephanopolous, G., (1993) Biotechnology. Vol. 3 (Bioprocessing). VCH, Germany.
3. Andrew A. Signore and Terry Jacobs (2005). Good Design Practices for GMP Pharmaceutical Facilities. Taylor & Francis.
4. Anurag Singh Rathore, Gail Sofer, G. K. Sofer.(2005).Process Validation in Manufacturing of Biopharmaceuticals: guidelines, current practices, and industrial case studies. Taylor & Francis.
5. Vogel, H.C., and Tadaro, C.L. (1997). Fermentation and Biochemical Engineering Handbook: Principles, Process Design, and Equipment. 2nd Edition. Noyes Publications. New Jersey.

PTT 402/3
BIOTECHNOLOGY FACILITY DESIGN

Course Synopsis

This course gives complete overview on the biotechnology facilities design. Topics included in this course are the processing equipment, cleaning of process design and utilities system. This course also introduces current Good Manufacturing Practices (cGMP), regulatory features affecting process and building design and documentation for validation of biotechnology facilities.

Course Outcomes

1. Ability to discuss the current and future bioprocess facility based on industry demand.
2. Ability to apply cGMP regulations in biotechnology facility.
3. Ability to design a bioprocess facility, undertake problem identification and solution.

References

1. Lydersen, B. K., D'elia, N.A., and Nelson, K.L., (1994). Bioprocess Engineering: System, Equipment and Facilities. John Wiley and Sons, Inc., USA.
2. Stephanopolous, G., (1993) Biotechnology. Vol. 3 (Bioprocessing). VCH, Germany.
3. Andrew A. Signore and Terry Jacobs (2005). Good Design Practices for GMP Pharmaceutical Facilities. Taylor & Francis.
4. Anurag Singh Rathore, Gail Sofer, G. K. Sofer.(2005).Process Validation in Manufacturing of Biopharmaceuticals: guidelines, current practices, and industrial case studies. Taylor & Francis.
5. Vogel, H.C., and Tadaro, C.L. (1997). Fermentation and Biochemical Engineering Handbook: Principles, Process Design, and Equipment. 2nd Edition. Noyes Publications. New Jersey.

PTT 403/2
BIOTECHNOLOGY PRODUCTS COMMERCIALIZATION

Course Synopsis

The course covers on the current status in biotechnology research and commercialization aspects of biotechnology products. Students will also learn about current issues of patenting, intellectual property and licensing of biotechnology products as well as developing business plans to meet the market needs.

Course Outcomes

1. Ability to illustrate the commercial aspects of biotechnology products.
2. Ability to select a potential product and prepare a business plan for that particular product.
3. Ability to practice costing of biotechnology projects.

References

1. Journals of Biotechnology
2. Trends in Biotechnology
3. Lawton Robert Burns, The Business of Healthcare Innovation, Cambridge University Press, 2005
4. Shreefal S. Mehta. (2008). **Commercializing Successful Biomedical Technologies: Basic Principles for the Development of Drugs, Diagnostics and Devices, Cambridge University Press.**

5. Maureen D. McKelvey, Annika Rickne, Jens Laage-Hellman. (2004). **The Economic Dynamics Of Modern Biotechnology, Edward Elgar Publishing.**

PTT 404/3
BIOPHARMACEUTICAL TECHNOLOGY

Course Synopsis

This course attempts to provide a balanced overview of the biopharmaceutical industry, in terms of categorizing the products currently available, and also illustrating how these drugs are produced and brought to market. It focuses on several 'traditional' pharmaceutical substances isolated from biological sources, and recently developed biopharmaceutica products. Polypeptide-based therapeutic agents, and the potential of nucleic acid-based drugs, biopharmaceutical drug delivery, genomics and proteomics are also discussed.

Course Outcomes

1. Ability to categorize various biopharmaceuticals and illustrating how these drugs are produced and brought to market.
2. Ability to demonstrate production process of biopharmaceuticals.
3. Ability to evaluate the application of biotechnology in the development of biopharmaceuticals.

References

1. Walsh.G. (2003. Biopharmaceuticals: Biochemistry and biotechnology, John Wiley & Sons Lt.
2. Walsh, G. (2007). Pharmaceutical biotechnology : Concepts and Applications, John Wiley & Sons Ltd, Chichester, West Sussex , England.
3. Kathleen Laura Hefferon. (2009). Biopharmaceuticals in Plants: Toward the Next Century of Medicine, CRC Press.
4. Jörg Knäblein. (2005) Modern Biopharmaceuticals: Design, Development and Optimization, Wiley-VCH.
5. Feroz Jameel, Susan Hershenson. (2010). Formulation and Process Development Strategies for Manufacturing Biopharmaceuticals Wiley,.

PTT 405/3
BIOREMEDIATION

Course Synopsis

This course attempts to provide a balanced overview of the bioremediation. The topic s that covered in this courses are: type sources of contamination and pollution, bioremediation technologies in for soil and water, Types of bioremediation technologies, bioremediation of solid, liquid and gas phase and the last one is case studies for bioremediation.

Course Outcomes

1. Ability to analyze and distinguish the type of bioremediation.
2. Ability to illustrate and solve the design consideration on each type of bioremediation.

References

1. Ronald L. Crawford , et al (2005) Bioremediation: Principles and Applications (Biotechnology Research). Cambridge University Press; 1 edition.
2. Ronald M. Atlas, Jim Philp. (2005). Bioremediation: Applied Microbial Solutions for Real-World Environment Cleanup, ASM Press.
3. Environmental Biotechnology: Theory and Application, Gareth M. Evans, Judith C. Furlong, WILEY,2002
4. Shree N. Singh. (2006) Environmental Bioremediation Technologies, Springer.
5. Dennis M. Filler, Ian Snape, David L. Barnes. (2008) Bioremediation of Petroleum Hydrocarbons in Cold Regions, Cambridge University Press.

PTT 444/3
TECHNOLOGIST IN SOCIETY

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

Course Outcome

1. Ability to understand, identify and evaluate the issues and challenges of engineering ethics.
2. Ability to explain and identify hazards; evaluate and review the function of risk management and occupational safety and health (OSHA).
3. Ability to discuss and evaluate the aspects and procedures of legal on engineering issues.

References

1. Van De Poel, I and Royakkers, L. (2011) Ethics, Technology, and Engineering: An Introduction, Wiley-Blackwell
2. Harrington, J.L. (2008) Technology And Society, Jones & Bartlett Learning
3. Lee Mei Peng, Detta, I.J. (2005) General Principles of Malaysian Law, Fifth Edition, Oxford Fajar.
4. Alcorn, P. A. (2001). Practical Ethics for a Technological World. Upper Saddle River, NJ: Prentice Hall.
5. Martin, M. and Schinzinger, R. (2004). Ethics in Engineering, McGraw-Hill.
6. Stephen Collins, John Ghey and Graham Mills, (1994) Professional Engineer in Society, Jessica Kingsley Publishers

BACHELOR OF ENGINEERING TECHNOLOGY (ELECTRICAL) (Hons) (INDUSTRIAL POWER)

Program Education Objective (PEO)

PEO 1
Graduates are leaders in the field of electrical engineering as demonstrated through career advancement.

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

PEO 3
Graduates pursue continuing education opportunities.

PEO 4
Graduates make contributions through research and development.

PEO 5
Graduates who are entrepreneurs.

Programme Outcomes (PO)

PO1
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialisation principles to defined and applied engineering procedures, processes, systems or methodologies;

PO2
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialisation

PO3
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns

PO4
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources

PO5
Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations

PO6
Function effectively as individuals, and as members or leaders in diverse technical teams

PO7
Communicate effectively with the engineering community and society at large

PO8
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities

PO9
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices

PO10
Demonstrate an awareness of management, business practices and entrepreneurship

PO11
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development

PO12
Recognise the need for professional development and to engage in independent and lifelong learning

STRUCTURE CURRICULUM BACHELOR OF ELCTRICAL ENGINERING TECHNOLOGY (INDUSTRIAL POWER) – RY31

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
DISCIPLINE CORE ((105)	PLT101/3 Computer programming	PLT105/3 Electric Circuit Theory I	PLT201/3 Electric Circuit Theory II	PLT205/4 Electrical Machines Technology I	PLT301/4 Electrical Machines Technology II	PLT340/4 Final Year Project I	PLT440/6 Final Year Project II	PIT4XX/12 Industrial Training
	PLT102//2 Computer Aided Drafting (CAD)	PLT106/3 Digital Electronics	PLT202/3 Measurement & Instrumentation	PLT206/3 Microcontroller System	PLT302/3 Electrical Installation I	PLT306/3 Electrical Installation II	PLT401/3 Power System Protection & Switchgear	
	PCT111/3 Engineering Skills I	PLT107/3 Electronics I	PLT203/3 Electronics II	PLT207/3 Power Electronic	PLT303/3 Electrical Drives	PLT307/3 Programmable Logic Controller (PLC)	**PLT4XX/3 Elective II	
		PLT108/3 Engineering Skills II	PLT 204/3 Electromagnetic Field Theory	PLT208/3 Communication System	PLT304/4 Electrical Power System	*PLT3XX/3 Elective I	***PLT4XX/3 Elective III	
				PLT209/3 Signal & Systems	PLT305/3 Control System Technology			
COMMON CORE (18)	PQT111/3 Mathematics for Engineering Technology I	PQT112/3 Mathematics for Engineering Technology II	PQT213/3 Mathematics for Engineering Technology III					
	PLT104/3 Engineering Science					PTT333/3 Engineering Technology Management	PTT444/3 Technologist in Society	
UNIVERSITY REQUIRED (19)	UZWXXX/1 Co-curriculum	UZWXXX/1 Co-curriculum	UZWXXX/1 Co-curriculum	UVW312/2 English for Technical Communication	UUW235/2 Ethnic Relation	UUW322/2 Thinking Skills		
	UUT122/2 Skills & Technology in Communication	UVW410/2 University Malay Language	UVWXXX/2 Option subjects					
	UUW233/2 Islamic Civilization and Asia Civilization	UUW224/2 Engineering Entrepreneurship						
142	19	20	18	18	19	18	18	12
Total Units for Graduation 142								

Elective I Elective IIElective III
A1: PLT 308/3 Power Quality B1: PLT 402/3 Industrial Automation C1: PLT 404/3 Renewable Energy System
A2: PLT 309/3 Substation Maintenance B2: PLT 403/4 High Voltage Technology C2: PLT 405/3 Energy Efficiency & Management

COURSE SYLLABUS

PLT101/3
COMPUTER PROGRAMMIG

Course Synopsis

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.

Course Outcomes

CO1: Ability to define and describe programming concepts and principles.
CO2: Ability to apply programming techniques and tools such as flowchart and pseudo code to design computer programs.
CO3: Ability to apply GNU/Linux for coding, compiling, executing and debugging computer programs.

References

1. Cheng, H. (2010). C for Engineers and Scientists. McGraw Hill.
2. Deitel, Sudin S. (2006). C How To Program. Pearson-Prentice Hall.
3. Hanly, J.R. and Koffman, E.B. (2001). C Program Design for Engineers. 2nd Edition. Addison-Wesley.

PLT102/2
COMPUTER AIDED DRAFTING (CAD)

Course synopsis

This is a core subject. It will expose the students to understand the concepts of Computer Aided Drafting. Student also would able to illustrate engineering drawing, 2D and 3D modeling and construct a product drawing.

Course Outcomes

CO1: Ability to apply fundamental concepts of Computer Aided Drafting.
CO2: Ability to illustrate engineering drawing by using proper techniques.
CO3: Ability to use of Computer Aided Drafting to construct a simple product drawing.
CO4: Ability to perform in groups to illustrate 2D and 3D modeling.

References

1. Alan J Kalameja. (2008). AutoCAD 2008 Tutor for Engineering Graphics'. Delmar Learning.
2. James A. Leach. (2007). AutoCAD 2007 instructor: a student guide to complete coverage of Autocad's commands and features. McGraw Hill.
3. David Frey. (2007). AutoCAD 2007 & AutoCAD LT 2007: no experience required. In:Wiley.
4. Paul Whelan; alih bahasa, T.H. Lai. (1999). AutoCAD LT:cara mudah. Federal Publications.

PLT104/3
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. William D. Callister, Jr. (2007). Materials Science and Engineering: An Introduction. 7th ed.
2. Yunus A. Cengel, Robert H. Turner. (2005). Fundamentals of Thermal-Fluid Sciences. Int ed. McGraw-Hill.
3. Lim Poh Seng, Tay Seng How, Koh Kok Pin. (2003). Strength of Materials for Polytechnic. Revised ed. Prentice Hall.
4. Robert L. Mott. (2006). Applied Fluid Mechanics. 6th ed. Pearson.

PLT105/3
ELECTRIC CIRCUIT THEORY 1

Course synopsis

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

Course Outcomes

CO1: Ability to derive importantequations to solve problems in 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 circuit parameters containing sinusoidal steady-state sources using complex impedances and phasor representations.

References

1. Charles K. Alexander, Matthew N.O Sadiku. (2013). Fundamentals of Electric Circuits. 5th Edition. Mc Graw Hill.
2. Nilson, J.W.,Riedel, S.A . (2010). Electric Circuits. 9th Edition. Prentice Hall.
3. Irwin, J.D., Nelms, R.M. (2008). Basic Engineering Circuit Analysis. 9th Edition. John Wiley.
4. Robbins, A.H, Miller, W.C. (2006). Circuit Analysis: Theory and Practice. 4th Edition. McGraw Hill.

PLT106/3
DIGITAL ELECTRONICS

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. The aim of this course is to introduce students to the basic knowledge in the digital electronics. The lectures and laboratories cover the following topics: Numbering System, Algebraic Switching, Boolean Function, Combinational Logic and Sequential Logic Circuit.

Course Outcomes

CO1: Ability to explain and use the basic principles of numbering system and basic theory of binary system in digital electronics
CO2: Ability to design and optimizes logic circuit using Boolean functions and Karnaugh maps
CO3: Ability to design digital system applications using combinational and sequential logic design techniques.

References

1. Rosni Abu Kassim, Nooritawati Md Tahir, (2010) Introduction to Electric Circuits, Wiley.
2. David E. Jhonson.(2010). Sistem Digit, Pearson Education, Penerbit Universiti Teknologi Malaysia Press.
3. Floyd. TL. (2009). Digital Fundamentals. 10th Ed. Prentice Hall.
4. Ronald J. Tocci.(2007) Digital Systems – Principles and Applications. 10th Edition, Prentice Hall.
5. Godse, Atul P. Godse, Deepali A. Godse, Gurpreet Singh Ghai. (2007). Digital Electronics, Technical Publications Pune.

PLT107/3
ELECTRONICS 1

Course synopsis

This subject 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. Basic theories, principles and practical are stressed in this course.

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 calculate and analyze the basic biasing circuits using datasheet.

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. Puspa Inayat Khalid, Rubita Sudirman, Siti Hawa Ruslan. (2001). Modul Pengajaran Elektronik 1. Edisi ke-3.

PLT108/3
ENGINEERING SKILLS II

Course synopsis

This is the core subject which is 100% practical and carried out 3 units credit hours. This course contains modules to provide students with engineering skills such as Printed Circuit Board (PCB) fabrication, computer assembled and networking and and electrical domestic wiring.

Course Outcomes

CO1: Ability to apply and construct the basic skills and standard practiced of PCB and electronic component fitting.
CO2: Ability to apply and construct the basic skills and standard practiced of domestic wiring.
CO3: Ability to apply and construct the basic skills and standard practiced of computer assemble and networking

References

1. Haji Md. Nasir. (1997). Panduan Pendawaian Elektrik Domestik. 24th Edition, IBS Buku Sdn. Bhd.
2. Steward, W.E. and Stubbs, T.A. (2005). Modern Wiring Practice: design and installation. 12th Edition, Newnes.
3. Pethebridge, K. and Nesson, I. (2002). Electrical Wiring Practice. 6th Edition, Mc-GrawHill.
4. Othman Shariff, Manual Asas Kerosakan dan Baik Pulih Komputer Peribadi, Venton Publishing,2002.
5. Bruce Hallberg, Networking: A Beginner's Guide, 2005, Mc-GrawHill.

PLT201/3
ELECTRIC CIRCUIT THEORY II

Course Synopsis

This is a core subject. It will expose the students to the circuit analysis using Laplace and Fourier Transform. Student also would able to explain the concept of mutual inductance, frequency response of AC circuit and two port network.

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 explain the concepts of frequency response for AC circuits and derive and analyze Bode plot for various types of transfer function.
CO4: Ability to work in team and communicate effectively.

References

1. Charles K Alexander and Matthew Sadiku. (2013). Fundamentals of Electric Circuits. 5th Edition. McGraw-Hill.
2. Nilsson, J. W. and Riedel, S.A. (2010). Electric Circuits. 9th Edition. Prentice Hall, New Jersey.
3. Dorf, R.C., Svodoba, J.A. (2010). Introduction to electric circuits. 8thEdition. John Wiley.
4. Robert L. Boylestad. (2010). Introductory Circuit Analysis, 12thEdition. Pearson.
5. Hyat W.H., Durbin, S.M., Kimmerly, J.E. (2007). Engineering Circuit Analysis, 7th Edition. McGraw Hill.

PLT202/3
MEASUREMENT & INSTRUMENTATION

Course Synopsis

This course covers topics of introduction to the basic concepts of measurement methods and instrumentation. This course intends to give the students knowledge on measuring devices, bridge methods and transducers.

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. Uday A.Bakshi, Ajay V.Bakshi, K Shiteeja A. Bakshi. (2007). Electrical Measurements and Measuring Instruments. Pune India. Technical Publications Pune.
2. H.S Kalsi. (2003). Electronics Instrumentation. Tata-McGraw Hill.

3. Ruzairi Hj Abdul Rahim, Herlina Abdul Rahim, Nasaruddin Ahmad, Anita Ahmad. (2003). Pengukuran & Instrumentasi Elektrik. Fakulti Kejuruteraan Elektrik. UTM.
4. Jones L.R, Chin, A.F. (1991). Electronic instruments and measurements. 2nd Edition. Prentice Hall.
5. Bell D.A. (1991). Electronics Instrumentation and measurements. 2nd Edition. Prentice Hall.

PLT203/3
ELECTRONICS II

Course Synopsis

This course covers topics of introduction to the basic concepts of electronics. This course intends to give the students knowledge on BJT and FET, Operation amplifier, Op-Amp applications, Feedback circuits and Voltage Regulator.

Course Outcomes

CO1: Ability to analyze dc, small-signal and frequency performance of basic amplifier configurations (bjt and fet).
CO2: Ability to describe the principles operation of some special electronic devices such as triac, ujt, scr and analyze their application in circuits.
CO3: Ability to describe the operation, analyze and design basic non-inverting and inverting amplifiers, summers, difference amplifier, integrator and differentiator.
CO4: Ability to define and differentiate the different types of feedback amplifier and their effects on some amplifier characteristics.
CO5: Ability to describe the operation, analyse and design simple linear and non-linear voltage regulator circuits.

References

1. Boylestad, R.L., Nashelsky, L. (2009). Electronic Devices and Circuit Theory. 10th Edition. Prentice Hall.
2. Adel S. Sedra, Kenneth C. Smith. (2009). Microelectronic Circuits. 6th Edition. Oxford University Press.
3. Donald A. Neamen. (2007). Microelectronics Circuit Analysis and Design. 3rd Edition. McGraw-Hill.
4. Floyd, T. (2008). Electronic Devices. 8th Edition. Pearson Education, Inc.
5. Bogart, T.F. (2004). Electronic Devices and Circuits. 6th Edition. Prentice Hall.

PLT204/3
ELECTROMAGNETIC FIELD 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, magneto statics and dynamics. Student should also understand the theory and application of transmission line.

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 magneto static.
CO4: Ability to apply the concept of electromagnetic in transmission line analysis.

References

1. Matthew N.O. Sadiku. (2008). Element of Electromagnetics. 3rd Edition. Amazon.
2. U.A. Bakshi and A.V.Bakshi. (2007). Electromagnetic Fields. 1st Edition. Technical Publications Pune.
3. Stuart M Wentworth. (2005). Fundamentals of Electromagnetics with Engineering Applications. Wiley.
4. William H.Hayt, John A Buck. (2006). Engineering Electromagnetics. 6th Edition. McGraw Hill. International ed.
5. Fawwaz T Ulaby. (2004). Fundamentals of Applied Electromagnetics. Pearson. Prentice Hall

PLT205/4
ELECTRICAL MACHINES TECHNOLOGY I

Course Synopsis

The practical and laboratory work are designed to give the students the practical perspective of the single phase, three phase transformer and DC machine. Practical based on experiments are the main practical work for the students in this course. They are given the opportunity to fully utilize the current available facilities to realize the knowledge of practical transformer and DC machine.

Course Outcomes

CO1: Ability to define and explain the machinery principle and magnetic circuits and its application to the electrical machines.
CO2: Ability to explain, apply and analyze the operation and performance of a transformer, DC andAC machines.

CO3: Ability to determine and analyze the parameters for DC Machines.
CO4: Ability to apply the related software tools in understanding the principle of electrical machines.

References

1. Kothari. D.P, Nagrath. I.J. (2010). Electric Machines. 4th Edition. Tata McGraw Hill. New Delhi.
2. Stephen J. Chapman. (2005). Electric Machinery Fundamentals. 4th Edition. McGraw-Hill.
3. Wildi, T. (2005). Electrical Machine, Drives and Power System. 6th Edition. Prentice-Hall.

PLT206/3
MICROPROCESSOR SYSTEM & MICROCONTROLLER

Course Synopsis

The aims of this course is to study the PIC 18 microcontroller architecture, its programming language (assembly and C) 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 explain the basic microcontroller architecture.
CO2: Ability to analyze and write a microcontroller programming language in assembly and C program.
CO3: Ability to interface the input and output devices with microcontroller.
CO4: Ability to design a simple microcontroller based system and present in group.

References

1. Katzen, S. (2010). The Essential PIC18® Microcontroller (Computer Communications and Networks). Springer.
2. Brey, B.B. (2008). Applying PIC18 Microcontroller: Architecture, Programming and Interfacing using C and Assembly. Prentice Hall.
3. Mazidi, M.A, Mckinlay, R.D, and Causey, D. (2008). PIC Microcontroller and Embedded Systems: Using Assembly and C for PIC18. Prentice Hall.
4. Bates, M. (2006). Interfacing PIC Microcontrollers: Embedded Design by Interactive Simulation. Newness.
5. Huang, H.W. (2005). PIC Microcontroller: An Introduction to Software and Hardware Interfacing. Thomson & Delmar Learning.

PLT207/3
POWER ELECTRONICS

Course Synopsis

Power Electronics as a multidisciplinary and 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. Power electronics 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 explain 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 design 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. Daniel W. Hart. (2011). Power Electronics. 1st Edition. McGraw Hill.
2. Muhammad H. Rashid. (2004). Power Electronics: Circuits, Devices & Applications. 3rd Edition. Pearson. Prentice Hall.
3. Mohan, Underland, Robbins. (2002). Power Electronics: Converters, Applications & Design. 3rd Edition. John Wiley.
4. Cyril W. Lander. (1994). Power Electronics. 3rd Edition. McGraw Hill.

PLT208/3
COMMUNICATIONS SYSTEM

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. Ian Glover, Peter M. Grant. (2009). Digital Communications. Prentice Hall.
2. Louis E. Frenzel. (2007). Principles of Electronic Communication Systems. McGraw-Hill.
3. William D. Stanley and John M. Jeffords. (2006). Electronic communications: principles and systems. Thomson Delmar Learning.
4. Jeffrey S. Beasley, Gary M. Miller. (2005). Modern electronic Communication. Pearson/Prentice Hall.

PLT209/3
SIGNAL & SYSTEMS

Course Synopsis

This course aims to introduce students the basic of signals and systems. To learn how certain input to a system will produce the required output. Understand 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 characteristic in engineering systems.
CO2: Ability to analyze signals and determine the process of the systems.
CO3: Ability to explain and calculate the system response using variable methods.
CO4: Ability to prepare a report in relevant topics using various resources.

References

1. Charles L. Philips, John M. Parr, Eve A. Riskin. (2003). Signals, Systems and Transforms. 3rd Edition. Prentice Hall International Edition.
2. Simon Haykin, Barry Van Veen. (1999). Signals and Systems. 2nd Edition. Wiley.
3. Fred J. Taylor. (1994). Principles of Signals and Systems. McGraw Hill International Edition.

PLT301/4
ELECTRICAL MACHINES TECHNOLOGY II

Course Synopsis

Electrical Machines Technology II is intended to give the students deep knowledge about the three phase system, single phase, three phase induction motor, synchronous machine, motor starter, testing and maintenance of electrical machines. This course focuses on the following concepts: The practical and laboratory work are designed to give the students the practical perspective of the three phase system, three phase AC motor, open and fix motor, star-delta starter and testing the AC motor. Practical based on experiments are the main practical work for the students in this course. They are given the opportunity to fully utilize the current available facilities to realize the knowledge of practical three phase system and AC motor.

Course Outcomes

CO1: Ability to define and explain the three phase system and its application to the electrical machines.
CO2: Ability to define and explain the single phase, synchronous and three phase motor and its application to the electrical machines.
CO3: Ability to determine and analyze parameters for AC Machines and the used of the motor starter.
CO4: Ability to apply related testing, maintenance and software tools in understanding the principle of electrical machines.

References

1. Stephen J. Chapman. (2011). Electric Machinery Fundamentals. 5th Edition. McGraw-Hill.
2. Bhattacharya S.K. (2009). Electrical Machines. 3rd Edition. McGraw-Hill.
3. D.P. Kothari and I.J. Nagrath Hughes. (2008). Electric Machines. 4th Edition. Tata McGraw-Hill.
4. Theraja B.L. (2007). A Text Book of Electrical Technology, Volume II (Electrical Machines. S. Chand & Company Ltd.
5. Wildi, T. (2005). Electrical Machine, Drives and Power System. 6th. Edition. Prentice-Hall.

PLT302/3
ELECTRICAL INSTALLATION I

Course synopsis

This course uses a combination of theory and practical 'hands on' project assignment to demonstrate and reinforce the principles. Students in this course are expected to work through the project assignments. The project assignments are based on actual installations and projects in low voltage system.

Course Outcomes

CO1: Describe, explain and apply the IEE Regulations and IEC Standards.
CO2: Define the general characteristics of an electrical installation.
CO3: Design electrical lighting and power requirements for building and specific applications.
CO4: Design electrical lighting and power installations for specific application

References

1. N.Hasnizam & M.Rafi. (2011). Lectures Notes: Electrical Installation Design. PPKSE.
2. G.Stokes & J.Bradley. (2009). A Practical Guide To The Wiring Regulations – 17th Edition IEE Wiring Regulations (BS 7671:2008).4th edition. John Wiley & Sons.
3. BSI & IEE. (2008). BS 7671 (2008) Requirements For Electrical Installations – IEE Wiring Regulations. 17th Edition. Polestar Wheatones.
4. T.Linsley. (2008). Basic Electrical Installation Work. 5th edition. UK: Elsevier & Newnes Press.
5. T.Linsley. (2008). Advanced Electrical Installation Work. 5th edition. UK: Elsevier & Newnes Press.

PLT303/3
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 analyze 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. Muhammad H. Rashid. (2004). Power Electronics: Circuits, Devices and Application. Second Edition. Prentice Hall International Inc. New Jersey
2. Gopal K.Dubey. (2001). Fundamentals of Electrical Drives, Second Edition. Alpha Science. Kanpur
3. El-Sharkawi A. Mohamed (2000). Fundamentals of Electric Drives. A division of Thomson Learning. USA
4. Bodea Ion, Nasar A.S. (1999). Electric Drives. CRC Press LLC
5. Vedam Subrahmanyam. (1994). Electric Drives : Concepts and Applications. Tata McGraw-Hill

PLT304/4
ELECTRICAL POWER SYSTEM

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 systems, fault and protection system.

Course Outcomes

CO1: Ability to explain types and operation of power system generations in groups.
CO2: Ability to solve single-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 analyze fault and protection system in power system.

References

1. Hadi Saadat. (2004). Power System Analysis. 3rd Edition. McGraw Hill.
2. Theodore R. Bosela. (2003). Electrical Systems Design. Pearson Education.
3. Dugan, Roger C. (2003). Electrical Power Systems Quality. 2nd Edition. McGraw Hill.
4. Chapman, Stephen J. (2002). Electric Machinery and Power System Fundamental. McGraw Hill.
5. Burke, James J. (1994). Power Distribution Engineering: Fundamentals and Application. Marcel Dekker

PLT305/3
CONTROL SYSTEM TECHNOLOGY

Course synopsis

This course is an introduction to control systems theory involving different areas of applications, comprises of three major parts: Part I - Control Systems Representations -representation of physical systems by differential equation, transfer function, state-space modeling, block diagram techniques and signal flow graph. Part II – Control Systems Performance Analysis - analysis of systems in terms of transient response, stability and steady-state errors. Root locus and frequency response techniques are used for higher order systems. Part III – Control Systems Design - design of controllers and compensators for systems via root locus and frequency response.

Course Outcomes

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

References

1. Nise, N. S. (2008). Control Systems Engineering. 5th edition. John Wiley.
2. Ogata, K. (2002). Modern Control Systems. 4th edition. Addison-Wesley Company.
3. Dorf, R.C. & Bishop, R.H. (2001). Modern Control Systems. 9th edition. Addison-Wesley Company.
4. Kuo, B.C. (1997). Automatic Control Systems. 7th edition. Prentice-Hall Pub Co.

PLT340/4
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.

Course Outcomes

CO1: Ability to apply and integrate theory and practical to solve the engineering problems.
CO2: Ability to develop suitable research methodology for the project.
CO3: Ability to explain a project in a technical report.
CO4: Ability to present and defend effectively project proposal to selected audience.
CO5: Ability to identify commercialization potential for proposed project.

PLT 306/3
ELECTRICAL INSTALLATION DESIGN II

Course synopsis

Maximum efficiency, reliability, and longevity of the various types of generators, exciters, voltage regulators, and uninterruptible power supply are of great concern to many industries. These objectives can only be achieved by understanding the characteristics, selection criteria, common problems and repair techniques, preventive and predictive maintenance. This course covers on diesel generator and uninterruptible power supply used in industrial and commercial facilities. The course also covers the bust duct system and lightning protection system.

Course Outcomes

CO1: Describe the fundamental operations of a backup energy system.
CO2: Describe how generators operate in parallel and design the synchronizing system for parallel generator.
CO3: Apply and design the backup energy system.
CO4: Explain and select the bust duct and performing all necessary calculations.
CO5: Design the lightning protection system for commercial buildings and facilities.

References

1. Paul Cook. (2008). Electrical Installation Design Guide: Calculations for Electricians L.L.J.Mohan. (2003). Diesel Generator Handbook. Butterworth Heinemann.
2. Ismail Kasikci. (2004). Analysis and Design of Low voltage Power Systems. Wiley-Vch Verlag GmBH & Co.
3. K.C. Agrawal. (2001). Industrial Power Engineering and Application Handbook. Butterworth-Heinemann.
4. American National Standards Institute. (1986). ANSI/IEEE Std 944-1986 – IEEE Recommendation Practice for the Application and

Testing of Uninterruptible Power Supplies for Power Generation Stations. The Institute of Electrical and Electronics Engineers.

PLT307/3
PROGRAMMABLE LOGIC CONTROLLER (PLC)

Course Synopsis

The student will be expose to programmable logic controller (PLC), PLC components, PLC programming and operational procedure. PLC is capable to perform more complex motion and process control applications.

Course Outcomes

CO1: Ability to explain ladder diagram that will perform a specified operation using PLC programming.
CO2: Ability to design a specified operation using PLC programming in applications of industrial electronic control.

References

1. Jacob, M. (1995). Industrial Control Electronics. Prentice Hall.
2. Webb, J., Greshock, K. (1993). Industrial Control Electronics. 2nd Edition. Prentice Hall.

PLT308/3
POWER QUALITY

Course Synopsis

This course will help students to understand the basics of the power quality. This course intends to give the students knowledge on power quality terms and definitions.

Course Outcomes

CO1: Ability to apply the basic principles of measurement electrical power transmission.
CO2: Ability to apply the concept of distribution system for current and voltage measurement.
CO3: Ability to apply the concept of power quality.
CO4: Ability to use the basic principle of energy management on power system economics.

References

1. Kusko, A. T., Marc T. (2007). Power Quality in Electrical Systems. McGraw-Hill Professional Publishing.
2. Dugan, R. S., Surya M., Mark F. (2002). Electrical Power Systems Quality. McGraw-Hill Professional Publishing.
3. Kennedy, B. W. (2000). Power Quality Primer. McGraw-Hill Professional Publishing.

PLT309/3
SUBSTATION MAINTENANCE

Course synopsis

This course introduces aspects of the fundamentals and considerations of substation maintenance, configuration, bus bar and safety requirement. This course describes the functions of various substation main equipments, substation auxiliary 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. This course will cover the principle elements of task to maintenance of a substation. Latter in this course, they will learn and practice how to test and maintain substation

Course Outcomes

CO1: Ability to explain fundamentals and considerations of substation design.
CO2: Ability to describe operation, maintenance, selection and functions of substation equipments part and ability to design simple bus bar.
CO3: Ability to measure resistivity and grounding resistance and ability to design and analysis ground grid substation and safety requirement.
CO4: Ability to identify and calculate parameters in protection system of substation equipments caused by internal and external faults.
CO5: Ability to calculate capacity and service substation areas, explain foundation and structure of substation and test some substation equipments.

References

1. John MC Donald. (2007). Electrical Power Substations Engineering. 2nd Edition. CRC Press.
2. Rao, S. (2003). Electrical Substation Engineering & Practice. Khana Publishers.
3. Garzon Ruben D. (2002). High Voltage Circuit Breaker. Marcel Decker Inc.
4. Colin Bayliss. (2002). Transmission and Distribution electrical engineering. Newness.

PLT440/6
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 research area is mainly on electrical engineering technology.

Course Outcomes

CO1: Ability to apply and integrate theory and practical to solve the engineering problems.
CO2: Ability to develop suitable research methodology for the project.
CO3: Ability to explain a complete project in a technical report (dissertation).
CO4: Ability to present and defend effectively project findings to selected audience.
CO5: Ability to identify commercialization potential for developed project.

PLT401/3
POWER SYSTEM PROTECTION AND SWITCHGEAR

Course Synopsis

This course introduces varieties of Circuit Breakers, Isolator, Earthing Switch, Bus-bar and Relays for protection of Generators, Motor, Transformers from short circuit, over voltage and other hazards caused by internal and external faults. This course also describes various Neutral grounding of the equipment related to protection systems.

Course Outcomes

CO1: Ability to explain and calculate restriking phenomenon, operation and selection of switchgear equipment.
CO2: Ability to identify abnormal condition on equipment, application, choice of protective relay correctly.
CO3: Ability to explain causes of overvoltage, Evaluate application of Arrester to equipment protection the related insulation coordination problems and necessity of earthing neutral.

References

1. Gupta J. B. (2010). Switchgear and Protection. S. K. Kataria & Sons.
2. B. Ravindranat and M. Chander (2008). Power System Protection and Switchgear. New Age International Publisher.
3. Rao, S. S (2004). Switchgear Protection and Power Systems. Khanna Publishers.
4. Leslie Hewitson, Mark Brown and Ramesh Balakrishnan(2004). Practical Power Systems Protection. Elsevier.
5. Badri Ram, and D.N (1995). Power System Protection and Switchgear. Tata McGraw-Hill.

PLT402/3
INDUSTRIAL AUTOMATION

Course Synopsis

This course will expose to the students about the properties and applications of concept of automation in industry, industrial automation tool, open and closed-loop process control systems and distinguish between their dynamics, principles of stability, disturbance rejection and robustness of control systems to process variations. The course also provides the student with basic skills useful in identifying the concepts of automated in machines and equipment and describe the terms and phrases associated with industrial automation. This course cover topics related to control pressure, level, temperature, flow and automation in the process industry. These include a study on industrial sensors and actuators, industrial controllers such as computer-based control. The control strategies for specific process applications and the applications of PLC's to industrial processes and design PLC programs to solve sequential control problems are also provide in this course.

Course Outcomes

CO1: Ability to describe the properties and applications of concept of automation in industry, industrial automation tool, open- and closed-loop process control systems and distinguish between their dynamics, principles of stability, disturbance rejection and robustness of control systems to process variations.
CO2: Ability to describe, summarise and evaluate of hydraulic, pneumatic and electronic automation systems, the operation of the different controller modes and their practical limitations, determine their response to standard inputs and to process disturbances in open- and closed-loop, the stability of given control systems.
CO3: Identify and outline the common control strategies for specific process applications, and the applications of PLC's to industrial processes and design PLC programs to solve sequential control problems.

References

1. Terry Bartelt (2006). Industrial Control Electronics; Devices, Systems and Application. Third Edition. Thomson Delmar Learning.
2. C. D. Johnson (2002). Process Control Instrumentation Technology. Prentice Hall.
3. Poppovik Bhatkar. Distributed Computer Control for Industrial Automation. Dekkar Publications.
4. Webb and Reis. Programmable Logic Controllers: Principles and Applications. PHI.

5. S.K.Singh. Computer Aided Process Control. PHI.

PLT403/3
HIGH VOLTAGE TECHNOLOGY

Course Synopsis

This course focus on phenomena of high voltage surges and insulation coordination for power systems, characteristics of conduction and breakdown of gas, liquid and solid dielectrics, generation of high voltages and currents, measurement of high voltages and currents, `non-destructive testing (NDT) for high voltage components, detection and measurement of discharge process.

Course Outcomes

CO1: Ability to explain the concept of high voltage engineering and calculate various breakdown parameters and identify applications of vacuum dielectrics, liquid dielectrics, solid dielectrics, and composite dielectrics.
CO2: Ability to explain, calculate and analyze the concept of generations and measurements of high voltage AC, DC, Impulse voltage and impulse current generators.
CO3: Ability to explain the over-voltage phenomena and the related insulation coordination problems and analyze types of high voltage testing for electrical apparatus and non-destructive materials.

References

1. S. Naidu & V. Kamaraju (2003). High Voltage Engineering. 3rd Edition. McGrawHill.
2. E. Kuffel & M. Abdullah (2000). High Voltage Engineering. 2rd Edition. Pergamon Press.
3. Arrilaga, J (1998). High Voltage Direct Current Transmission. 2rd Edition. IEE.
4. Davies T (1998). Protection of Industrial Power Systems. 2nd Edition. Newness.

PLT404/3
RENEWABLE ENERGY

Course Synopsis

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

Course Outcomes

CO1: Ability to explain the fundamental principles of major renewable energy technologies.
CO2: Ability to analyze and solve problems on both technical and economic aspect of renewable energy systems.
CO3: Ability to design and evaluate appropriate system configuration based on given application.

References

1. John Twidell and Anthony D. Weir (2006). Renewable Energy Resources. 2nd Edition. Taylor & Francis.
2. John A. Duffie, William A. Beckman. (2006). Solar Engineering of Thermal Processes. John Wiley & Sons.
3. Mukund R. Patel. (2005). Wind and Solar Power Systems: Design, Analysis and Operation. 2nd Edition. CRC Press.
4. Gilbert M. Masters. (2004). Renewable and Efficient Electrical Power Systems. John Wiley & Sons.
5. J. Larminie, A. Dicks. (2003). Fuel Cells System Explained. 2nd Edition. John Wiley & Sons.

PLT405/3
ENERGY EFFICIENCY AND MANAGEMENT

Course Synopsis

This course exposes the students to the energy efficiency and energy management in order to reduce energy costs and promote economic and environmental sustainability. At the end of this course, students will be exposed to the techniques for energy audit such as analyzing energy consumptions and design a solution for energy saving programs. In addition, safety aspect of electrical equipment will also be exposed to the student to create awareness and safe working practice.

Course Outcomes

CO1: Ability to apply the basic principles of measurement electrical power transmission.
CO2: Ability to apply the concept of distribution system for current and voltage measurement.
CO3: Ability to apply the concept of power quality.
CO4: Ability to use the basic principle of energy management on power system economics.

References

1. Frank Kreith and D. Yogi Goswami (2008). Energy Management and Conservation Handbook. CRC Press.

2. Frank Kreith, Ronald E. West (2007). CRC Handbook of Energy Efficiency. CRC Press.
3. Wayne C. Turner (2005). Energy Management Handbook. Fairmont Press Inc.
4. Gilbert M. Masters. (2004). Renewable And Efficient Electric Power Systems. John Wiley and Sons.
5. 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.

FACULTY OF ENGINEERING TECHNOLOGY
DEPARTMENT OF ELECTRICAL ENGINEERING
BACHELOR OF ELECTRICAL ENGINEERING TECHNOLOGY (Hons) (ROBOTIC & AUTOMATION TECHNOLOGY)

Programme Educational Objective

PEO1
Graduates are leaders in the field of electrical engineering as demonstrated through career advancement.

PEO2
Graduates who are members and contribute to professional society.

PEO3
Graduates pursue continuing education opportunities.

PEO4
Graduates make contributions through research and development.

PEO5
Graduates who are entrepreneurs.

Programme Outcomes (PO)

PO1
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialisation principles to defined and applied engineering procedures, processes, systems or methodologies;

PO2
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialisation

PO3
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns

PO4
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources

PO5
Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations

PO6
Function effectively as individuals, and as members or leaders in diverse technical teams

PO7
Communicate effectively with the engineering community and society at large

PO8
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities

PO9
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices

PO10
Demonstrate an awareness of management, business practices and entrepreneurship

PO11
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development

PO12
Recognise the need for professional development and to engage in independent and lifelong learning

STRUCTURE CURRICULUM BACHELOR OF ELECTRICAL ENGINEERING TECHNOLOGY (ROBOTIC & AUTOMATION TECHNOLOGY) – RY32

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
DISCIPLINE CORE ((108)	PLT 101/3 Computer programming	PLT105/3 Electric Circuit Theory I	PLT 202/3 Measurement & Instrumentation	PLT 206/3 Microcontroller Systems	PLT303/3 Electrical Drives	PLT 340/4 Final Year Project I	PLT 440/6 Final Year Project II	PIT4XX/12 Industrial Training
	PLT 102//2 Computer Aided Drafting (CAD)	PLT 106/3 Digital Electronics	PLT121/3 Electrical Technology	PLT 209/3 Signal and Systems	PLT 305/3 Control System Technology	PLT 307/3 Programmable Logic Controller (PLC)	PLT421/3 Industrial Management and Quality Control	
	PCT 111/3 Engineering Skills I	PLT107/3 Electronics I	PLT221/3 Principles of Thermo fluid and Materials	PLT324/3 Manufacturing Processes	PLT321/3 Industrial Networking	PLT322/3 Industrial Process Control	PLT422/3 Mechatronic Systems	
		PLT 108/3 Engineering Skills II	PLT222/3 Applied Mechanics	PLT223/3 Machine Design	PLT323/3 Introduction to Robotics	PLT326/3 Industrial Automation	PLT 4xx/3 Elective II	
				PLT224/3 Pneumatics & Hydraulic Systems	PLT325/3 Manufacturing Support System	PLT327/3 Industrial Robotics		
						PLT 3xx/3 Elective I		
COMMON CORE (18)	PQT 111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II	PQT 213/3 Mathematics for Engineering Technology III					
	PLT 104/3 Engineering Science				PTT 333/3 Engineering Technology Management		PTT 444/3 Engineering Technologist in Society	
UNIVERSITY REQUIRED (19)	UUW 235/2 Ethnic Relation	UVW XXX/0 Foundation English 1	UVW XXX/2 Foundation English 2	UVW 312/2 English for Technical Communication				
	UUT122/2 Skills & Technology in Communication	UUW 233/2 Islamic Civilization and Asia Civilization	UVW 410/2 University Malay Language	UUW 224/2 Engineering Entrepreneurship	UUW 322/2 Thinking Skills			
	UZW XXX/1 Co-Curricular Activity	UZW XXX/1 Co-Curricular Activity	UZW XXX/1 Co-Curricular Activity					
145	19	18	20	19	20	19	18	12
Total Units for Graduation 145								

Elective I Elective II
A1: PLT 329/3 Advanced Control System B1: PLT 423/3 Material Handling and Identification
A2: PLT 328/3 Robotic Control B2: PLT 424/3 Automated Guided Vehicle

COURSE SYLLABUS

PLT102/2
COMPUTER AIDED DRAFTING (CAD)

Course synopsis

This is a core subject. It will expose the students to understand the concepts of Computer Aided Drafting. Student also would able to illustrate engineering drawing, 2D & 3D modelling and construct a product drawing.

Course Outcomes

CO1: Ability to apply fundamental concepts of Computer Aided Drafting.
CO2: Ability to illustrate engineering drawing by using proper techniques.
CO3: Ability to use of Computer Aided Drafting to construct a simple product drawing.
CO4: Ability to perform in groups to illustrate 2D and 3D modeling.

References

1. Alan J Kalameja. (2008). AutoCAD 2008 Tutor for Engineering Graphics'. Delmar Learning.
2. James A. Leach. (2007). AutoCAD 2007 instructor: a student guide to complete coverage of Autocad's commands and features. McGraw Hill.
3. David Frey. (2007). AutoCAD 2007 & AutoCAD LT 2007: no experience required. In:Wiley.
4. Paul Whelan; alih bahasa, T.H. Lai. (1999). AutoCAD LT:cara mudah. Federal Publications.

PLT104/3
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.
CO4: Ability to work in team and communicate effectively.

References

1. William D. Callister, Jr. (2007). Materials Science and Engineering: An Introduction. 7th ed.
2. Yunus A. Cengel, Robert H. Turner. (2005). Fundamentals of Thermal-Fluid Sciences. Int ed. McGraw-Hill.
3. Lim Poh Seng, Tay Seng How, Koh Kok Pin. (2003). Strength of Materials for Polytechnic. Revised ed. Prentice Hall.
4. Robert L. Mott. (2006). Applied Fluid Mechanics. 6th ed. Pearson.

PLT105/3
ELECTRIC CIRCUIT THEORY 1

Course synopsis

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

Course Outcomes

CO1: Ability to derive importantequations to solve problems in 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 circuit parameters containing sinusoidal steady-state sources using complex impedances and phasor representations.

References

1. Nilson, J.W.,Riedel, S.A . (2010). Electric Circuits. 9th Edition. Prentice Hall.
2. Irwin, J.D., Nelms, R.M. (2008). Basic Engineering Circuit Analysis. 9th Edition. John Wiley.
3. Robbins, A.H, Miller, W.C. (2006). Circuit Analysis: Theory and Practice. 4th Edition. McGraw Hill.

PLT106/3
DIGITAL ELECTRONICS

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.

The aim of this course is to introduce students to the basic knowledge in the digital electronics. The lectures and laboratories cover the following topics: Numbering System, Algebraic Switching, Boolean Function, Combinational Logic and Sequential Logic Circuit.

Course Outcomes

CO1: Ability to explain and use the basic principles of numbering system and basic theory of binary system in digital electronics
CO2: Ability to design and optimizes logic circuit using Boolean functions and Karnaugh maps
CO3: Ability to design digital system applications using combinational and sequential logic design techniques.

References

1. Rosni Abu Kassim, Nooritawati Md Tahir, (2010) Introduction to Electric Circuits, Wiley.
2. David E. Jhonson.(2010). Sistem Digit, Pearson Education, Penerbit Universiti Teknologi Malaysia Press.
3. Floyd. TL. (2009). Digital Fundamentals. 10th Ed. Prentice Hall.
4. Ronald J. Tocci.(2007) Digital Systems – Principles and Applications. 10th Edition, Prentice Hall.
5. Godse, Atul P. Godse, Deepali A. Godse, Gurpreet Singh Ghai. (2007). Digital Electronics, Technical Publications Pune.

PLT107/3
ELECTRONICS 1

Course synopsis

This subject 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. Basic theories, principles and practical are stressed in this course.

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 calculate and analyze the basic biasing circuits using datasheet.

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. Puspa Inayat Khalid, Rubita Sudirman, Siti Hawa Ruslan. (2001). Modul Pengajaran Elektronik 1. Edisi ke-3.

PLT108/3
ENGINEERING SKILLS II

Course synopsis

This is the core subject which is 100% practical and carried out 3 units credit hours. This course contains modules to provide students with engineering skills such as Printed Circuit Board (PCB) fabrication and design module and electrical domestic wiring.

Course Outcomes

CO1: Ability to use OrCAD software to construct PCB circuit board.
CO2: Ability to apply and construct the basic skills and standard practiced of PCB layout design and fabrication process.
CO3: Ability to apply and construct the basic skills and standard practiced of domestic wiring.

References

1. Steward, W.E. and Stubbs, T.A. (2005). Modern Wiring Practice: design and installation. 12th Edition, Newnes.

2. William J.Palm III. (2001). MATLAB for Engineering Students. McGraw Hill.
3. ORCAD Capture & Layout User's Guide Manual. Cadence design Systems, Inc.
4. Pethebridge, K. and Nesson, I. (2002). Electrical Wiring Practice. 6th Edition, Mc-GrawHill.

PLT121/3
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*. 2ndEdition, Wiley.

PLT202/3
MEASUREMENT & INSTRUMENTATION

Course Synopsis

This course covers topics of introduction to the basic concepts of measurement methods and instrumentation. This course intends to give the students knowledge on measuring devices, bridge methods and transducers.

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. Uday A.Bakshi, Ajay V.Bakshi, K Shiteeja A. Bakshi. (2007). Electrical Measurements and Measuring Instruments. Pune India. Technical Publications Pune.
2. H.S Kalsi. (2003). Electronics Instrumentation. Tata-McGraw Hill.
3. Ruzairi Hj Abdul Rahim, Herlina Abdul Rahim, Nasaruddin Ahmad, Anita Ahmad. (2003). Pengukuran & Instrumentasi Elektrik. Fakulti Kejuruteraan Elektrik. UTM.
4. Jones L.R, Chin, A.F. (1991). Electronic instruments and measurements. 2nd Edition. Prentice Hall.
5. Bell D.A. (1991). Electronics Instrumentation and measurements. 2nd Edition. Prentice Hall.

PLT206/3
MICROPROCESSOR SYSTEM & MICROCONTROLLER

Course Synopsis

The aims of this course is to study the PIC 18 microcontroller architecture, its programming language (assembly and C) 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 explain the basic microcontroller architecture.
CO2: Ability to analyze and write a microcontroller programming language in assembly and C program.
CO3: Ability to interface the input and output devices with microcontroller.
CO4: Ability to design a simple microcontroller based system and present in group.

References

1. Katzen, S. (2010). The Essential PIC18® Microcontroller (Computer Communications and Networks). Springer.

2. Brey, B.B. (2008). Applying PIC18 Microcontroller: Architecture, Programming and Interfacing using C and Assembly. Prentice Hall.
3. Mazidi, M.A, Mckinlay, R.D, and Causey, D. (2008). PIC Microcontroller and Embedded Systems: Using Assembly and C for PIC18. Prentice Hall.
4. Bates, M. (2006). Interfacing PIC Microcontrollers: Embedded Design by Interactive Simulation. Newness.
5. Huang, H.W. (2005). PIC Microcontroller: An Introduction to Software and Hardware Interfacing. Thomson & Delmar Learning.

PLT209/3
SIGNAL & SYSTEMS

Course Synopsis

This course aims to introduce students the basic of signals and systems. To learn how certain input to a system will produce the required output. To understand 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 characteristic in engineering systems.
CO2: Ability to analyze signals and determine the process of the systems.
CO3: Ability to explain and calculate the system response using variable methods.
CO4: Ability to prepare a report in relevant topics using various resources.

References

1. Charles L. Philips, John M. Parr, Eve A. Riskin. (2003). Signals, Systems and Transforms. 3rd Edition. Prentice Hall International Edition.
2. Simon Haykin, Barry Van Veen. (1999). Signals and Systems. 2nd Edition. Wiley.
3. Fred J. Taylor. (1994). Principles of Signals and Systems. McGraw Hill International Edition.

PLT221/3
PRINCIPLES OF THERMO FLUID 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*.

PLT222/3
ENGINEERING MECHANICS

Course Synopsis

This course covers vector representation of forces, moments and couples of static equilibrium of particles, rigid body and engineering structures, together with analysis of external and internal forces in structure via the methods of free body diagram and properties of cross-sectional areas. The course also elaborates on kinematics and kinetics of system of particles and a rigid bodies in two and three-dimensional spaces covering force and acceleration, linear and angular momentum and energy conservation.

Course Outcomes

CO1: Ability to apply the basic principles of statics and dynamics on mechanism and bodies.
CO2: Ability to analyse systems/ problems related to forces, loads, displacement for bodies at rest.
CO3: Ability to analyse systems/ problems related to forces, loads, displacement for bodies in motion.

References

1. RC Hibeler, *Engineering Mechanics: Statics and Dynamics*, 12th Edition, Pearson Prentice Halls, 2010.
2. Bedford and Fowler, Engineering Mechanics: Statics and Dynamics, 5th Edition, Pearson Prentice Halls, 2007.
3. Richard G. Budynas and J. Keith Nisbet (2008). *Shigley's Mechanical Engineering Design*. 8th Ed., McGraw Hall.
4. Charles E. Wilson and J. Peter Sandler (2006). *Kinematics and Dynamics of Machinery.*3rd Ed., Pearson Prentice-Hall.

PLT 223/3
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, applies, and organizes 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.* 5rd 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.

PLT224/3
PNEUMATICS AND HYDRAULIC SYSTEM

Course synopsis

This course discusses basic pneumatics, sensors, electro-pneumatics and hydraulics technologies that are related to industrial application. Students will study the construction and design of circuit by eans of example and exercises.

Course Outcomes

CO1: Ability to differentiate and explain type of hydraulics and pneumatics motor, drive and sensors and drive requirements.
CO2: Ability to justify and analyze power of hydraulics and pneumatics drives parameters based on load characteristics.
CO3: Ability to explain and calculate converters parameters for hydraulics and pneumatics drives.

References

1. Pepperl and Fuchs, Training Package Sensoric, Pepperl and Fuchs 2005.
2. Crosser P., Thomson, J. Basic Pneumatics Textbook, 3rd, Ed. FESTO Didactic, 2002.
3. Jay F. Hooper, Basic Pneumatics, Caroline Academic Press, 2003.

PLT303/3
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 analyze 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. Muhammad H. Rashid. (2004). Power Electronics : Circuits, Devices and Application. Second Edition. Prentice Hall International Inc. New Jersey

2. Gopal K.Dubey. (2001). Fundamentals of Electrical Drives, Second Edition. Alpha Science. Kanpur
3. El-Sharkawi A. Mohamed (2000). Fundamentals of Electric Drives. A division of Thomson Learning. USA
4. Bodea Ion, Nasar A.S. (1999). Electric Drives. CRC Press LLC
5. Vedam Subrahmanyam. (1994). Electric Drives : Concepts and Applications. Tata McGraw-Hill

PLT305/3
CONTROL SYSTEM TECHNOLOGY

Course synopsis

This course is an introduction to control systems theory involving different areas of applications, comprises of three major parts: Part I - Control Systems Representations -representation of physical systems by differential equation, transfer function, state-space modeling, block diagram techniques and signal flow graph. Part II – Control Systems Performance Analysis - analysis of systems in terms of transient response, stability and steady-state errors. Root locus and frequency response techniques are used for higher order systems. Part III – Control Systems Design - design of controllers and compensators for systems via root locus and frequency response.

Course Outcomes

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

References

1. Nise, N. S. (2008). Control Systems Engineering. 5th edition. John Wiley.
2. Ogata, K. (2002). Modern Control Systems. 4th edition. Addison-Wesley Company.
3. Dorf, R.C. & Bishop, R.H. (2001). Modern Control Systems. 9th edition. Addison-Wesley Company.
4. Kuo, B.C. (1997). Automatic Control Systems. 7th edition. Prentice-Hall Publishing Company.

PLT307/3
PROGRAMMABLE LOGIC CONTROLLER (PLC)

Course Synopsis

The student will be expose to programmable logic controller (PLC), PLC components, PLC programming and operational procedure. PLC capable to perform more complex motion and process control applications.

Course Outcomes

CO1: Ability to explain ladder diagram that will perform a specified operation using PLC programming.
CO2: Ability to design a specified operation using PLC programming in applications of industrial electronic control.

References

1. Jacob, M. (1995). Industrial Control Electronics. Prentice Hall.
2. Webb, J., Greshock, K. (1993). Industrial Control Electronics. 2nd Edition. Prentice Hall.

PLT321/3
INDUSTRIAL NETWORKING

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.

PLT322/3
INDUSTRIAL PROCESS CONTROL
(Pre Requisite: PLT 305/3 Control System Technology)

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.

PLT323/3
INTRODUCTION TO 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*. Mc Graw 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.

PLT324/3
MANUFACTURING PROCESS

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.

PLT325/3
MANUFACTURING SUPPORT SYSTEM

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.

PLT326/3
INDUSTRIAL 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"

PLT327/3
INDUSTRIAL 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.

PLT 328/3
ROBOTIC CONTROL
(ELECTIVE A1)

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.

PLT 329/3
ADVANCED CONTROL SYSTEM
(ELECTIVE A2)

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

PLT340/4
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.

Course Outcomes

CO1: Ability to apply and integrate theory and practical to solve the engineering problems.
CO2: Ability to develop suitable research methodology for the project.
CO3: Ability to explain a project in a technical report.
CO4: Ability to present and defend effectively project proposal to selected audience.
CO5: Ability to identify commercialization potential for proposed project.

PLT421/3
INDUSTRIAL MANAGEMENT AND 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

PLT422/3
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

PLT 423/3
MATERIAL HANDLING AND IDENTIFICATION
(ELECTIVE B1)

Course Synopsis

This course introduces important concepts of material handling and identification and their applications in automation systems. The concepts include Introduction to Material Transport Sytem, Conveyor system, Storage System, Automated Storage System, Automated Identification and Data Technology, Industrial Machine and Vision System.

Course Outcomes

CO1: Ability to explain and analyze the material handling system and its relationship with assembly process
CO2: Ability to explain and analyze the automated storage system
CO3: Ability to explain and analyze the automated identification and data capture technology systems.
CO4: Ability to explain and analyze application of industrial machine vision system.

References

1. Mikell P. Groover (2001), "Automation, Production Systems, and Computer-Integrated Manufacturing" 2nd Edition, Prentice Hall
2. Plant Layout and Material Handling Innovative Automatic Identification and Location-Based Services
3. Alexander Hornberg (2007),"Handbook of Machine Vision" 2nd Edition, Wiley Publication

PLT 424/3
AUTOMATED GUIDED VEHICLE
(ELECTIVE B2)

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

PLT440/6
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 research area is mainly on electrical engineering technology.

Course Outcomes

CO1: Ability to apply and integrate theory and practical to solve the engineering problems.
CO2: Ability to develop suitable research methodology for the project.
CO3: Ability to explain a complete project in a technical report (dissertation).
CO4: Ability to present and defend effectively project findings to selected audience.
CO5: Ability to identify commercialization potential for developed project.

Career opportunities

Robotics and Automation Engineering 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
- Education and training (universities, polytechnics and colleges)

BACHELOR OF ELECTRONIC ENGINEERING TECHNOLOGY (Hons) ELECTRONIC SYSTEM

PROGRAMME OBJECTIVES (PEO)

PEO 01
Electronic System Technology graduates who are competent in both technology theory and practice.

PEO 02
Electronic System Technology graduates who are able to demonstrate leadership and contribute to team success and manage projects in a multi-disciplinary environment.

PEO 03
Electronic System Technology graduates who are able to make contributions to knowledge.

PEO 04
Electronic System Technology graduates who are able to demonstrate an ethical commitment to the community.

PROGRAMME OUTCOMES (PO)

PO 01
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialization principles to defined and applied engineering procedures, processes, systems or methodologies;

PO 02
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialization;

PO 03
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns;

PO 04
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources;

PO 05
Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations;

PO 06
Function effectively as individuals, and as members or leaders in diverse technical teams;

PO 07
Communicate effectively with the engineering community and society at large;

PO 08
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities;

PO 09
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices;

PO 10
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development;

PO 11
Demonstrate an awareness of management, business practices and entrepreneurship and Engineering Management;

PO 12
Recognize the need for professional development and to engage in independent and lifelong learning.

STRUCTURE CURRICULUM BACHELOR OF ELECTRONIC ENGINEERINGTECHNOLOGY (Honours) (ELECTRONIC SYSTEM) – RY40

YEAR	FIRST					SECOND					THIRD				FOURTH			
SEM	I		II			III		IV			V		VI		VII		VIII	
Discipline Core (102)	PGT 101/3 Electric Circuit Principles	3	PGT 105/3 Electrical Engineering Technology	3	INDUSTRIAL EXPOSURE (IndEX) - 1 WEEK	PGT 211/3 Electromagnetic Theory	3	PGT 213/3 Analogue Electronics II	3	INDUSTRIAL ENTREPRENEURSHIP - 2 DAYS	PGT 301/3 Communication System	3	PGT 300/4 Final Year Project I	4	PGT 400/6 Final Year Project II	6	PXX 4XX/12 Industrial Training	12
	PGT 102/3 Engineering Science	3	PGT 104/3 Digital Electronics	3		PGT 201/3 Microprocessor	3	PGT 206/3 Computer Architecture	3		PGT 320/3 Power Electronics	3	PGT 312/3 Modern Control Systems	3				
	PGT 103/3 Computer Technology	3	PGT 106/3 C Programming	3		PGT 202/3 Analogue Electronics I	3	PGT 220/3 VLSI Design	3		PGT 330/3 Microelectronic Fabrication Technology	3	PGT 332/3 Semiconductor Packaging	3	PGT 420/3 Instrumentation	3		
	PGT 120/3 Engineering Material	3	PGT 107/2 Writing in Engineering Technology	2		PGT 207/3 Object Oriented Programming	3	PGT 205/3 Signal and Systems	3		PGT 331/3 Nanoelectronic Fundamental	3	PGT 333/3 Reliability & Failure Analysis	3	PGT 4XX/3 Elective II	3		
													PGT 3XX/3 Elective I	3	PGT 4XX/3 Elective III	3		
Common Core (21)	PQT 111/3 Mathematics for Engineering Technology I	3	PQT 112/3 Mathematics for Engineering Technology II	3		PQT 213/3 Mathematics for Engineering Technology III	3	PQT 274/3 Statistics for Engineering Technology	3		PTT 333/3 Engineering Technology Management	3	PTT 444/3 Technologist in Society	3				
	PCT111/3 Engineering Skills	3																
University Required (19)			UVW 410/2 University Malay Language	2		UUW 224/2 Engineering Entrepreneurship	2	UUW 235/2 Ethnic Relation	2		UUW 322/2 Thinking Skills	2						
			UUT 122/2 Skills and Technology in Communication	2		UVW 312/2 English for Technical Communication	2	UUW 233/2 Islamic Civilization and Asia Civilisation	2		UUW XXX/2 Option Subjects	2						
	UZWXXX/1 Co-Curriculum	1	UZWXXX/1 Co-Curriculum	1		UZWXXX/1 Co-Curriculum	1											
Unit		19		19			20		19			19		19		15		12

Elective I : PGT 334/3-Nanosystem Design **OR** PGT 323/3-Verification on Chip
Elective II : PGT 430/3-Micro-Electro-Mechanical System **OR** PGT 421/3-Artificial Intelligent System
Elective III : PGT 310/3-Digital Signal Processing **OR** PGT 431/3-Optoelectronic System

TOTAL UNITS FOR GRADUATION = 142

COURSE SYLLABUS

DISCIPLINE CORE

PGT 101/3
Electric Circuit Principles

Course Synopsis

This course covers introduction to the basic of electrical measurements, Ohm's Law, Series and Parallel Circuits, Circuit Theorems and Conversions and RLC circuits. This course will expose the students to the elements and principles of electrical circuit theory with appropriate to any RLC circuit applications. The laboratory sessions will complement the theories given in a class.

References

1. Thomas L. Floyd. Principles of Electric Circuits, Pearson Prentice Hall, 2009 (Floyd 9e)
2. Alenxander and Sadiku. Fundamentals Of Electric Circuits, McGraw-Hill, 2007
3. Nilsson and Riedel, Electric Circuits, Pearson Prentice Hall, 2008
4. Thomas L.Floyd, Electric Circuit Fundamental 8 Edition

PGT 102/3
Engineering Science

Course Synopsis

This course covers introduction to physic and science which are force and motion, circular motion, work, power and energy, electrostatic, magnetism and electric current and resistance. Fundamental physics is combined with problem solving and engineering skills through suitable experiments. This course will expose the students to the elements and principles of basic concepts of physics and its application.

References

1. Jerry Wilson, Anthony Buffa. "College Physics", 7th ed., Pearson Education,2009
2. Giambattista, Richardson, Richardson, "College Physics", McGraw Hill Internationatial Ed., 2007.
3. Stephen T.Thornton, Andrew Rex. "Modern Physics for Scientists & Engineers", 2nd ed, Brooks Cole, 1999.
4. W. Bolton. "Engineering Science". Fourth Edition. Newnes. 2001

PGT 103/3
Computer Technology

Course Synopsis

This course prepares the student to be familiar with computer hardware and software available in the market. The hardware includes CPU, memories and I/O such as monitor, keyboard and mouse. Computer software contains various Operating Systems (OS) such as Android, GNU/Linux, Microsoft and Apple based OS. Introduction to Free Open Source Software (FOSS) concept and philosophy, various applications such as Office Suite (word processor and spread sheet) will be explained.

References

1. Randal E. Bryant and David R. O'Hallaron, "Introduction to Computer Systems: A Programmer's Perspective", Second edition Prentice Hall.
2. William Stallings " Computer Organization and Architecture", Eight edition Pearson
3. M. Morris Mano, "Computer System Architecture", Third Edition, Prentice-Hall.
4. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization", Fifth Edition, McGraw Hill

PGT 120/3
Material Engineering

Course Synopsis

The course is tailored to give students a broad introduction to material properties and limitations. The subject will cover class of material properties, measurement of the properties, and fundamental knowledge to make material selection with better properties. The common micro-structural features of different material classes will be outlined in order to relate material with its process as well as performance.

References

1. Ashby, M., Shercliff, H. and Cebon, D., A., (2007). Materials: engineering, science, processing, and design, Elsevier.
2. Ashby, M. and Jones, D.R.H. (2005). Engineering Materials I: An Introduction to Properties, Applications, and Design, 3rd Edition, Elsevier, Butterworth Heinemann.
3. Ashby, M. and Jones, D.R.H. (2006). Engineering Materials II: An Introduction to Microstructure, processing, and design, 3rd Edition, Elsevier, Butterworth Heinemann.
4. Sharma, C.P. (2004). Enginjeering material properties and applications of metal and alloys, Prentice Hall, New Delhi.
5. Rajput, R.K. (2000). Engineering Materials. S.Chand & Companu, New Delhi.

PGT 105/3
Electrical Engineering Technology

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.

References

1. Chapman S.J., "Electric Machinery Fundamentals", Fifth Edition, 2009, McGraw Hill, Singapore.
2. C.S Rangan, G.R. Sarma & V.S. Mani, "Instrumentation Devices & System" Tata, McGraw-Hill Publishing Company Limited, 2004.
3. Bhas S. Guru & Huseyin R. Hiziroglu, "Electric Machinery and Transformers", 2001, Oxford University Press.
4. A.K. Sawhney & P.Sawhney, "A Course in Electronic and Electrical Measurement and Instrumentation" Dhanpat Rai & Co. (P) Ltd., 2001.
5. Z.A. Yamayee & J.L. Bala, " Electromechanical Energy Devices & Power Systems", 1994, Wiley & Sons, USA.

PGT 104/3
Digital Electronics

Course Synopsis

Introduction and discussion of fundamental of digital circuit design and analysis. The lecture and tutorial 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. Thomas L. Floyd, "Digital Fundamentals:,10th Ed., Pearson Prentice Hall, 2009.
2. Floyd. TL, "Digital Fundamentals", 9th Ed., Prentice Hall, 2006.
3. Ronald J. Tocci, "Digital Systems – Principles and Applications", 7th Ed., Prentice Hall, 2003.
4. Nigel, P.C. "A First Course in Digital Electronics", 1st Ed., Prentice Hall, 1999.

PGT 106/3
C Programming

Course Synopsis

This course introduces basic programming using high-level language (C language). The main objective of this course is to prepare the students with the ability of problem solving with programming, to be able to do analysis with programming tools such as flowcharts and pseudo code and then to implement them by developing C programmes.

References

1. Deitel and Deitel, Sudin, S.,Ahmad, R.B. and Yacob, Y., "C How To Program", Pearson-Prentice Hall, 2012.
2. Cheng, H., "C for Engineers and Scientists", McGraw Hill, 2010.
3. Hanly, J.R. and Koffman, E.B., "Problem Solving and Program Design in C", 6th Ed., Pearson, 2007.
4. Sprankle and Maureen, "Problem Solving and Programming Concepts" 7th Ed., Prentice Hall, 2006.
5. Etter, D.M., "Engineering Problem Solving with C", 3rd Ed., Prentice Hall, 2004.

PGT 107/2
Writing in Engineering Technology

Course Synopsis

To expose the students to the common requirements and expectations of writing as an engineering technologist; as well as to the format and techniques of writing various types of engineering technology documents.

References

1. Leo Finkelstein Jr (2008). Pocket Book of Technical Writing for Engineers and Scientist, 3rd Ed. (New York: McGraw Hill International Edition
2. Beer, D. (2009). A Guide to Writing as an Engineer, 3rd Ed. (John Wiley, USA)
3. Pfeiffer, W. S., Adkins, K. E. (2010). Technical Communication – A Practical Approach, 7th Ed. (Pearson, USA)
4. Lannon, J. M, Gurak, L. J. (2011) Technical Communication, 12th Ed. (Longman).

PGT 211/3
Electromagnetic Theory

Course Synopsis

This is the first course in Electromagnetic Field Theory at the undergraduate level. It provides basic concepts and understanding of fundamental laws of electrostatics and magnetostatics . Applications of these laws for different field configurations are also introduced. The course also introduces transmission line theory and the use of transmission

lines as circuit elements. Calculation of transmission line parameters like VSWR, reflection coefficient and impedance matching using Smith's chart is also included in this course.

References

1. Fawwaz T. Ulaby, Eric Micielssen, Umberto Ravaioli, "Fundamentals of Applied Electromagnetics", Pearson (Prentice Hall) 2010.
2. Stuart M. Wentworth, "Applied Electromagnetics", John Wiley, USA, 2007.
3. Stuart M. Wentworth, "Fundamental of Electromagnetics with Engineering Applications", Wiley edition, 2005.

PGT 201/3
Microprocessor

Course Synopsis

The aim of this course is to study the Intel 8085 microprocessor architecture and relate that knowledge to the design of microprocessor based systems. This includes the design technique for designing memory, input and output for the systems. The study of 8085 instruction set and various software development tools are also emphasized as the knowledge are needed in the design of the microprocessor-based systems.

PGT 202/3
Analog Electronics I

Course Synopsis

This course exposes the student the basic knowledge in analog electronic. The exposure encompasses amplifier design based on bipolar and field effect transistors, for single and multi stage, power amplifier, frequency response analysis of amplifiers. Emphasis is placed on basic design aspects and applications. The course has been designed to provide basic analog electronic skills covering theories and practices.

PGT 207/3
Object-Oriented Programming

Course Synopsis

This course discuss object-oriented problem solving in Java, with attention to general as well as language-specific issues including applications, event-driven programming; elements of graphical user interfaces (GUIs); inheritance and polymorphism; exception handling; packages; applets; swing.

PGT 213/3
Analog Electronics 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: 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 Analog Filters: Basic filter, filter response characteristics, low-pass filter, high-pass filter, band-pass filter, band-stop filter, frequency response measurement, design of filter, Butterworth, Chebychev and Elliptic

References

1. Floyd, T., '*Electronic Devices'*, 8th Ed., Pearson Education, Inc., 2007.
2. Boylestead, R.L, and Nashelsky, L., '*Electronic Devices and Circuit Theory'*,7th Ed., Prentice-Hall, 1999.
3. Malvino, A, '*Electronic Principles'*, 6th Ed., Mc Graw Hill,1999

PGT 206/3
Computer Architecture

Course Synopsis

This course covers both the architectural and organizational aspects of computer systems. Architectural aspects of a system are defined as the features that are available to the operating system kernel such as the instruction set, data representations and peripheral interfaces. On the other hand, organizational aspects of a system are defined as the physical implementations that realize the features given for a system. These include the design of basic building blocks such as the ALU and the control unit, as well as the logic level interface of both internal and external units. This course expects the students to have a good fundamental on digital logic design (both combinatorial and sequential logic).

PGT 220/3
VLSI 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.

References

1. Wolf, Rabeay, Jan M. Weste, Neil H.E. - CMOS VLSI; A Design Perspective, Compiled by Norina Idris, Norhawati Ahmad, Rizalafande Che Ismail, Muammar Mohamad Isa, Siti Zarina Md Naziri, Muhammad Imran Ahmad. Pearson, 2008.
2. W Weste, Neil H.E. and Harris, D., CMOS VLSI Design- A Circuits and Systems Perspective, Prentice Hall, 2005.
3. Rab aey, J.M., et al., Digital Integrated Circuits – A Design Perspective, 2nd Ed., Prentice-Hall, 2003.
4. Wolf, W., Modern VLSI Design – System on Chip, Prentice Hall, 2002.
5. Wayne Wolf, Modern VLSI Design: IP-Based Design, 2009.
6. Vai, , M. M., VLSI Design, CRC Press, 2001.
7. Uyemura, John P., Chip Design for Submicron VLSI: CMOS Layout and Simulation, SGS Thomson, 2006.

PGT 205/3
Signals and Systems

Course Synopsis

This course introduce student to mathematical foundation and computational tools for processing continuous-time and discrete-time signals in both time and frequency domains. Key concepts and tools introduced and discussed in this class include linear time-invariant systems, impulse response, frequency response, convolution, filtering, sampling, and Fourier transform, Laplace Transform and z-Transform. This course serves as entry and prerequisite for any higher level course in the fields of signal processing, communications, and control.

PGT 301/3
Communication Systems

Course Synopsis

This course 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.

PGT 320/3
Power Electronics

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.

References

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

PGT 330/3
Microelectronic Fabrication Technology

Course Synopsis

This course on advance fabrication technology focuses on the concept and the basics of semiconductor materials, process technology and the fabrication processes of Integrated Circuits (ICs). The students will also be exposed to thefabrication process from oxidation, photolithography, etching, e-beam lithography,diffusion, implantation, metallization and characterization.

References

1. Hong Xiao, Introduction to Semiconductor ManufacturingTechnology, Prentice Hall, 2001.
2. Introduction to Microelectronic Fabrication, Volume V,Second Edition, Richard C. Jaeger, Prentice Hall, 2002.
3. Semiconductor Devices, Physics and Technology, 2ndEdition, S.M. Sze, John Wiley & Sons, Inc, 2002.
4. Silicon VLSI Technology: Fundamentals, Practice andModeling, James D. Plummer, Michael D. Deal andPeter B. Griffin, Prentice Hall, 2000.
5. G. Timp, Nanotechnology, Springer Verlag, 1999 (General) 6. Nanoimprint Lithography, Stephen Chou, J. Vac.Sci.Technol.B, 14(6), pp.4129, 1996.

PGT 331/3
Nanoelectronic Fundamental

Course Synopsis

Fundamentals of nanotechnology and its application to engineering systems, emphasizing basic principles, materials, measurement tools, fabrication techniques, and applications

References

1. Nano-Engineering in Science and Technology by Michael Rieth, World Scinetific Pub Co, 2003.
2. Introduction to Nanotechnology by Charles P. Poole & Frank J. Owens, John-Wiley & Sons, 2003.

PGT 312/3
Modern Control Systems

Course Synopsis

The course aims to give the student a throught but practical understanding on the concept of control systems theory, classical control and modern control methods.

References

1. I. J. Nagrath (2005). Control Systems Engineering. New Age International.
2. Stanley M. Shinners (1998). Modern Control System Theory and Design. Wiley - IEEE.
3. P. N. Paraskevopoulos (2002). Modern Control Engineering. Marcel Dekker.

PGT 332/3
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, advance material for nanopackaging 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 modelings in packaging are also introduced.

References

1. Advanced Electronic Packaging, Richard K. Ulrich & William D. Brown, John Wiley & Sons Inc.
2. Nanopackaging: Nanotechnologies and Electronics Packaging by James E. Morris.
3. Electronic Packaging Materials and Their Properties (Electronic Packaging Series) by Michael Pecht, Rakish Agarwal, F. Patrick McCluskey, and Terrance J. Dishongh.
4. Fundamentals of Microsystems Packaging, Rao R. Tumala, McGraw-Hill.

PGT 333/3
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.

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.

PGT 334/3
Nanosystem Design

Course Synopsis

Nanosystem design is an advanced nanosystem course and divided into three parts which are nanosystems design, parallel architecture and complex integrated nanosystems and nanoelectronics and nanowire. Nanosystem design part will cover the topics on basis of nanomaterials, nanoelectronic and nanoarchitectures and application of nanodevices in

integrated system. In parallel architecture and complex integrated nanosystems the topics that covered are architecture principles and nanosystems as information-processing machines. Otherwise, in nanoelectronics and nanowire the topics that covered are nanoelectronics with tunneling devices, nanoelectronics with superconducting devices and basic of nanowire development and characterization.

References

1. Karl Goser, "Nanoelectronics and Nanosystems: From Transistors to Molecular and Quantum Devices", Springer, 2004.
2. Giovanni De Micheli, Yusuf Leblebici, Martin Gijs and Janos Voros, "Nanosystems Design and Technology", Springer US, 2009.
3. K.Goser, P.Glosekotter and J.Dienstuhl, "Nanoelectronics and Nanosystems", Springer Germany, 2004.
4. Alina Voda, "Micro, Nanosystems and Systems on Chips: Modeling, Control, and Estimation", Wiley-ISTE, 2010.
5. Rainer Waser, "Nanoelectronics and Information Technology: Advanced Electronic Materials and Novel Devices", Wiley-VCH, 2003.

PGT 323/3
Verification on Chip

Course Synopsis

The aim of this course is to provide the introduction of system verilog language that will be used for verification to describe a basic coverage driven, constrained random layered testbench using Object Oriented Programming (OOP).

References

1. Cris Spear, 'System verilog for verification', 2nd edition, Springer, 2008
2. Bergeron, J, Cerny, E., Hunter, A. Nightingale, A., 'Verification methodology manual for system verilog' Springer, 2006.
3. Farzad Nekoogar and Faranak Nekoogar, "From ASICs to SOCs: A Practical Approach,"Prentice Hall, 2003.

PGT 420/3
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.

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.

PGT 430/3
Micro-Electro-Mechanical System

Course Synopsis

This course will focus on design and simulation of N/MEMSdevices. The design will include several of analysis types suchas structural, electrical and mechanical while the fabricationtechnology will focus on bulk and surface micromachining. Thiscourse will also discuss the application and technology of N/MEMS packaging in various fields.

References

1. Nano and Micro-Electromechanical Systems: Fundamentals of Nano and Microengineering by Sergey E. Lyshevski and Sergey Edward Lyshevski.
2. MEMS and NEMS: Systems, Devices, and Structures by Sergey Edward Lyshevski.
3. Foundations of MEMS by Chang Liu

PGT 421/3
Artificial Intelligence System

Course Synopsis

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

References

1. 1 Michael Negnevitsky, Artificial Intelligence: A Guide to Intelligent Systems (2nd Edition), Addison-Wesley, 2005

2. 2 Li, Hongxing, Chen, C. L. P. and Huang, H. P., "Fuzzy Neural Intelligent Systems", CRC Press, U.S.A., 20012 Li, Hongxing, Chen, C. L. P. and Huang,H. P., "Fuzzy Neural Intelligent Systems", CRC Press, U.S.A., 2001.
3. 3 Adam Greenfield, Everyware: The dawning age of ubiquitous computing, New Riders, 2006.

PGT 310/3
Digital Signal Processing

Course Synopsis

Digital Signal Processing (DSP) has continued to have a major and increasing impact in many key areas of technology including telecommunication, digital television and media, biomedicine, VLSI design etc. DSP is now at the core of many new and emerging digital products and applications in the information society and is a core subject in most electronic/computer/communication engineering curricula. This course is designed to give the students the necessary mathematical tools to analyze discrete time signals and systems. The course also includes various techniques for the design of digital filters and their implementations using DSP processors.

References

1. S. Salivahanan, A. Vallavaraj, C.Gnanapriya, Digital Signal processing, Second Edition, Tata McGraw Hill Education 2010.
2. Sanjit K. Mitra, Digital Signal Processing, McGraw Hill, 2006.
3. Emmanuel C. Ifeachor, Digital Signal Processing, Prentice Hall.
4. Vinay K Ingle, John G. Proakis, Digital Signal Processing using MATLAB

PGT 431/3
Optoelectronic System

Course Synopsis

The students studying this course will develop a basic understanding of the principles and practices of modern optoelectronic device includes fiber optic, semiconductor laser, photodiode and LED.The important functions for applications for these optoelectronic devices will acquire in optoelectronic system such as optical communication and display technology. Practical skills by using software in optical fiber systems and measurement will also be acquired.

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.

PGT 300/4
Final Year Project I

PGT 400/4
Final Year Project II

Course Synopsis

This is a research project in connection with engineering technology problem and under the guidance of a faculty member. The project undertaken may fall under one of the following areas: mathematical analysis, experimental tests, computer simulation, hardware and/or software development, device fabrication. For both FYP I and II, each student prepares a comprehensive engineering report, present and demonstrate findings and results of the project work.

BACHELOR OF ELECTRONIC ENGINEERING TECHNOLOGY (Honours) (ELECTRONIC TELECOMMUNICATION DESIGN)

Programme Objectives (PEO)

PEO 01
Telecommunication Technology graduates who are competent in both technology theory and practice.

PEO 02
Telecommunication Technology graduates who are able to demonstrate leadership and contribute to team success and manage projects in a multi-disciplinary environment.

PEO 03
Telecommunication Technology graduates who are able to make contributions to knowledge.

PEO 04
Telecommunication Technology graduates who are able to demonstrate an ethical commitment to the community.

Programme Outcomes (PO)

PO 01
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialization principles to defined and applied engineering procedures, processes, systems or methodologies;

PO 02
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialization;

PO 03
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns;

PO 04
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources;

PO 05
Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations;

PO 06
Function effectively as individuals, and as members or leaders in diverse technical teams;

PO 07
Communicate effectively with the engineering community and society at large;

PO 08
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities;

PO 09
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices;

PO 10
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development;

PO 11
Demonstrate an awareness of management, business practices and entrepreneurship and Engineering Management

PO 12
Recognize the need for professional development and to engage in independent and lifelong learning.

STRUCTURE CURRICULUM BACHELOR OF ELECTRONIC ENGINEERING TECHNOLOGY (Honours) (ELECTRONIC TELECOMMUNICATION DESIGN) – RY41

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
Engineering Core (102)	PGT 110/3 Multimedia Systems	PGT 104/3 Digital Electronics	PGT 210/3 Measurement and Instrumentation	PGT 206/3 Computer Architecture	PGT 301/3 Communication System	PGT 300/4 Final Year Project I	PGT 400/4 Final Year Project II	PGT 411/12 Industrial Training
	PGT 101/3 Electric Circuit Principles	PGT 105/3 Electrical Engineering Technology	PGT 211/3 Electromagnetic Theory	PGT 212/3 Electronic Communication Technology	PGT 310/3 Digital Signal Processing	PGT 313/3 Digital Communication Technology	PGT 410/3 Satellite Technology	
	PGT 102/3 Engineering Science	PGT 106/3 C Programming	PGT 201/3 Microprocessor	PGT 205/3 Signal and Systems	PGT 311/3 Antenna and Propagation	PGT 314/3 Optical Technology	PGT xxx/3 Elective II	
	PGT 103/3 Computer Technology	PGT 107/2 Writing in Engineering Technology	PGT 202/3 Analog Electronics I	PGT 213/3 Analog Electronics II	PGT 312/3 Modern Control Systems	PGT 315/3 RF and Microwave Technology	PGT xxx/3 Elective III	
						PGT xxx/3 Elective I		
Common Core (21)	PQT 111/3 Mathematics I	PQT 112/3 Mathematics for Engineering Technology II	PQT 213/3 Mathematics for Engineering Technology III	PQT 274/3 Statistics for Engineering Technology	PTT 333/3 Engineering Technology in Management	PTT 444/3 Technologiest in Society		
	PCT 111/3 Engineering Skill							
University Required (17)	UZW xxx/1 Co-Curriculum	UVW 410/2 University Malay language	UUW224/2 Engineering Entrepreneurship	UUW 235/2 Ethnic Relation	UUW 322/2 Thinking Skill			
		UUW 122/2 IT and Communication Skills	UVW312/2 English for Technical Education	UUW 233/2 Islam & Asia Civilisation	UUW xxx/2 Option subjects			
		UZW xxx/1 Co-Curriculum	UZW xxx/1 Co-Curriculum					
	19	19	20	19	19	19	15	12
Total Units for Graduation = 142								

Elective 1, 2 and 3: Mobile and Wireless Communication, Telecommunication and switching technology, Radar Engineering, Electronics and RF Circuits Design, Technology of Image Processing, Audio & Video Signal Processing , Artificial Intelligence, Waveform Coding,

Course Syllabus

PGT 110/3
Multimedia System

Course Synopsis

Multimedia software systems incorporate various media, such as text, images, video and audio, to provide rich experiences for users. This is a course in the design, implementation and evaluation of multimedia systems. The course include the development and use of various multimedia data types; the design and evaluation of multimedia systems; and to plan, develop and implement multimedia projects.

References

1. Shuman, J. E. (2003). *Multimedia concepts, enhanced edition: Illustrated introductory.* Boston, MA: Course Technology. (ISBN: 061911052X)
2. Alber, A. F. (1996). *Multimedia: A management perspective.* Boston, MA: International Thomson Publishing Company.
3. Alessi, S. M., & Trollip, S. R. (2001). *Multimedia for learning: Methods and development*. Needham Heights, MA: Allen and Bacon.

PGT 210/3
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

PGT 211/3
Electromagnetic Theory

Course Synopsis

This is the first course in Electromagnetic Field Theory at the undergraduate level. It provides basic concepts and understanding of fundamental laws of electrostatics and magnetostatics . Applications of these laws for different field configurations are also introduced. The course also introduces transmission line theory and the use of transmission lines as circuit elements. Calculation of transmission line parameters like VSWR, reflection coefficient and impedance matching using Smith's chart is also included in this course.

References

1. Fawwaz T. Ulaby, Eric Micielssen, Umberto Ravaioli, "Fundamentals of Applied Electromagnetics", Pearson (Prentice Hall) 2010.
2. Stuart M. Wentworth, "Applied Electromagnetics", John Wiley, USA, 2007.
3. Stuart M. Wentworth, "Fundamental of Electromagnetics with Engineering Applications", Wiley edition, 2005.

PGT 212/3
Electronic Communication Technology

Course Synopsis

This subject introduces the students about the basic communication components and circuits used in communication systems. This includes the architecture of radio frequency amplifiers, mixers, AM and FM modulators and demodulators, transmitter circuits and receiver's circuits design. Practical exercises such as design, measurement and analyze of the circuit and output signal in the communication systems which improve understanding and develop skills in communication electronic field.

References

1. Wayne Tomasi. (2004). *Electronic Communication System, Fundamental Through Advanced.* 5th Ed. Pearson Prentice Hall. (Text)
2. Paul Young. (2004). *Electronics Communications Techniques*. 5th Edition. Prentice Hall.
3. K. Sam Shanmugan. (2002). *Analog and Digital Communication.* Wiley.

PGT 213/3
Analog Electronics 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: 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 Analog Filters: Basic filter, filter response characteristics, low-pass filter, high-pass filter, band-pass filter, band-stop filter, frequency response measurement, design of filter, Butterworth, Chebychev and Elliptic

References

1. Floyd, T., '*Electronic Devices'*, 8th Ed., Pearson Education, Inc., 2007.
2. Boylestead, R.L, and Nashelsky, L., '*Electronic Devices and Circuit Theory'*,7th Ed., Prentice-Hall, 1999.
3. Malvino, A, '*Electronic Principles'*, 6th Ed., Mc Graw Hill,1999

PGT 310/3
Digital Signal Processing

Course Synopsis

Digital Signal Processing (DSP) has continued to have a major and increasing impact in many key areas of technology including telecommunication, digital television and media, biomedicine, VLSI design etc. DSP is now at the core of many new and emerging digital products and applications in the information society and is a core subject in most electronic/computer/communication engineering curricula. This course is designed to give the students the necessary mathematical tools to analyze discrete time signals and systems. The course also includes various techniques for the design of digital filters and their implementations using DSP processors.

References

1. S. Salivahanan, A. Vallavaraj, C.Gnanapriya, Digital Signal processing, Second Edition, Tata McGraw Hill Education 2010.
2. Sanjit K. Mitra, Digital Signal Processing, McGraw Hill, 2006.
3. Emmanuel C. Ifeachor, Digital Signal Processing, Prentice Hall.
4. Vinay K Ingle, John G. Proakis, Digital Signal Processing using MATLAB

PGT 311/3
Antenna and Propagation

Course Synopsis

By the end of the course, students will be able to explain basic concept in antennas and propagation. Practical skills in antennas and propagation will also be acquired.

References

1. John Daniel Kraus, Ronald J. Marhefka (2002). Antennas for All Applications. McGraw-Hill.
2. Rajeswari Chatterjee (2006). Antenna Theory and Practice. New Age International.
3. Joseph J. Carr (2001). Practical Antenna Handbook. McGraw-Hill.

PGT 312/3
Modern Control Systems

Course Synopsis

The course aims to give the student a throught but practical understanding on the concept of control systems theory, classical control and modern control methods.

References

1. I. J. Nagrath (2005). Control Systems Engineering. New Age International.
2. Stanley M. Shinners (1998). Modern Control System Theory and Design. Wiley - IEEE.
3. P. N. Paraskevopoulos (2002). Modern Control Engineering. Marcel Dekker.

PGT 313/3
Digital Communication Technology

Course Synopsis

By the end of the course, students will be able to explain basic concept in digital communication technology. Practical skills in digital communication technology will also be acquired.

References

1. S. Haykin (2006). Digital Communications. Wiley India Pvt. Ltd.
2. John R. Barry, Edward A. Lee, David G. Messerschmitt (2004). Digital Communication. Springer.
3. B. Sklar (2009). Digital Communications: Fundamentals & Applications. Pearson Education.

PGT 314/3
Optical Technology

Course Synopsis

The students studying this module will develop a basic understanding of the principles and practices of modern optoelectronic devices and their important functions for applications in optical communication. Optoelectronic Communications which includes laser, fiber optics and amplifier fundamentals,

Semiconductor sources, optical detector, optical amplifiers, optical devices, introduction to modern optics, tailored to the needs of the optoelectronic, photonics and optical communications industry. Practical skills in optical fiber systems and measurement will also be acquired.

References

1. Ghatak and Thyagarajan, Introduction to Fiber Optics, Cambridge University Press,1998.
2. John M. Senior, Optical Fiber Communications; Principles and Practice, 2nd Edition, Prentice-Hall, 1992

PGT 315/3
RF and Microwave Technology

Course Synopsis

This course thoroughly covers the basic principles, analysis, design and measurement techniques necessary for an introductory undergraduate or graduate course in microwave engineering.

Reference Book

1. Max W. Medley Jr. (1993). Microwave and RF Circuits Analysis, Synthesis and Design. Artech House Inc.
2. Randall W.Rhea (2005). HF Filter Design and Computer Simulation. McGraw Hill Inc.
3. Om P. Gandhi, “Microwave Engineering And Applications”, Maxwell Macmillan Int. Edition, 1989.

PGT 410/3
Satellite Technology

Course Synopsis

The course aims to give the student a thorough but practical understanding of the principles and technological issues of satellite technology.

References

1. Dennis Roddy (2001). Satellite Communication. McGraw-Hill Professional.
2. Bruce R. Elbert (2004). The Satellite Communication Applications Handbook. Artech House.
3. Madhavendra Richharia (1999). Satellite Communication Systems. McGraw-Hill Professional.

BACHELOR OF ELECTRONIC ENGINEERING TECHNOLOGY (Honours) (ELECTRONIC NETWORK DESIGN)

PROGRAMME OBJECTIVES (PEO)

PEO 01
Computer Network Technology graduates who are competent in both technology theory and practice.

PEO 02
Computer Network Technology graduates who are able to demonstrate leadership and contribute to team success and manage projects in a multi-disciplinary environment.

PEO 03
Computer Network Technology graduates who are able to make contributions to knowledge.

PEO 04
Computer Network Technology graduates who are able to demonstrate an ethical commitment to the community.

PROGRAMME OUTCOMES (PO)

PO 01
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialization principles to defined and applied engineering procedures, processes, systems or methodologies;

PO 02
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialization;

PO 03
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns;

PO 04
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources;

PO 05
Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations;

PO 06
Function effectively as individuals, and as members or leaders in diverse technical teams;

PO 07
Communicate effectively with the engineering community and society at large;

PO 08
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities;

PO 09
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices;

PO 10
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development;

PO 11
Demonstrate an awareness of management, business practices and entrepreneurship and Engineering Management

PO 12
Recognize the need for professional development and to engage in independent and lifelong learning.

STRUCTURE CURRICULUM BACHELOR OF ELECTRONIC ENGINEERING TECHNOLOGY (Honours) (ELECTRONIC NETWORK DESIGN) – RY43

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
Discipline Core (102)	PGT 100/3 Networking Fundamentals	PGT 104/3 Digital Electronics	PGT 200/3 Operating Systems	PGT 204/3 Internetworking Technology I	PGT 301/3 Communication Systems	PGT 300/4 Final Year Project I	PGT 400/6 Final Year Project II	PIT 4XX/12 Industrial Training
	PGT 101/3 Electric Circuit Principles	PGT 105/3 Electrical Engineering Technology	PGT 201/3 Microprocessor	PGT 205/3 Signals and Systems	PGT 302/3 Embedded Software Technology	PGT 305/3 Network Management	PGT 401/3 Network Security Technology	
	PGT 102/3 Engineering Science	PGT 106/3 C Programming	PGT 202/3 Analog Electronics I	PGT 206/3 Computer Architecture	PGT 303/3 Data Structures	PGT 306/3 Network Modeling	PGT XXX/3 Elective II	
	PGT 103/3 Computer Technology	PGT 107/2 Writing in Engineering Technology	PGT 203/3 Database Management Systems	PGT 207/3 Object Oriented Programming	PGT 304/3 Internetworking Technology II	PGT 307/3 Programming for Networking	PGT XXX/3 Elective III	
						PGT XXX/3 Elective I		
Common Core (21)	PQT 111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II	PQT 213/3 Mathematics for Engineering Technology III	PQT 274/3 Statistics for Engineering Technology	PTT 333/3 Engineering Technology Management	PTT 444/3 Technologist in Society		
	PCT 111/3 Engineering Skills							
University Required (19)	UZW 1XX/1 Co-Curricular Activity	UVW 410/2 University Malay Language	UUW 224/2 Engineering Entrepreneurship	UUW 235/2 Ethnic Relation	UUW 322/2 Thinking Skills			
		UUT 122/2 Skills and Technology in Communication	UVW 312/2 English for Technical Communication	UUW233/2 Islamic & Asian Civilizations	UUW XXX/2 Option Subjects			
		UZW 1XX/1 Co-Curricular Activity	UZW 1XX/1 Co-Curricular Activity					
142	19	19	20	19	19	19	15	12
Total Units for Graduation 142								

Elective: PGT308 CCNA I, CCNA II, CCNA III, CCNA IV, PGT402 Mobile Computing, PGT403 Web Programming, PGT404 Artificial Intelligent, PGT309 Cloud Information and Storage

Course Syllabus

PGT 101/3
Electric Circuit Principles

Course Synopsis

This course covers introduction to the basic of electrical measurements, Ohm's Law, Series and Parallel Circuits, Circuit Theorems and Conversions and RLC circuits. This course will expose the students to the elements and principles of electrical circuit theory with appropriate to any RLC circuit applications. The laboratory sessions will complement the theories given in a class.

References

1. Thomas L. Floyd. Principles of Electric Circuits, Pearson Prentice Hall, 2009 (Floyd 9e)
2. Alenxander and Sadiku. Fundamentals Of Electric Circuits, McGraw-Hill, 2007
3. Nilsson and Riedel, Electric Circuits, Pearson Prentice Hall, 2008
4. Thomas L.Floyd, Electric Circuit Fundamental 8 Edition

PGT 100/3
Networking Fundamentals

Course Synopsis

This course prepares the students to know how computers are connected. In addition, students are able to connect the computer to the Internet both wired and wireless. The students are expected to be able to troubleshoot problems that cause network disconnection, slow and effectiveness.

References

1. W. Odom and T. Knott, Networking Basics, Cisco Press, 2012.
2. J. F. Kurose, Computer Networking: A Top-Down Approach, 7th Edition, Addison-Wesley, 2011.
3. S. Tanenbaum, Computer Network, 5th Edition. Prentice-Hall, 2011.
4. M. Dye, R. McDonald, A.W. Rufi, Network Fundamentals-CCNA Exploration Companion, Cisco Press, 2008.

PGT 102/3
Engineering Science

Course Synopsis

This course covers introduction to physic and science which are force and motion, circular motion, work, power and energy, electrostatic, magnetism and electric current and resistance. Fundamental physics is combined with problem solving and engineering skills through suitable experiments. This course will expose the students to the elements and principles of basic concepts of physics and its application.

References

1. Jerry Wilson, Anthony Buffa. "College Physics", 7th ed., Pearson Education,2009
2. Giambattista, Richardson, Richardson, "College Physics", McGraw Hill Internationatial Ed., 2007.
3. Stephen T.Thornton, Andrew Rex. "Modern Physics for Scientists & Engineers", 2nd ed, Brooks Cole, 1999.
4. W. Bolton. "Engineering Science". Fourth Edition. Newnes. 2001

PGT 103/3
Computer Technology

Course Synopsis

This course prepares the student to be familiar with computer hardware and software available in the market. The hardware includes CPU, memories and I/O such as monitor, keyboard and mouse. Computer software contains various Operating Systems (OS) such as Android, GNU/Linux, Microsoft and Apple based OS. Introduction to Free Open Source Software (FOSS) concept and philosophy, various applications such as Office Suite (word processor and spread sheet) will be explained.

References

1. Randal E. Bryant and David R. O'Hallaron, "Introduction to Computer Systems: A Programmer's Perspective", Second edition Prentice Hall.
2. William Stallings " Computer Organization and Architecture", Eight edition Pearson
3. M. Morris Mano, "Computer System Architecture", Third Edition, Prentice-Hall.
4. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization", Fifth Edition, McGraw Hill

PGT 104/3
Digital Electronics

Course Synopsis

Introduction and discussion of fundamental of digital circuit design and analysis. The lecture and tutorial 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. Thomas L. Floyd, "Digital Fundamentals:,10th Ed., Pearson Prentice Hall, 2009
2. Floyd. TL, "Digital Fundamentals", 9th Ed., Prentice Hall, 2006.
3. Ronald J. Tocci, "Digital Systems – Principles and Applications", 7th Ed., Prentice Hall, 2003
4. Nigel, P.C. "A First Course in Digital Electronics", 1st Ed., Prentice Hall, 1999.

PGT 105/3
Electrical Engineering Technology

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.

References

1. Chapman S.J., "Electric Machinery Fundamentals", Fifth Edition, 2009, McGraw Hill, Singapore.
2. C.S Rangan, G.R. Sarma & V.S. Mani, "Instrumentation Devices & System" Tata, McGraw-Hill Publishing Company Limited, 2004.
3. Bhas S. Guru & Huseyin R. Hiziroglu, "Electric Machinery and Transformers", 2001, Oxford University Press.
4. A.K. Sawhney & P.Sawhney, "A Course in Electronic and Electrical Measurement and Instrumentation" Dhanpat Rai & Co. (P) Ltd., 2001.
5. Z.A. Yamayee & J.L. Bala, " Electromechanical Energy Devices & Power Systems", 1994, Wiley & Sons, USA.

PGT 106/3
C Programming

Course Synopsis

This course introduces basic programming using high-level language (C language). The main objective of this course is to prepare the students with the ability of problem solving with programming, to be able to do analysis with programming tools such as flowcharts and pseudo code and then to implement them by developing C programmes.

References

1. Deitel and Deitel, Sudin, S.,Ahmad, R.B. and Yacob, Y., "C How To Program", Pearson-Prentice Hall, 2012.
2. Cheng, H., "C for Engineers and Scientists", McGraw Hill, 2010.
3. Hanly, J.R. and Koffman, E.B., "Problem Solving and Program Design in C", 6th Ed., Pearson, 2007.
4. Sprankle and Maureen, "Problem Solving and Programming Concepts" 7th Ed., Prentice Hall, 2006.
5. Etter, D.M., "Engineering Problem Solving with C", 3rd Ed., Prentice Hall, 2004.

PGT 107/2
Writing in Engineering Technology

Course Synopsis

To expose the students to the common requirements and expectations of writing as an engineering technologist; as well as to the format and techniques of writing various types of engineering technology documents.

References

1. Leo Finkelstein Jr (2008). Pocket Book of Technical Writing for Engineers and Scientist, 3rd Ed. (New York: McGraw Hill International Edition
2. Beer, D. (2009). A Guide to Writing as an Engineer, 3rd Ed. (John Wiley, USA)
3. Pfeiffer, W. S., Adkins, K. E. (2010). Technical Communication – A Practical Approach, 7th Ed. (Pearson, USA)
4. Lannon, J. M, Gurak, L. J. (2011) Technical Communication, 12th Ed. (Longman).

PGT 200/3
Operating Systems

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.

PGT 201/3
Microprocessor

Course Synopsis

The aim of this course is to study the Intel 8085 microprocessor architecture and relate that knowledge to the design of microprocessor based systems. This includes the design technique for

designing memory, input and output for the systems. The study of 8085 instruction set and various software development tools are also emphasized as the knowledge are needed in the design of the microprocessor-based systems.

PGT 202/3
Analog Electronics I

Course Synopsis

This course exposes the student the basic knowledge in analog electronic. The exposure encompasses amplifier design based on bipolar and field effect transistors, for single and multi stage, power amplifier, frequency response analysis of amplifiers. Emphasis is placed on basic design aspects and applications. The course has been designed to provide basic analog electronic skills covering theories and practices.

PGT 203/3
Database Management Systems

Course Synopsis

The subject will focus on the concept of database system and architecture. This includes data models, schemas and instances and system environment. Students will be exposed with data modeling by using high level conceptual data models for relational database design that includes Entity Relationship Diagram(ERD), Structured Query Language (SQL) and normalization and also covers database storage and management.

PGT 204/3
Internetworking Technology I

Course Synopsis

This course will introduce students with the fundamental knowledge and tools for study 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. Related technologies such as Local Area Network, Wide Area Network and techniques use in data transmission as well as latest technologies. Practical exercises such as design, install and testing of a simple computer internetworking which improve understanding and develop skills on networking are integrated in laboratories exercises.

PGT 205/3
Signals and Systems

Course Synopsis

This course introduce student to mathematical foundation and computational tools for processing continuous-time and discrete-time signals in both time and frequency domains. Key concepts and tools introduced and discussed in this class include linear time-invariant systems, impulse response, frequency response, convolution, filtering, sampling, and Fourier transform, Laplace Transform and z-Transform. This course serves as entry and prerequisite for any higher level course in the fields of signal processing, communications, and control.

PGT 206/3
Computer Architecture

Course Synopsis

This course covers both the architectural and organizational aspects of computer systems. Architectural aspects of a system are defined as the features that are available to the operating system kernel such as the instruction set, data representations and peripheral interfaces. On the other hand, organizational aspects of a system are defined as the physical implementations that realize the features given for a system. These include the design of basic building blocks such as the ALU and the control unit, as well as the logic level interface of both internal and external units. This course expects the students to have a good fundamental on digital logic design (both combinatorial and sequential logic).

PGT 207/3
Object-Oriented Programming

Course Synopsis

This course discuss object-oriented problem solving in Java, with attention to general as well as language-specific issues including applications, event-driven programming; elements of graphical user interfaces (GUIs); inheritance and polymorphism; exception handling; packages; applets; swing.

PGT 300/4
Final Year Project I

PGT 400/4
Final Year Project II

Course Synopsis

This is a research project in connection with engineering technology problem and under the guidance of a faculty member. The project undertaken may fall under one of the following areas: mathematical analysis, experimental tests, computer simulation, hardware and/or software development, device fabrication. For both FYP I and II, each student prepares a comprehensive engineering report, present and demonstrate findings and results of the project work.

PGT 301/3
Communication Systems

Course Synopsis

This course 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.

PGT 302/3
Embedded Software Technology

Course Synopsis

This course introduces a real-world embedded system software technology development environment from hardware and software perspectives. It applies the concept of open source embedded operating system (GNU/Linux) and using appropriate tools in designing a system. Few of the techniques such as advance C programming, scripting and external hardware interfacing on single board computer (SBC). Student will be assigned with laboratory-oriented design projects, with emphasis on the use of open source and GNU/Linux OS and Free Software tools; and hardware interfacing.

PGT 303/3
Data Structures

Course Synopsis

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

PGT 304/3
Internetworking Technology II

Course Synopsis

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

PGT 305/3
Network Management

Course Synopsis

The course aims to give knowledge of operation, and maintenance of modern computer and global networks. Network Management basics, and standards is described with focus on Internet Management with the aid of Simple Network Management Protocol (SNMP), as well as the application of the same. The course also gives practical knowledge in system and network administration as well as network supervision.

PGT 306/3
Network Modelling

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.

PGT 307/3
Programming for Networking

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.

PGT 401/3
Network Security Technology

Course Synopsis

The aims of this course are to introduce basic concept of network security technology. It includes concepts, security practice and encryption and decryption techniques. Discussion in network security will involved network defence concepts and network intruders. Firewall application software will be discussed together with computer security services and security management.

BACHELOR OF ELECTRONIC ENGINEERING TECHNOLOGY (Honours) (INTEGRATED ELECTRONICS)

PROGRAMME OBJECTIVES (PEO)

PEO 01
Integrated Electronics graduates who are competent in both technology theory and practice.

PEO 02
Integrated Electronics graduates who are able to demonstrate leadership and contribute to team success and manage projects in a multi-disciplinary environment.

PEO 03
Integrated Electronics graduates who are able to make contributions to knowledge.

PEO 04
Integrated Electronics graduates who are able to demonstrate an ethical commitment to the community.

PROGRAMME OUTCOME (PO)

PO 01
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialization principles to defined and applied engineering procedures, processes, systems or methodologies;

PO 02
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialization;

PO 03
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns;

PO 04
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources;

PO 05
Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations;

PO 06
Function effectively as individuals, and as members or leaders in diverse technical teams;

PO 07
Communicate effectively with the engineering community and society at large;

PO 08
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities;

PO 09
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices;

PO 10
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development;

PO 11
Demonstrate an awareness of management, business practices and entrepreneurship and Engineering Management

PO 12
Recognize the need for professional development and to engage in independent and lifelong learning.

STRUCTURE CURRICULUM BACHELOR OF ELECTRONIC ENGINEERING TECHNOLOGY (Honours) (INTEGRATED ELECTRONIC) – RY44

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
Discipline Core (102)	PGT 103/3 Computer Technology	PGT 104/3 Digital Electronics	PGT 211/3 Electromagnetic Theory	PGT 213/3 Analog Electronics II	PGT 301/3 Communication Systems	PGT 300/4 Final Year Project I	PGT 400/6 Final Year Project II	PXX 4XX/12 Industrial Training
	PGT 102/3 Engineering Science	PGT 105/3 Electrical Engineering Technology	PGT 201/3 Microprocessor	PGT 205/3 Signals and Systems	PGT 320/3 Power Electronics	PGT 312/3 Modern Control Systems	PGT 420/3 Instrumentation	
	PGT 101/3 Electric Circuit Principles	PGT 106/3 C Programming	PGT 202/3 Analog Electronics I	PGT 206/3 Computer Architecture	PGT 321/3 VLSI System Design	PGT 323/3 Verification on Chip	PGT 422/3 Analog Integrated Circuit Design Or PGT 421/3 Artificial Intelligent System	
	PGT 120/3 Engineering Material	PGT 107/2 Writing in Engineering Technology	PGT 207/3 Object Oriented Programming	PGT 220/3 VLSI Design	PGT 322/3 Microcontroller	PGT 310/3 Digital Signal Processing	PGT 423/3 MEMS Design and Fabrication Or PGT431 Optoelectronic Systems	
						PGT 333/3 Reliability and Failure Analysis Or PGT334/3 Nanosystem Design		
Common Core (21)	PQT 111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II	PQT 213/3 Mathematics for Engineering Technology III	PQT 274/3 Statistics for Engineering Technology IV	PTT 333/3 Engineering Technology Management	PTT 444/3 Technologist in Society		
	PCT 111/3 Engineering Skills							
University Required (19)		UVW 410/2 University Malay Language	UUW 224/2 Engineering Entrepreneurship	UUW 235/2 Ethnic Relation	UUW 322/2 Thinking Skills			
		UUT 122/2 Skills & Technology in Communication	UVW 312/2 English For Technical Communications	UUW233/2 Islamic & Asian Civilizations				
	UZW 1XX/1 Co-Curricular Activity	UZW 1XX/1 Co-Curricular Activity	UZW XXX/1 Co-Curricular Activity		UVW XXX/2 Option Subjects			
122	19	19	20	19	19	19	15	12
19	University English, Engineering Entrepreneurship, TITAS, Ethnic Relation, Thinking Skill, University Malay Language, Co-Curriculum, Option Subject							
Total Units for Graduation 142								

COURSE SYLLABUS

DISCIPLINE CORE

PGT 101/3
Electric Circuit Principles

Course Synopsis

This course covers introduction to the basic of electrical measurements, Ohm's Law, Series and Parallel Circuits, Circuit Theorems and Conversions and RLC circuits. This course will expose the students to the elements and principles of electrical circuit theory with appropriate to any RLC circuit applications. The laboratory sessions will complement the theories given in a class.

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1. Thomas L. Floyd. Principles of Electric Circuits, Pearson Prentice Hall, 2009 (Floyd 9e)
2. Alenxander and Sadiku. Fundamentals Of Electric Circuits, McGraw-Hill, 2007
3. Nilsson and Riedel, Electric Circuits, Pearson Prentice Hall, 2008
4. Thomas L.Floyd, Electric Circuit Fundamental 8 Edition

PGT 102/3
Engineering Science

Course Synopsis

This course covers introduction to physic and science which are force and motion, circular motion, work, power and energy, electrostatic, magnetism and electric current and resistance. Fundamental physics is combined with problem solving and engineering skills through suitable experiments. This course will expose the students to the elements and principles of basic concepts of physics and its application.

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1. Jerry Wilson, Anthony Buffa. "College Physics", 7th ed., Pearson Education,2009
2. Giambattista, Richardson, Richardson, "College Physics", McGraw Hill Internationatial Ed., 2007.
3. Stephen T.Thornton, Andrew Rex. "Modern Physics for Scientists & Engineers", 2nd ed, Brooks Cole, 1999.
4. W. Bolton. "Engineering Science". Fourth Edition. Newnes. 2001

PGT 103/3
Computer Technology

Course Synopsis

This course prepares the student to be familiar with computer hardware and software available in the market. The hardware includes CPU, memories and I/O such as monitor, keyboard and mouse. Computer software contains various Operating Systems (OS) such as Android, GNU/Linux, Microsoft and Apple based OS. Introduction to Free Open Source Software (FOSS) concept and philosophy, various applications such as Office Suite (word processor and spread sheet) will be explained.

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1. Randal E. Bryant and David R. O'Hallaron, "Introduction to Computer Systems: A Programmer's Perspective", Second edition Prentice Hall.
2. William Stallings " Computer Organization and Architecture", Eight edition Pearson
3. M. Morris Mano, "Computer System Architecture", Third Edition, Prentice-Hall.
4. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, "Computer Organization", Fifth Edition, McGraw Hill

PGT 120/3
Engineering Material

Course Synopsis

PGT 120/3
Material Engineering

Course Synopsis

The course is tailored to give students a broad introduction to material properties and limitations. The subject will cover class of material properties, measurement of the properties, and fundamental knowledge to make material selection with better properties. The common micro-structural features of different material classes will be outlined in order to relate material with its process as well as performance.

References

1. Ashby, M., Shercliff, H. and Cebon, D., A., (2007). Materials: engineering, science, processing, and design, Elsevier.
2. Ashby, M. and Jones, D.R.H. (2005). Engineering Materials I: An Introduction to Properties, Applications, and Design, 3rd Edition, Elsevier, Butterworth Heinemann.
3. Ashby, M. and Jones, D.R.H. (2006). Engineering Materials II: An Introduction to Microstructure, processing, and design, 3rd Edition, Elsevier, Butterworth Heinemann.
4. Sharma, C.P. (2004). Enginjeering material properties and applications of metal and alloys, Prentice Hall, New Delhi.

5. Rajput, R.K. (2000). Engineering Materials. S.Chand & Companu, New Delhi.

PGT 105/3
Electrical Engineering Technology

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.

References

1. Chapman S.J., "Electric Machinery Fundamentals", Fifth Edition, 2009, McGraw Hill, Singapore.
2. C.S Rangan, G.R. Sarma & V.S. Mani, "Instrumentation Devices & System" Tata, McGraw-Hill Publishing Company Limited, 2004.
3. Bhas S. Guru & Huseyin R. Hiziroglu, "Electric Machinery and Transformers", 2001, Oxford University Press.
4. A.K. Sawhney & P.Sawhney, "A Course in Electronic and Electrical Measurement and Instrumentation" Dhanpat Rai & Co. (P) Ltd., 2001.
5. Z.A. Yamayee & J.L. Bala, " Electromechanical Energy Devices & Power Systems", 1994, Wiley & Sons, USA.

PGT 104/3
Digital Electronics

Course Synopsis

Introduction and discussion of fundamental of digital circuit design and analysis. The lecture and tutorial 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. Thomas L. Floyd, "Digital Fundamentals:,10th Ed., Pearson Prentice Hall, 2009.
2. Floyd. TL, "Digital Fundamentals", 9th Ed., Prentice Hall, 2006.
3. Ronald J. Tocci, "Digital Systems – Principles and Applications", 7th Ed., Prentice Hall, 2003.
4. Nigel, P.C. "A First Course in Digital Electronics", 1st Ed., Prentice Hall, 1999.

PGT 106/3
C Programming

Course Synopsis

This course introduces basic programming using high-level language (C language). The main objective of this course is to prepare the students with the ability of problem solving with programming, to be able to do analysis with programming tools such as flowcharts and pseudo code and then to implement them by developing C programmes.

References

1. Deitel and Deitel, Sudin, S.,Ahmad, R.B. and Yacob, Y., "C How To Program", Pearson-Prentice Hall, 2012.
2. Cheng, H., "C for Engineers and Scientists", McGraw Hill, 2010.
3. Hanly, J.R. and Koffman, E.B., "Problem Solving and Program Design in C", 6th Ed., Pearson, 2007.
4. Sprankle and Maureen, "Problem Solving and Programming Concepts" 7th Ed., Prentice Hall, 2006.
5. Etter, D.M., "Engineering Problem Solving with C", 3rd Ed., Prentice Hall, 2004.

PGT 107/2
Writing in Engineering Technology

Course Synopsis

To expose the students to the common requirements and expectations of writing as an engineering technologist; as well as to the format and techniques of writing various types of engineering technology documents.

References

1. Leo Finkelstein Jr (2008). Pocket Book of Technical Writing for Engineers and Scientist, 3rd Ed. (New York: McGraw Hill International Edition
2. Beer, D. (2009). A Guide to Writing as an Engineer, 3rd Ed. (John Wiley, USA)
3. Pfeiffer, W. S., Adkins, K. E. (2010). Technical Communication – A Practical Approach, 7th Ed. (Pearson, USA)
4. Lannon, J. M, Gurak, L. J. (2011) Technical Communication, 12th Ed. (Longman).

PGT 211/3
Electromagnetic Theory

Course Synopsis

This is the first course in Electromagnetic Field Theory at the undergraduate level. It provides basic concepts and understanding of fundamental laws of electrostatics and magnetostatics . Applications of these laws for different field configurations are also introduced. The course also introduces transmission line theory and the use of transmission lines as circuit elements. Calculation of transmission line parameters like VSWR, reflection coefficient and impedance matching using Smith's chart is also included in this course.

References

1. Fawwaz T. Ulaby, Eric Micielssen, Umberto Ravaioli, "Fundamentals of Applied Electromagnetics", Pearson (Prentice Hall) 2010.
2. Stuart M. Wentworth, "Applied Electromagnetics", John Wiley, USA, 2007.
3. Stuart M. Wentworth, "Fundamental of Electromagnetics with Engineering Applications", Wiley edition, 2005.

PGT 201/3
Microprocessor

Course Synopsis

The aim of this course is to study the Intel 8085 microprocessor architecture and relate that knowledge to the design of microprocessor based systems. This includes the design technique for designing memory, input and output for the systems. The study of 8085 instruction set and various software development tools are also emphasized as the knowledge are needed in the design of the microprocessor-based systems.

References

1. R.S. Gaonkar, Microprocessor Architecture, Programming, and Applications with the 8085, 5th Edition, Prentice Hall, 2002.
2. W. Kleitz, Microprocessor and Microcontroller Fundamentals: The 8085 and 8051 Hardware and Software, Prentice Hall, 1998.
3. B.B. Brey, The 8085A Microprocessor: Software, Programming and Architecture, 2nd Edition, Prentice Hall, 1996.

PGT 202/3
Analogue Electronics I

Course Synopsis

This course exposes the student the basic knowledge in analog electronic. The exposure encompasses amplifier design based on bipolar and field effect transistors, for single and multi stage, power amplifier, frequency response analysis of amplifiers. Emphasis is placed on basic design aspects and applications. The course has been designed to provide basic analog electronic skills covering theories and practices.

References

1. Thomas L. Floyd, "Electronic Devices", 8th Edition, Pearson, 2008.
2. Boylestad, R.L, Nashelsky, L., " Electronic Devices and Circuit Theory", 8th Edition, Prentice Hall, 2002.
3. Ahmad Radzi Mat Isa, Yaacob Mat Daud, Roslinda Zainal, " Elektronik Asas Peranti Semikonduktor", ISBN 983-52-0419-5, 2007.

PGT 207/3
Object-Oriented Programming

Course Synopsis

This course discuss object-oriented problem solving in Java, with attention to general as well as language-specific issues including applications, event-driven programming; elements of graphical user interfaces (GUIs); inheritance and polymorphism; exception handling; packages; applets; swing.

PGT 213/3
Analogue Electronics 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: 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 Analog Filters: Basic filter, filter response characteristics, low-pass filter, high-pass filter, band-pass filter, band-stop filter, frequency response measurement, design of filter, Butterworth, Chebychev and Elliptic

References

1. Floyd, T., 'Electronic Devices', 8th Ed., Pearson Education, Inc., 2007.
2. Boylestead, R.L, and Nashelsky, L., 'Electronic Devices and Circuit Theory',7th Ed., Prentice-Hall, 1999.
3. Malvino, A, 'Electronic Principles', 6th Ed., Mc Graw Hill,1999

PGT 206/3
Computer Architecture

Course Synopsis

This course covers both the architectural and organizational aspects of computer systems. Architectural aspects of a system are defined as the features that are available to the operating system kernel such as the instruction set, data representations and peripheral interfaces. On the other hand, organizational aspects of a system are defined as the physical implementations that realize the features given for a system. These include the design of basic building blocks such as the ALU and the control unit, as well as the logic level interface of both internal and external units. This course expects the students to have a good fundamental on digital logic design (both combinatorial and sequential logic).

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.

PGT 220/3
VLSI 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.

References

1. Wolf, Rabeay, Jan M. Weste, Neil H.E. - CMOS VLSI; A Design Perspective, Compiled by Norina Idris, Norhawati Ahmad, Rizalafande Che Ismail, Muammar Mohamad Isa, Siti Zarina Md Naziri, Muhammad Imran Ahmad. Pearson, 2008.
2. W Weste, Neil H.E. and Harris, D., CMOS VLSI Design- A Circuits and Systems Perspective, Prentice Hall, 2005.
3. Rab aey, J.M., et al., Digital Integrated Circuits – A Design Perspective, 2nd Ed., Prentice-Hall, 2003.
4. Wolf, W., Modern VLSI Design – System on Chip, Prentice Hall, 2002.
5. Wayne Wolf, Modern VLSI Design: IP-Based Design, 2009.
6. Vai, , M. M., VLSI Design, CRC Press, 2001.
7. Uyemura, John P., Chip Design for Submicron VLSI: CMOS Layout and Simulation, SGS Thomson, 2006.

PGT 205/3
Signals and Systems

Course Synopsis

This course introduce student to mathematical foundation and computational tools for processing continuous-time and discrete-time signals in both time and frequency domains. Key concepts and tools introduced and discussed in this class include linear time-invariant systems, impulse response, frequency response, convolution, filtering, sampling, and Fourier transform, Laplace Transform and z-Transform. This course serves as entry and prerequisite for any higher level course in the fields of signal processing, communications, and control.

References

1. Simon Haykin, Barry Van Veen "Signals and Systems", 2nd. Ed., Wiley, 1999.
2. Fred J. Taylor, "Principles of Signals and Systems", McGraw Hill International Ed. 1994
3. Charles L. Philips, John M. Parr, Eve A. Riskin, "Signals, Systems and Transforms", 3rd Ed., Prentice Hall International Edition, 2003.

PGT 301/3
Communication Systems

Course Synopsis

This course 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," 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 Analog Communication Systems", 4th Ed. Oxford Univ Press, 2009.
6. A.B.Calson, P. Crilly, " Communication Systems", 5th Ed. McGraw Hill, 2009.
7. Rozeha A. Rashid, Mohamad Kamal A. Rahim, Alias Mohd, Mohamad Rijal Hamid, Kamaludin Mohamad Yusof, Nor Hafizah Ngajikin, Prinsip Kejuruteraan Telekomunikasi, UTM Press, 2007
8. Ahmad Radzi Mat Isa, Asas Perhubungan Elektronik, UTM Press, 2006

PGT 320/3
Power Electronics

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.

References

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

PGT 321/3
VLSI System Design

Course Synopsis

This course will cover various important elements for VLSI design such as sequential circuit, clock design, DSM Interconnect and Power Dissipations and Low Power Design

References

1. Niel H.E. Waste, David Harris (2005). CMOS VLSI Design: A Circuits and Systems Perspective, 3rd Edition Addison Wesley.
2. Jan M. Rabaey, Anantha Chandrakasan, Borivoje Nikolic (2003). Digital Integrated Circuits: A Design Perspective. 2nd Edition. Prentice Hall.
3. Keating and Pierre Bricaud (2002). Reuse Methodology Manual for System-on-a-Chip Designs. 3rd Edition. Springer.
4. 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.
5. Wayne Wolf. (2002). Modern VLSI Design: System-on-Chip Design. 3rd ed. Prentice Hall PTR

PGT 322/3
Microcontroller

Course Synopsis
The aim or this cource is to study the concept and requirement of embededded system. This includes the characteristic of embededded system, hardware and software development, signle chip microecontroller and programming technique in assembly language and C, basic multitasking concept, developing and embedded system application.

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.

PGT 312/3
Modern Control Systems

Course Synopsis

The course aims to give the student a throught but practical understanding on the concept of control systems theory, classical control and modern control methods.

References

1. I. J. Nagrath (2005). Control Systems Engineering. New Age International.
2. Stanley M. Shinners (1998). Modern Control System Theory and Design. Wiley - IEEE.
3. P. N. Paraskevopoulos (2002). Modern Control Engineering. Marcel Dekker.

PGT 323/3
Verification On Chip

Course Synopsis

The aim of this course is to provide the introduction of system verilog language that will be used for verification to describe a basic coverage driven, constrained random layered testbench using Object Oriented Programming (OOP).

References

1. Cris spear, 'System verilog for verification', 2nd edition, Springer, 2008
2. Bergeron, J, Cerny, E., Hunter, A. Nightingale, A., 'Verification methodology manual for system verilog' Springer, 2006.
3. Farzad Nekoogar and Faranak Nekoogar, "From ASICs to SOCs: A Practical Approach,"Prentice Hall, 2003

PGT 310/3
Digital Signal Processing

Course Synopsis

Digital Signal Processing (DSP) has continued to have a major and increasing impact in many key areas of technology including telecommunication, digital television and media, biomedicine, VLSI design etc. DSP is now at the core of many new and emerging digital products and applications in the information society and is a core subject in most electronic/computer/communication engineering curricula. This course is designed to give the students the necessary mathematical tools to analyze discrete time signals and systems. The course also includes various techniques for the design of digital filters and their implementations using DSP processors.

References

1. S. Salivahanan, A. Vallavaraj, C.Gnanapriya, Digital Signal processing, Second Edition, Tata McGraw Hill Education 2010.
2. Sanjit K. Mitra, Digital Signal Processing, McGraw Hill, 2006.
3. Emmanuel C. Ifeachor, Digital Signal Processing, Prentice Hall.
4. Vinay K Ingle, John G. Proakis, Digital Signal Processing using MATLAB

PGT 334/3
Nanosystem Design

Course Synopsis

Nanosystem design is an advanced nanosystem course and divided into three parts which are nanosystems design, parallel architecture and complex integrated nanosystems and nanoelectronics and nanowire. Nanosystem design part will cover the topics on basis of nanomaterials, nanoelectronic and nanoarchitectures and application of nanodevices in integrated system. In parallel architecture and complex integrated nanosystems the topics that covered are architecture principles and nanosystems as information-processing machines. Otherwise, in nanoelectronics and nanowire the topics that covered are nanoelectronics with tunneling devices, nanoelectronics with superconducting devices and basic of nanowire development and characterization.

References

1. Karl Goser, "Nanoelectronics and Nanosystems: From Transistors to Molecular and Quantum Devices", Springer, 2004.
2. Giovanni De Micheli, Yusuf Leblebici, Martin Gijs and Janos Voros, "Nanosystems Design and Technology", Springer US, 2009.
3. K.Goser, P.Glosekotter and J.Dienstuhl, "Nanoelectronics and Nanosystems", Springer Germany, 2004.
4. Alina Voda, "Micro, Nanosystems and Systems on Chips: Modeling, Control, and Estimation", Wiley-ISTE, 2010.
5. Rainer Waser, "Nanoelectronics and Information Technology: Advanced Electronic Materials and Novel Devices", Wiley-VCH, 2003.

PGT 333/3
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.

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.

PGT 420/3
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.

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.

PGT 430/3
Micro-Electro-Mechanical System

Course Synopsis

This course will focus on design and simulation of N/MEMSdevices. The design will include several of analysis types suchas structural, electrical and mechanical while the fabricationtechnology will focus on bulk and surface micromachining. Thiscourse will also discuss the application and technology of N/MEMS packaging in various fields.

References

1. Nano and Micro-Electromechanical Systems: Fundamentals of Nano and Microengineering by Sergey E. Lyshevski and Sergey Edward Lyshevski.
2. MEMS and NEMS: Systems, Devices, and Structures by Sergey Edward Lyshevski.
3. Foundations of MEMS by Chang Liu

PGT 421/3
Artificial Intelligence System

Course Synopsis

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

References

1. 1 Michael Negnevitsky, Artificial Intelligence: A Guide to Intelligent Systems(2nd Edition), Addison-Wesley, 2005
2. 2 Li, Hongxing, Chen, C. L. P. and Huang, H. P., "Fuzzy Neural Intelligent Systems", CRC Press, U.S.A., 20012 Li, Hongxing, Chen, C. L. P. and Huang,H. P., "Fuzzy Neural Intelligent Systems", CRC Press, U.S.A., 2001.
3. 3 Adam Greenfield, Everyware: The dawning age of ubiquitous computing, New Riders, 2006.

PGT 422/3
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.

References

1. Behzad Razavi, Design of Analog CMOS Integrated Circuit, McGraw-Hill, 2000.
2. Phillip E. Allen, Douglas R. Holberg, CMOS Analog Circuit Design, Oxford University Press, 2002.
3. Paul R. Gray, Analysis and Desgn of Analog Integrated Circuit, 4th Ed, Wiley.

4. R. Jacob Baker, CMOS Circuit Design, Layout, and Simulation, Revised Second Edition Wiley-IEEE Press; 2 edition, 2007,
5. Niel H.E. Waste, David Harris. CMOS VLSI Design: A Circuits and Systems Perspective, Addison Wesley, 4 edition, 2010.

PGT 423/3
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.

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.

PGT 300/4
Final Year Project I

PGT 400/4
Final Year Project II

Course Synopsis

This is a research project in connection with engineering technology problem and under the guidance of a faculty member. The project undertaken may fall under one of the following areas: mathematical analysis, experimental tests, computer simulation, hardware and/or software development, device fabrication. For both FYP I and II, each student prepares a comprehensive engineering report, present and demonstrate findings and results of the project work.

BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (Honours) (MACHINING)

PROGRAMME OBJECTIVES (PEO)

PEO 01
To produce competent Engineering Technologists who are able to apply principles of science, engineering and modern technology in solving current and future problems related to manufacturing engineering technology.

PEO 02
To produce Engineering Technologists in manufacturing engineering field who perform work and duty ethically with high moral values and responsibility to God, nation and societies.

PEO 03
To produce creative and innovative Engineering Technologist in research and development in fulfilling the nation's requirements.

PEO 04
To produce Engineering Technologists who are able to communicate effectively with good leadership as well as able to function in teamwork environment.

PEO 05
To produce Engineering Technologists that shows enthusiasm in engaging long-life learning through continuity of learning, technical practices and professional development.

PROGRAMME OUTCOMES (PO)

PO1
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialization principles to define and apply engineering procedures, processes, systems or methodologies.

PO2
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialization;

PO3
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns;

P04
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources;

PO5
Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations;

PO6
Function effectively as individuals, and as members or leaders in diverse technical teams;

PO7
Communicate effectively with the engineering community and society at large;

PO8
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities;

PO9
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices;

PO10
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development;

PO11
Demonstrate an awareness of management, business practices and entrepreneurship;

PO12
Recognize the need for professional development and to engage in independent and lifelong learning.

STRUCTURE CURRICULUM BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (Honours) (MACHINING) – RY55

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
DISCIPLINE CORE (108)	PDT101/3 Statics and Dynamics	PDT122/3 Material Science	PDT201/3 Strength of Materials	PDT203/3 Noise & Vibration	PDT309/3 Manufacturing Economics	PDT313/4 Final Year Project I	PDT413/6 Final Year Project II	PDT400/12 Industrial Training
	PDT106/3 Engineering Graphics	PDT111/3 Manufacturing Process	PDT209/3 Industrial Safety	PDT206/3 Jigs & Fixtures Design	PDT311/4 Advanced Machining Technology II	PDT314/4 Machining Project	Elective II/3	
	PDT109/2 Workshop Practice	PDT107/2 Computer Aided Design	PDT210/4 Conventional Machining	PDT211/4 Advanced Machining Technology I	PDT312/3 Computer Aided Manufacturing	PDT315/3 Maintenance	Elective III/3	
	PDT110/3 Metrology	PDT120/3 Basic Electrical and Electronic	PDT202/3 Heat Transfer	PDT222/3 Metallurgy	PDT310/3 Quality System	PDT316/3 Sustainable Machining		
		PDT112/3 Theory in Machining		PDT212/3 Geometric, Dimensioning & Tolerance		Elective I/3		
COMMON CORE (15)	PQT111/3 Mathematics for Engineering Technology I	PQT112/3 Mathematics for Engineering Technology II	PQT213/3 Mathematics for Engineering Technology III				PTT444/3 Engineering Technologist in Society	
							PTT333/3 Engineering Technology Management	
UNIVERSITY REQUIRED (19)	UUW 233/2 Islam & Asia Civilisation (TITAS)	UZW XXX/1 Co-Curriculum	UVW 312/2 English for Technical Communication	UUW 224/2 Engineering Entrepreneurship	UUW 322/2 Thinking Skills	UVW XXX/2 Option Subject or UUT122 /2 Skill and Technology in Communication		
	UVW 410/2 University Malay Language	Found. Eng 2/2	UZW XXX/1 Co-Curriculum		UUW 235/2 Ethnic Relation			
	UZW XXX/1 Co-Curriculum							
TOTAL CREDIT	19	20	19	18	17	19	18	12
Total units for Graduation = 142								

COURSES SYLLABUS

PDT101/3 Statics and Dynamics

Course synopsis

This course comprises two parts, namely; statics and dynamics. In statics, the basic principles of engineering mechanics such as forces, moments and friction are introduced. Students are required to apply this basic knowledge in analysing the equilibrium of rigid bodies, as well as the stability of a structure. The subjects of dynamics cover the concept of kinematics and kinetics. Kinematics treats the geometric aspects of the motion, whereas kinetics analyses the forces that cause the motion. Analyses in relation to kinetic problems are solved using acceleration method, principle of work and energy, and principle of impulse and momentum.

References

1. Hibbeler, R. C., Engineering Mechanics Statics. 11th ed., Prentice Hall (2007)
2. Hibbeler, R. C., Engineering Mechanics Dynamics. 11th ed., Prentice Hall (2007)
3. Beer, F. B. and Johnston, E. R. Jr., Vector Mechanics for Engineers: Statics and Dynamics. 8th ed., Canada, McGraw_Hill (2004)
4. Beer and E.R. Johnson Jr., 'Vector Mechanics tor Engineer: Statics 8th ed. In SI Units', McGraw Hill (2004).
5. Beer and E.R. Johnson Jr., 'Vector Mechanics tor Engineer: Dynamics 8th ed. In SI Units', McGraw Hill (2004)
6. Meriam, J. L. and Kraige, L. G., Engineering Mechanics: Statics. 5th ed., USA, SI ver. Wiley (2003).
7. Meriam, J. L. and Kraige, L. G., Engineering Mechanics: Dynamics. 5th ed., USA, SI ver. Wiley (2003).

PDT106/3 Engineering Graphics

Course synopsis

This course provides the skills to students the basics of Engineering Drawing, Computer Aided Drafting (CAD) and their engineering applications. The course covers the detail of Engineering Drawing for beginners followed with projection systems, oblique and isometric sketches. The course also introduced the Computer Aided Drafting using dedicated software, AUTOCAD, which focuses on product design in 2D and 3D environment. Fundamental knowledge in dimensioning and geometrical tolerance (GDT) enhances student's ability in interpreting and assessing information from basic raw data of an engineering drawing.

References

1. Frederick E. Giesecke, Henry Cecil Spencer, John Thomas Dygdon, Alva Mitchell, Ivan Leroy Hill, James E Novak, "Technical Drawing" 10th Ed., Prentice Hall, 2002.
2. James H. Earle, "Engineering Design Graphics", IIth ed.,Pearson Prentice-Hall, 2004.
3. James D. B., "Engineering graphics with AutoCAD 2007", Pearson, 2007.
4. G. R. Cogorno, "Geometric Dimensioning and Tolerancing for Mechanical Design", McGraw-Hill, 2006.
5. R.K Dhawan, "Lukisan Mesin: Dalam Unjuran Sudut Pertama", Cetakan Pertama, Golden Books Centre Sdn. Bhd., 2002.

PDT109/2 Workshop Practice

Course synopsis

This course is a practice of manufacturing process that is used in the industry to transform from raw material to finished products such as sand casting, vacuum casting, rapid prototyping, powder metallurgy, injection molding and heat treatment processes which covers introduction, processes and application. Practical work will help students to gain effective understanding.

References

1. Mikell P. Groover (2007). Fundamentals of Modern Manufacturing, 3rd ed. John Wiley & Sons, Inc.
2. S. Kalpakjian, S.R. Schmid (2001). Manufacturing Engineering and Technology. 4th Ed. Prentice Hall International.
3. John A. Schey. (2000). Introduction to Manufacturing Processes. Mc Graw Hill.
4. Philip F. Ostwald, Jairo Munoz (1997). Manufacturing Processes and Systems. 9th ed., John Wiley & Sons.
5. E.Paul DeGarmo, J T. Black, Ronald A. Kohser (1997). Materials and Processes in Manufacturing. 8th ed., John Wiley & Sons, Inc.
6. Steve F. Krar, Arthur R.Gill, Peter Smid. Technology of Machine Tools. 6th ed. Mc Graw Hill.

PDT110/3 Metrology

Course synopsis

This course provides the skills to students the fundamental of metrology, measurement standards, and tolerance in measurement. The students are introduced to metrology equipment

such as vernier calliper, micrometer, profile projector, gage block, coordinate measuring machine (CMM) and surface roughness measurer. The course also covers measurement techniques for a reference plane, angle measurement and surface measurement.

References

1. Dotson, C.L. Fundamentals of Dimensional Metrology. 5th Edition, Unites States, Thomson Delmar Learning, 2006.
2. Placko, D. Fundamentals of Instrumentation and Measurement, London, United Kingdom, ISTE, 2007.
3. DeSilva, G.M.S., Basic Metrology for ISO 9000 Certification, Delhi, India, Butterworth-Heinemann, 2002.
4. S. Kalpakjian, S.R. Schmid. Manufacturing Engineering and Technology. 4th ed. Prentice Hall International, 2001.

PDT122/3 Material Science

Course synopsis

This course introduces students to historical perspective of materials science and engineering fundamentals characteristics begin from understanding the atomic structures, atomic bonding in solids, crystal structures, mechanical and physical properties of materials. Students will then apply the understanding on properties of materials through phase diagram, transformations and heat treatment processing on ferrous and non-ferrous alloys, polymer and advanced materials.

References

1. William D. Callister, Introduction to Materials, John-Wiley & Sons. Serope Kalpakjian, Steven R. Schmid (2010)."Manufacturing Engineering and Technology." 6th ed Prentice Hall.
2. William F. Smith, Javad Hashemi, 2006, Foundation of Materials Science and Engineering, Fourth edition, McGraw Hill.
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.

PDT111/3 Manufacturing Process

Course synopsis

This course explores the manufacturing process which used in industry to convert raw material into finished product. This course is devided into five sections. First, the introduction to manufacturing technology will be given, followed by material selection in manufacturing and heat treatment process. Secondly, the casting technology and various metal casting processes will be introduced including sand casting, investment casting, vacuum casting and other casting processes. Thirdly, overview of forming and shaping process will be given on rolling, forging, extrusion, drawing, sheet-metal forming, powder metallurgy, processing of ceramics, injection molding, and rapid prototyping process. Fourthly is about various joining process such as brazing, soldering, adhesive bonding, and mechanical fastening processes.

References

1. Groover, M.P. Fundamentals of Modern Manufacturing; Materials, Processes, and Systems, 4th Ed., John Wiley & Sons, Inc., 2010.
2. Kalpakjian S, Schmid S.R. Manufacturing Engineering and Technology, 4th ed., Prentice Hall Inc. 2001
3. Schey, J.A. Introduction to Manufacturing Processes, 3rd Ed., Mc Graw Hill, 2000.
4. Philip F. Ostwald, Jairo Munoz (1997). Manufacturing Processes and Systems. 9th ed., John Wiley & Sons.
5. E.Paul DeGarmo, J T. Black, Ronald A. Kohser (1997). Materials and Processes in Manufacturing. 8th ed., John Wiley & Sons, Inc.

PDT107/2 Computer Aided Design

Course synopsis

This course focuses on giving exposure and skill to students about the basics of 3D modeling and its application in engineering field by using 3D Modeling software. This course includes details on 3D modeling followed by producing 2D drawing, assembly drawing, exploded drawing, surface modeling, rendering and animation. All this skill will help student to produce technical drawing and virtual prototype or model. This skill is very demanding in industry.

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. R.K Dhawan, "Lukisan Mesin: Dalam Unjuran Sudut Pertama", Cetakan Pertama, Golden Books Centre Sdn. Bhd., 2002.
4. N. Zulkifli, M. H. Omar & F. F. Mohamed, "Computer Aided Drafting", UUM.
5. Frederik E. Giesecke, Alva Mithell, Hendry Cecil, Ivan Leyoy Hell, Robert Olin, John Thomas Dygdon & James E. Novak, "Engineering Graphics", 8th edition, Pearson, 2004.

PDT120/3 Basic Electrical and Electronic

Course Synopsis

This course provides basic knowledge of solving DC and AC electrical circuits. It also covers the fundamentals of electrical machines. The electronics section includes basic semi conductor diodes and transistors as well as the fundamentals of digital systems. At the end of the semester students will be able to understand, analyze and apply basic electrical and electronics concept and principles.

References

1. Hambley, A. R., Electrical Engineering: Principles and Applications, 5th ed., Pearson (2011)
2. Hughes, E., Electrical and Electronic Technology, 11th ed. Pearson (2012).
3. Zekayat, S. A., Electrical Engineering Concepts and Applications , Pearson(2012)
4. Floyd, T.L., Electronic Devices. 9th ed. Prentice Hall, Inc, 2012.
5. Floyd, T.L., Digital Fundamentals, 10th ed. Prentice Hall, Inc, 2009.

PDT 112/3 Theory in Machining

Course synopsis

In this course, the students learn the fundamentals and principles of metal cutting/machining processes common to current industrial practises. This includes single point orthogonal and turning operations, multi-point cutting operations, i.e. milling, drilling; and abrasive processes/grinding operations. Key technological principles and mechanisms of chip formations are initially explained. This is followed by discussions and evaluations of various conventional machining operations for different part shape requirements. Basic toolings for machining operations are introduced along with the machine tool structures to perform the cutting operations. Material removal rate, machining time and machining economics are analyzed as part of machinability analyses.

References

1. Krar, S.F., Gill, A.R. and Smid, P. Technology of Machine Tools. 7th Edition, United States, McGraw Hill, 2011.
2. Groover, M.P. Principles of Modern Manufacturing. 4th Edition, United States, John Wiley & Sons, 2010.
3. Kalpakjian, S., Schmid, S.R., Manufacturing Engineering & Technology. 6th Edition, United States, Pearson, 2010.
4. Stephenson, D.A., Agapiou, J.S., Metal Cutting Theory & Practise. United States, CRC Press Taylor & Francis Group, 2005.
5. Childs, T., Maekawa, K., Obikawa, T., Yamane, Y. Metal Machining: Theory and Applications, London, United Kingdom, John Wiley & Sons (accessed from Elsevier Science Direct), 2000.

PDT209/3 Industrial Safety

Course synopsis

This course gives an exposure to students to understand industrial safety standards and guidelines, quality management concept and various quality tools that allow students to understand the general picture of both areas which are being practiced by industries. At the end of this course, students are expected to be able to identify suitable quality techniques and tools to be implemented in production management and can apply Industrial Safety standards in real industrial environment.

References

1. David L. Goetsch, Quality Management – Introduction to Total Quality Management for Production, Processing, and Services. 5th Ed., Pearson Prantice Hall, 2006.
2. C. Ray Asfahl, Industrial Safety and Health Management, 5th Ed., Pearson Prantice Hall, 2003.
3. David L. Goetsch, Occupational Safety and Health, for Technologists, 4. Engineering, and Managers., 4th ed., Prentice Hall. 2002.
4. Willie Hammer, Dennis Price, Occupational Safety Management and Engineering, 5th ed., Prentice Hall. 2001.
5. Howard S. Gitlow et. al,Quality Management, 3rd ed., McGraw-Hill. 2005

PDT210/4 Conventional Machining

Course synopsis

This course introduce about safety aspects in workshop and fundamental of measurement technique followed by

milling, lathe and grinding operation which consists of introduction to basic knowledge of various cutting tools, parts of machine and its functions, machine operations, and numerous calculations involving the operations. Students will practices the conventional machining process that is used in the industry to transform from raw material to finished products. Practical work will help students to gain effective understanding.

References

1. Steve F. Krar, Arthur R. Gill, Peter Smid, Technology of Machine Tools. 6th ed. Mc Graw Hill
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. Zainal Abidin Ahmad. Proses Pembuatan. Jilid I. UTM: Cetak Ratu Sdn. Bhd, 1999.
6. Zainal Abidin Ahmad. Proses Pembuatan Jilid II. UTM: Cetak Ratu Sdn. Bhd, 1999.

PDT202/3 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., 2003, 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.

PDT203/3 Noise and Vibration

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.

References

1. J.P. Den Hartog, Mechanical Vibrations, Third Edition, Mc Graw Hill (2008)
2. Singiresu S. Rao, Mechanical Vibration, Fourth Edition, Prentice Hall (2000)
3. W. Thomson, Theory of Vibration With Application, Prentice Hall (2004)
4. W. J. Palm III. Mechanical Vibration, John Wiley & Sons (2005).
5. G Genta, Vibration of Structures and Machines (Practical Aspects), Third Edition, Springer (1998)

PDT206/3 Jigs and Fixtures Design

Course synopsis

This course provides concept and understanding to allow students to find suitable designs for components in designing machine system, jig and fixtures. It focuses on basics of power transmission system, motors, fasteners and fundamental principles of jig and fixtures. Students will be exposed with simple design problems before being assigned to compute design parameters. At the end of this course, students will be analyzed simple designs of machine components by using CAD Aided Engineering (CAE) software.

References

1. Robert L. Mortt. Machine Elements in Mechanical Design. 4th Edition. Pearson Prantice Hall, 2004.
2. Edward G. Hoffman. Jig and Fixture Design. 4th Edition. Delmar Publishers, 1996.
3. Norton, Robert L. Design of Machinery. 3rd Edition. McGraw-Hill, 2004.
4. Robert C. Juvinall and Kurt M. Marshek. Fundamental of Machine Components Design. 4th Edition. John Wiley & Sons, 2005.
5. Richard Budynass, Joseph E. Shigley and Charles R. Mischke. Mechanical Engineering Design. 7th Edition. McGraw-Hill, 2004.
6. Erik K.Henriksen. Jig and Fixture Design manual. Industrial Press INC, 1973.

PDT 211/4 Advanced Machining Technology I

Course Synopsis

This course enables students to understand the use of conventional and modern machining processes. The course begins with an introduction to machining processes, followed by analyses of machine tools. Then, students are taught about CNC programming, CNC processes, tools and control systems. Students will perform machining processes and learn how to develop programming and solve problems related with it.

References

1. Jon Stenerson, Kelly Curran, Computer Numerical Control Operation and Programming. 3rd ed., Prentice Hall, 2007.
2. By Stephen F. Krar, Arthur Gill, Exploring Advanced Manufacturing Technologies, Industrial Press Inc. New York, 2003.
3. P.N. Rao, CAD/CAM Principles and Applications, 2nd ed., Mc Graw Hill, 2002.
4. Smid, CNC Programming Handbook, 2nd ed., Industrial Press, 2002.
5. Mikell P. Groover, Fundamentals of Modern Manufacturing, 3rd ed., John Wiley & Sons, Inc., 2007.
6. S.Kalpakjian, S.R.Schmid, Manufacturing Engineering and Technology. 4th ed., Prentice Hall International, 2001.

PDT212/3 Geometric, Dimensioning and Tolerancing

Course synopsis

This course introduces the basic knowledge of Geometric Dimensioning and Tolerancing (GD&T) and applies to the drawing. Students will be exposed to GD&T fundamentals, symbols, terms, rules, profile, technique, and strategy for tolerancing parts.

References

1. Gene R. Cogorno, Geometric Dimensioning and Tolerancing for Mechanical Design, McGraw-Hill, 2006.
2. Dotson, C.L. Fundamentals of Dimensional Metrology. 5th Edition, Unites States, Thomson Delmar Learning, 2006.

PDT309/3 Manufacturing Economics

Course synopsis

This course addresses a systematic evaluation of proposed solution to engineering problems. It evaluates the monetory consequences of products, projects and processes that engineers design. The course introduces students to fundamental economics consideration and costs involve in decision making for a production or a project which will be economically acceptable and demonstrate a positive balance of long term benefits over long term costs. The students learn about fundamental cost concepts and costs involve in a production process. Then, money-time relationship (also called time value of money) and concept of equivalence expose students to the value of investment by estimating future costs or revenues. The application of money-time relationship in comparing different alternatives help to choose best solution before investing.

References

1. Sullivan, W. G., Wicks, E. M. & Luxhoj, J. T. “Engineering Economy”, 13/E, Prentice Hall, 2006.
2. Park, C.S. “Fundamental of Engineering Economics”, Prentice Hall, 2004.
3. Park, C. S. “Contemporary Engineering Economics”, 4/E, Prentice Hall, 2007.
4. Newnan, D. G., Eschenbach, T. G. and Lavelle, J. P. “Engineering Economics Analysis”, Oxford, 2004.
5. Blank, L. and Tarquin, A. “Engineering Economy”, 6/E, McGraw Hill, 2005.

PDT311/4 Advanced Machining Technology II

Course synopsis

This course is the introduction for EDM technology (Electrical Discharge Machining) which is used in industries nowadays. It includes topics about introduction to EDM technology, wire-cut and Ram (die-sinker) machining. Students are involved with system and process for both type of machining. Besides that, students are also exposed to other types of EDM process.

References

1. Carl Sommer, Steve Sommer, Complete EDM Handbook, Advance Pub., 2005
2. Elman C. Jameson. Electrical Discharge Machining, Society of Manufacturing Engineers and Machining Technology Association, 2001

3. E. Bud Guitrau. The EDM Handbook, Hanser Gardner Publications, 1997.
4. Carl Sommer, Steve Sommer. Wire EDM Handbook, Advance Publ., 2000
5. P N Rao. Manufacturing Technology: Metal Cutting & Machine Tools, Mc Graw Hill, 2000.
6. Carl Sommer. Non-Traditional Machining Handbook, Advance Pub, 2001.

PDT 312/3 Computer Aided Manufacturing

Course synopsis

This course introduces principles and application of CAD/CAM system. This course enables student to understand the theory, concept, and application of CAD/CAM in an industry. Students will be exposed to CAD software to illustrate parts and then using CAM software to convert CAD file into numerical control (NC) codes.

References

1. P.N. Rao. (2004). CAD/CAM Principles and Applications. 2nd Edition. McGraw Hill.
2. Ibrahim Zeid (2004). Mastering CAD/CAM.1st Edition. McGraw Hill International Edition.
3. Farid M. Amirouche. (2003). Principles of Computer Aided Design and Manufacturing. 2nd Edition. Prentice Hall.
4. Kunwoo Lee (1999). Principles of CAD/CAM/CAE. 1st Edition. Prentice Hall.
5. Chris McMahon and Jimmy Brown (1999). CAD/CAM: Principles, Practice and Manufacturing Management. 2nd Edition. Prentice Hall.

PDT310/3 Quality Control

Course synopsis

This course is offered to introduce quality assurance which refers to all systematic and planned activities in quality systems that are proved to be sufficient enough to build up proper confidence in meeting quality requirements whether for products or services which meet or exceed customer expectations. In this course student will learn the quality management as the key for quality assurance achievement. This course comprise of the quality management's philosophy and concepts and application of quality tools and techniques in order to achieve quality assurance. By understanding the entire contents of this course, students will be able to interpret the standard for quality assurance and quality management systems, and able to develop, formulate, and organize their works or organization effectively.

References

1. David L. Goetsch, Stanley B. Davis, Quality Management: Introduction to Total Quality Management for Production, Processing, and Services, 5th ed., Pearson Prentice Hall, 2006.
2. Melissa G. Hartman, Fundamental Concepts of Quality Improvement, 1st ed., ASQ Quality Press, Milwaukee, Wisconsin, 2002.
3. Stephen B. Vardeman, J. Marcus Jobe, Statistical Quality Assurance Methods For Engineers, !st Ed., John Wiley & Sons, Inc., 1999.
4. Fred Owen, Derek Maidment, Quality assurance: A guide to the application of ISO 9001 to process plant projects, 2nd ed,. IChemE, 1996.

PDT 313/4 Final Year Project

Course synopsis

A projects based course that exposes students to solve, analyze, design and research engineering problems in the field of manufacturing engineering, machining or product design.

ENGINEERING TECHNOLOGY PROGRAMME: BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (Honours) (AGRICULTURAL SYSTEMS)

Programme Educational Objectives

PEO 01
Graduates competent in the application of mathematics and sciences in engineering technology in managing agricultural production and natural resources.

PEO 02
Graduates capable of addressing issues of ethics, safety, professionalism, cultural diversity, globalization, environmental impact, and social and economic impact in their careers.

PEO 03
Graduates capable of managing technology and systems including capabilities to think creatively and innovatively solve problems and communicate effectively.

PEO 04
Graduates who can work collaboratively, have people skills and continually engaged in lifelong learning.

Programme Outcomes

PO 01
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialization principles to defined and applied engineering procedures, processes, systems or methodologies;

PO 02
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialization;

PO 03
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns;

PO 04
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources;

PO 05
Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations;

PO 06
Function effectively as individuals, and as members or leaders in diverse technical teams;

PO 07
Communicate effectively with the engineering community and society at large;

PO 08
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities;

PO 09
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices;

PO 10
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development;

PO 11
Demonstrate an awareness of management, business practices and entrepreneurship; and

PO 12
Recognize the need for professional development and to engage in independent and lifelong learning.

CURRICULUM STRUCTURE OF BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (Honours) (AGRICULTURAL SYSTEM) – RY56

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
Discipline Core (108)	PDT176/2 Computer Aided Drafting	PDT181/3 Engineering Mechanics	PDT276/3 Mechanics of Materials	PDT 281/3 Instrumentations and Control	PDT 376/3 Farm Power and Machinery	PDT 381/4 Final Year Project 1	PDT 476/6 Final Year Project 2	PDT 400/12 Industrial Training
	PDT177/2 Applied Chemistry	PDT182/3 Electronic Application in Agriculture	PDT277/3 Applied Thermodynamics	PDT 282/3 Applied Fluid Mechanics	PDT 377/3 Applied Heat and Mass Transfer	PDT 382/3 Controlled Environment Agriculture	PDT 477/3 Post-Harvest Technology	
	PDT178/2 Applied Biology	PDT183/2 Agricultural Mechanics and Workshop Technology	PDT278/2 Geodetics Engineering	PDT 283/2 Agribusiness Management	PDT 378/2 Precision Agriculture Technology	PDT 383/3 Renewable Energy	PDT 478/3 Agricultural Waste Management and Utilization Eng.	
	PDT179/3 Agricultural Economics	PDT184/4 Agricultural Production Systems	PDT279/4 Principles of Agronomy	PDT 284/2 Agro-ecosystems and Sustainability	PDT 379/3 Water Resource Management	PDT 384/3 Food Technology	Elective II/3	
	PDT 180/3 Engineering Science		PDT280/2 Fundamentals of Agribusiness Accounting and Finance		PDT 380/3 Automations in Agricultural Systems	Elective I/3	Elective III/3	
Common Core (15)	PQT 111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II		PQT 213/3 Mathematics for Engineering Technology III	PTT 333/3 Engineering Technology Management	PTT 444/3 Engineering Technologist in Society		
University Required (19)	UVW 410/2 University Malay Language	Found. Eng. 2/2	UUW 233/2 Islamic & Asian Civilisations	UUW 322/2 Thinking Skills	UUW 235/2 Ethnic Relation			
	UZW XXX/1 Co-Curriculum	UVW XXX/2 Option Subject or UUT122 /2 Skill and Technology in Communication	UZW XXX/1 Co-Curriculum	UUW 224/2 Engineering Entrepreneurship				
		UZW XXX/1 Co-Curriculum	UVW 312/2 English for Technical Education					
Total Credit	18	20	19	17	19	19	18	12
Total units for Graduation = 142								

COURSE SYLLABUS

PDT176/2
COMPUTER AIDED DRAFTING

Course Synopsis

This course introduces the application of drafting and modelling techniques commonly used in mechanical and civil designs 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

1. Ability to apply basic drafting skills using computer aided drafting software.
2. Ability to construct and interpret drawings in orthographic projection.
3. Ability to construct a working drawing for an engineering product or device using a CAD system.
4. Ability to accurately interpret and construct standard engineering drawings and schematic diagram.

References

1. Ibrahim Zeid. 2002. CAD/CAM Theory and Practice, McGraw Hill International, NY.
2. David G. Ullman. 2003. The Mechanical Design Process. 3rd Edition. McGraw-Hill.
3. Simon D. 2004. The Complete Guide to Digital 3D Design. Cambridge: ILEX.
4. Julien M. C. 2005. Best of 3D Virtual Product Design. Singapore: Page One Publishing Private Ltd.
5. Bruce H. 2004. Becoming a Product Designer. John Wiley and Sons. New York.

PDT177/2
APPLIED CHEMISTRY

Course Synopsis

The course covers pure chemistry (chemical elements, atoms and molecules), water and the fitness of environment, carbon and functional groups, structure and function of macromolecules and analytical chemistry (stoichiometric calculations and chemical equilibrium which comprises of acid base equilibrium, acid base titrations and reactions, and precipitation titrations).

Course Outcomes

1. Ability to apply the concepts and principles of general chemistry and analytical chemistry.
2. Ability to solve the problems in chemical reactions and calculations.
3. Ability to recognise and analyze the data from various types of chemistry of life and problem solving in analytical chemistry.

References

1. Steven, S. Z. and Susan A. Z. (2008) Chemistry 8th Edition. Cengage. USA.
2. Skoog, D. A. 2004. Fundamentals of Analytical Chemistry 8th Edition. Thomson-Brooks/Cole, Miami.
3. Gesser, H. D. (2002). Applied Chemistry : A Textbook for Engineers and Technologists Kluwer Academic, New York.
4. Wan Saime Wan Ngah and Che Sofiah Saidin (2007). Basic Analytical Chemistry 2nd Ed. Pearson Prentice Hall.
5. Campbell, N.A, Reece, J.B. 2008. Biology, 9th ed. Pearson Cummings, San Francisco

PDT178/2
APPLIED BIOLOGY

Course Synopsis

This course introduces the general concepts of biology as related to agricultural technology, the molecular and cellular aspects of living things, structure and function of plants and animals, plant and animal diversity, principles of classification and ecological relationships in organisms, and the role of genetics in organism variation and adaptation.

Course Outcomes

1. Ability to illustrate important traits in living organisms with reference to: evolution, classification and ecology
2. Ability to interpret growth in living organisms with reference to: physiology and genetics.

References

1. Campbell, N.A, Reece, J.B. 2008. Biology, 9th ed. Pearson Cummings, San Francisco
2. Alters, S. and Alters, B., .2006. Biology: Understanding Life. Wiley, New York.
3. Campbell, N.A., Williamson, B., and Heyden, R.J. 2004. Biology Exploring Life. Prentice Hall, London.
4. Collen,B., and Virginia. 2007. Biology Science for Life. 2nd Ed. Prentice Hall,
5. Sylvia, S.M. 2007. Biology. 9th Ed. McGraw Hill, London.

PDT179/3
AGRICULTURAL ECONOMICS

Course Synopsis

The course introduces to the study of economic principles with respect to supply-demand, finance and marketing of agricultural products related to food and fiber production with special references to Malaysian conditions and policies.

Course Outcomes

1. Ability to apply economic development and agriculture, with specific context of Malaysia's economy and the agriculture sector.
2. Ability to analyze consumer behavior, market supply-demand equilibrium, and elasticity.
3. Ability to analyze business behavior and market supply-demand equilibrium.
4. Ability to apply macroeconomics of agriculture with respect to international agricultural trades and exchange rates and policies.

References

1. John B. Penson, Jr. Oral T. Capps, Jr. (2010), Introduction to Agricultural Economics, 5th Ed., Prentice Hall, New York, NY.
2. Nellis, J.G. and Parker, D. (2008), Principles of Business Economics, 2nd Ed., Prentice Hall, New York, NY.
3. Richard, L.K. and Joseph, N.U. (2001),Marketing of Agricultural Products, 9th Ed. McGraw Hill, New York, NY.
4. Won, W.K. and Kennedy, P.L. (2003), International Trades and Agriculture: Theory and Practices, Wiley-Blackwell, New York, NY.
5. Gail, L.C. , Jensen, C.W. and Dauglas, D.S. (2001), Agricultural Economics, John Wiley, New York, NY.

PDT180/3
ENGINEERING SCIENCE

Course Synopsis

The course covers foundations of quantity and units of measurement, vectors, particle dynamics, work, power and momentum. Additional coverage includes forces on objects and introduction to electrical circuit.

Course Outcomes

1. Ability to analyze problems related to units of measurements, and scalar and vector quantities.
2. Ability to analyze particles in motion, energy, work, power, and momentum.
3. Ability to analyze forces acting on objects.
4. Ability to analyze basic electrical circuitry.

References

1. Raymond, A. S. and John, W. J. (2010), Physics For Scientists and Engineers, 8th Ed., Thompson Higher Education, Belmont, CA.
2. Dauglas, C.G.(2010), Physics: Principles with Applications, 6th Ed., Pearson, New York, NY.
3. Hibbler, R.C. (2010), Engineering Mechanics: Statics and Dynamics, 12th Edition, Peason Prentice Hall, Singapore.
4. Richard, J.F. (2008), Electricity Principles and Applications, 7th Ed., McGraw Hill, New York, NY.
5. Huges, E. (2005), Electrical and Electronics Technology, 9th Ed., Prentice Hall, New York, NY.

PDT181/3
ENGINEERING MECHANICS

Course Synopsis

This course covers vector representation of forces, moments and static equilibrium of particles, rigid bodies, and engineering structures, analysis of external and internal forces in structures via the methods of free-body diagrams and properties of cross-sectional areas, 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 interpret the basic principles of statics and dynamics on mechanism and bodies.
2. Ability to apply the basic principles of statics and dynamics on mechanism and bodies.
3. Ability to solve problem related forces, loads, displacement, velocity and acceleration of a body or mechanism.

References

1. Hibbler R.C. 2010.Engineering Mechanics: Statics, 12th Edition, Peason Prentice Hall, Singapore
2. Bedford, A. and Fowler, W. 2007. Engineering Mechanics: Statics and Dynamics, 5th Edition, Pearson-Prentice Hall,
3. Sheppard S.D. and Tongue B.H. 2005.Statics. Analysis and design of systems in equilibrium, Wiley, N.Y
4. Tongue B.H. and Sheppard S.D. 2005. Dynamics. Analysis and design of systems in motion, Wiley, N.Y
5. Beer, F.P. and Johnston, E.R. 2006. Vector mechanics for engineers: Statics and Dynamics, 8th edition, McGraw Hill, N.Y

PDT182/3
ELECTRONICS APPLICATION IN AGRICULTURE

Course Synopsis

This course introduces basic electrical circuit theory and analogue electronics, basic DC and AC circuits and fundamental of electronic components such as operational amplifiers and semiconductor diodes.

Course Outcomes

1. Ability to demonstrate application of the key principles of DC circuit theory including Kirchhoff's laws of current and voltage, and rules for current and voltage division.
2. Ability to apply ideal and non-ideal operational amplifier circuits.
3. Ability to analyze simple AC series and parallel circuits using phasors and complex numbers.

References

1. Bird, J. 2010. Electrical Circuit Theory and Technology. 4th Edition. Elsevier
2. Boylestad, R. 2010 Introductory Circuit Analysis. 12th Edition. Pearson
3. Harry,F.L and John, B. S. 2007. Introduction to Agricultural Engineering Technology, 3rd Edition.
4. Bishop, O. 2010 Electronics Circuits and Systems. 3rd Edition Elsevier
5. Donald,C. 2004.Standard Handbook Electronic Engineering, McGraw-Hill Professional

PDT183/2
AGRICULTURAL MECHANICS AND WORKSHOP TECHNOLOGY

Course Synopsis

This laboratory course is designed to provide students with introductory level experiences in selected major areas of agricultural mechanics technology which may include small engine maintenance and repair, metal fabrication, concrete construction, building construction, plumbing, electrical wiring, maintenance of agricultural machinery, equipment and tractors.

Course outcomes

1. Ability to follow safety procedures in the agricultural mechanics shop.
2. Ability to sketch drawings of simple projects, layout projects from drawings, creates a bill of materials for organizing agricultural mechanics shop projects.
3. Ability to identify tools and materials common to agricultural mechanics shop.
4. Ability to demonstrate basic shop skills common to agricultural mechanics shop through the construction of an agricultural mechanics project.

References

1. Herren, R. V.2006. Agricultural Mechanics: Fundamentals & Applications. 5th Edition. Thomson/ Delmar Learning.Clifton Park, NY
2. John, K. C. 2010. Mechanical Workshop Practice", PHI Learning Private Limited
3. Bawa, H. S. 2007. Workshop Practice. 3rd Edition, Tata McGraw-Hill
4. Garg, S.K. 2006. Workshop Technology: Manufacturing Processes. 2nd Edition, Laxmi Publication
5. Carl, B. and Stanley, R. B. 2006. Modern Agricultural Mechanics. 3rd Edition. Pearson/Prentice Hall Interstate.

PDT184/4
AGRICULTURAL PRODUCTION SYSTEMS

Course Synopsis

The course covers the various facets of agricultural production systems and practices, dynamism within the soil-plant-atmosphere continuum involving living organisms related to crops and fauna, components in agricultural production systems and good agricultural practices and sustainability approaches.

Course Outcomes

1. Ability to define and interpret the basic principles and processes involved in agricultural production systems.
2. Ability to solve systems/problems related to aspects in agricultural production systems.
3. Ability to choose systems related to good agricultural practices and sustainable farming

References

1. Benckiser, G. and Schnell, S. 2007. Biodiversity in Agricultural Production Systems. CRC Press / Taylor and Francis, Florida, USA.
2. Akinyemi, O. M. 2007. Agricultural Production; Organic and Conventional. Science Publishers,Inc.,USA.

3. Martins, J.H., Leonard, W.H., Stamp, D.L. and Waldren, R.P. 2005. Principles of Field Crop Production. Prentice Hall, NewYork.
4. Fageria, N.K. Baligar, V.C. and Ralph B.C. 2006. Physiology of Crop Production. Haworth Press, New York, USA.
5. Hans J. M. 2005. Globalization and Agricultural Trade Policy. Lynne Rienner Publishers, USA.

PDT276/3
MECHANICS OF MATERIAL

Course Synopsis

This course covers analysis of stresses due to various loading conditions, stresses and strains at a point, stress-strain relationships, theories of failure, energy methods, shear center, unsymmetrical bending, curved beams, torsion, and buckling problems.

Course Outcomes

1. Ability to analyze the basic concepts of mechanics of materials in design consideration.
2. Ability to analyze stress and strain by using Mohr's Circle and Hooke's Law plane stress in pressure vessels and beams.
3. Ability to use the superposition method or moments-area method to analyze the deflections of beams.
4. Ability to analyze buckling and stability for Columns and in designing columns.

References

1. Hibbeler,R.C. 2010. Mechanics of Materials. Pearson Prentice Hall, NY
2. Ugural, A. C. 2008.Mechanics of Materials 3rd Edition, Wiley, USA
3. James, M. G., Barry, J. G. 2009 Mechanics of Materials, 7th Edition, Cengage Learning Inc.
4. Ferdinand, B. P.,John, T. D. 2008. Mechanics of Materials, 8th Edition, McGraw Hill, NY
5. Cristopher, R. J., Sanjeev V. K. 2010.Mechanics of Mateials 10th Edition, Elsevier Inc, NY

PDT277/3
APPLIED THERMODYNAMICS

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. This course, covers the terminology, principles, theory, and practical application of the First and Second Law of engineering thermodynamics.

Course Outcomes

1. Ability to discuss basic concept of thermodynamic and energy transformation in the system.
2. Ability to apply the concepts of thermodynamics systems such as processes, cycles and working fluid in engineering field.
3. Ability to solve thermodynamics system performance problem analytically.
4. Ability to analyze thermodynamics system such as steam power cycles and refrigeration cycles.

References

1. Cengel, Y.A and Boles, M.A. 2008. Thermodynamics: An Engineering Approach", 6th Edition, McGraw-Hill, NY
2. Nag, P.K, 2010. Basic and Applied Thermodynamics 2nd Edition, McGraw Hill, NY
3. Robert, T. B. 2010.Modern Engineering Thermodynamics. Elsevier Inc, NY
4. Rajput, R.K, 2010. Engineering Thermodynamics, 3rd Edition, Jones and Bartlett
5. Srivastava, R. C 2007. Thermodynamics, 3rd Edition, Prentice Hall, London

PDT278/2
GEODETICS ENGINEERING

Course Synopsis

This course emphasizes on knowledge and skills using surveying equipments such as leveling, theodolite and GPS. Topics discussed include are traversing, tacheometry, mapping, setting out, triangulation, geometric design, vertical and horizontal alignment, and volume of earthwork.

Course Outcomes

1. Ability to apply concepts and principles of geodetic surveying.
2. Ability to perform surveying tasks and procedures.
3. Ability to analyze data from various types of geodetics surveying.

References

1. Uren, J and Price, W.F., (2006). Surveying for engineers 4th Edition, Palgrave Macmillan, McMillan, London.
2. Kavanagh, B.F. (2009), Surveying: Principles and applications, 8th Ed. Prentice Hall, New York, NY.
3. McCormack, J. (2004), Surveying, 5th Ed., John Wiley and Sons, New York, NY.

4. Nathanson, J., Lanzafama, M. T. dan Kissam, P. 2006. Surveying Fundamentals and Practices, 5th Edition, Person Prentice Hall, New Jersey.
5. Irvine, W. and Maclennan, F. 2006, Surveying For Construction, 5th Ed., McGraw-Hill, London.

PDT279/4
PRINCIPLES OF AGRONOMY

Course Synopsis

A foundation course in agronomy applying crop, soil, and environmental sciences in understanding agricultural systems. Topics include crop morphology and classification, soils and soil water management, mineral nutrition of crops, pest management, plant breeding, seed and grain quality and sustainable aspects of crop production.

Course Outcomes

1. Ability to relate the science and principles of agricultural crop production systems and the importance of crops to our society.
2. Ability to apply crop production principles to crop production practices.
3. Ability to demonstrate sustainable practices for agricultural crops.

References

1. Mullen R.E. 2008. Plant Production Systems, 5th edition, Kendall-Hunt Publishing, Dubuque, Iowa.
2. Gardiner, D.T. and Miller, R.W. 2008. Soils in Our Environment. 11th edition. Upper Saddle River: Pearson Prentice Hall.
3. Jones Jr., J.B. 2002. Agronomic Handbook. Boca Raton: CRC Press.
4. Anderson, W.P. 2007. Weed Science: Principles and Application. Long Grove: Waveland Inc.
5. Mauseth, J.D. 2008. Botany: An Introduction to Plant Biology, 4th edition. Ontario: Jones & Bartlett Publications.

PDT280/2
FUNDAMENTALS OF AGRIBUSINESS ACCOUNTING AND FINANCE

Course Synopsis

This course covers fundamentals of the double-entry accounting cycle as it relates to partnerships and sole proprietorships operating in the agricultural sector including the use of automated accounting software the application of an agribusiness firm.

Course Outcomes

1. Ability to apply transactions into debit and credit parts.
2. Ability to apply accounts as assets, liabilities, or owner's equity.
3. Ability to prepare and analyze a balance sheet, an income statement, and statement of owner's equity.

References

1. Silva, U.H. and Judy, U.H.(2009): Fundamentals of Agribusiness Accounting, Rex Bookstore Inc, Philippines.
2. Albrect, W.S. and Stice, J.D. (2007): Accounting: Concepts and Applications. Thompson, Mason, OH.
3. McLaney, E. and Atrill, P. (2007): Accounting: An Introduction, Prentice Hall, New York, NY.
4. Ralph, W.B. and Robert, C.T. (2008): Fundamentals of Agribusiness Finance, Iowa State University Press, Ames, IA.
5. Bamber, L.S. and Harrison, W.T. (2009): Managerial Accounting, Prentice Hall, New York, NY.

PDT281/3
INSTRUMENTATIONS AND CONTROL

Course Synopsis

The course covers the general concept of instrumentation, various measuring devices, manipulation, transmission, and recording of data, measurement standards, data analysis, calibration methods and software simulation to design and solve problems in measurement and automation systems.

Course Outcomes

1. Ability to differentiate main components in instrumentation, measurement, their integration and working principle of various measurement devices.
2. Ability to differentiate roles and features of appropriate instruments for various agricultural technology and applications.
3. Ability to solve connectivity and interfacing of different instrumentation.

References

1. David Alciatore and Michael B. Hisband. 2011. Introduction to Mechatronics & Measurement Systems 4th edition. McGraw-Hill Publishing.
2. John G. W. 1998. Measurement, Instrumentation & Sensors Handbook.

3. Douglas V.H. 1992.Microprocessors and Interfacing. McGraw-Hill Publishing.
4. John P. and Steve M. 2003. Practical Data Acquisition for Instrumentation and Control Systems. Newnes.
5. Campbell, M. 1996. Sensor Systems for Environmental Monitoring, Thomson Science and Professional. Glaslow.

PDT282/3
APPLIED FLUID MECHANICS

Course Synopsis

This course emphasizes fundamental concepts and problem-solving techniques in 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 common devices used in measuring pressure and flow rates and turbo machineries.
2. Ability to analyze pressures, forces, and energy in fluid systems.
3. Ability to calculate pressure, forces and flow rates in dynamic fluid system.

References

1. Cengel, Y. A. Cimbala, J. M. 2010. Fluid Mechanics: Fundamental and Applications, 2nd edition in SI units. McGraw-Hill, New York.
2. Mott, R.L. 2006. Applied Fluid Mechanics, 6th Edition, Prentice Hall, London.
3. Crowe, C.T., Elger, D.F., and Robertson, J.A.2005. Engineering Fluid Mechanics, 8th Edition. John Wiley, New York.
4. Pijush K. K., Ira M. C., David R. D. 2011. Fluid Mechanics with Multimedia DVD 5th ed.
5. Bruce R. M. 2009. Fundamental of Fluid Mechanics. 6th ed. John Wiley, NY

PDT283/2
AGRIBUSINESS MANAGEMENT

Course Synopsis

As farming becomes more complex and global, and that the economic pressure on farming increases, future farm managers need to be equipped with knowledge in management and business strategies. This course covers strategy, marketing, financial, operations quality, risks, human resources, and organizational management.

Course Outcomes

1. Ability to apply various management functions to agribusiness entity.
2. Ability to analyze business process improvement using quality tools.
3. Ability to analyze time-value of money.

References

1. Kent, D.O. (2008). Farm Management: Principles and Strategies, Iowa State Press, Ames, IA.
2. Rickettes, C. (2008). Agribusiness: Fundamentals and Applications, Delmar Cengage Learning.
3. Rawlins, N.O. (2004) Introduction to Agribusiness, Thompson Learning, OH
4. Ralph, W.B. and Robert, C.T. (2008) Fundamentals of Agribusiness Finance, Iowa State University Press, Ames, IA.
5. Bamber, L.S. and Harrison, W.T. (2009) Managerial Accounting, Prentice Hall, New York, NY

PDT284/2
AGRO-ECOSYSTEMS AND SUSTAINABILITY

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 current practices and design are covered.

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, D. R.2009. Sustainable natural resource management for scientists and engineers, Cambridge University Press, New York
2. Michel D.L. and Luc D. 2008. Sustainable management of natural resources : Mathematical models and method, Springer-Verlag Berlin Heidelberg

3. Mason.J. 2003Sustainable Agriculture. 2nd Edition. Landlinks Press, Collingwood Vic. Australia.
4. Gliessman, S. R. 2001. Agroecosystem sustainability: developing practical strategies, CRC Press, Washington.
5. Anil S. and David C.2004. New Dimension in Agroecology. CRC Press. USA.

PDT376/3
FARM POWER AND MACHINERY

Course Synopsis

The course covers the basic of machines and the importance of mechanization for various farm operations, selection of appropriate machines and its maintenance and the management of farm machineries.

Course Outcomes

1. Ability to apply the basic principles, construction and working of farm machinery for different crops and livestocks.
2. Ability to select and assemble appropriate machinery, use, repair and maintenance.
3. Ability to manage agro machinery service centre.

References

1. Brian,B. 2005. Farm Machinery, Fifth Edition, Old Pond Publishing Ltd,
2. Hunt, D. 2001. Farm Power and Machinery,Management. Tenth Edition. Blackwell Publishing Professional. United State of America.
3. Bello, S. R. Adegbulugbe, T. A. and Odey, S.O. 2010. *Farm* Power and Machinery Practical workbook.
4. Goering, C. E. and Handerson, A. C. 2004. Engine and Tractor Power. ASME.
5. Culpin, C. 2008. Farm Machinery, Fourth Edition. Hesperides Press.

PDT377/3
APPLIED HEAT AND MASS TRANSFER

Course Synopsis

The course covers the application of various energy resources to generate power useful for processing biological materials and focuses on the technology, production process and engineering of renewable sources of energy which includes solar, wind, wave, and energy from biomass.

Course Outcomes

1. Ability to discuss mechanisms and characteristics of heat and mass transfer**.**
2. Ability to apply mathematical models of various heat transfer mechanisms.
3. Ability to analyze different types of heat exchangers, heat transfer coefficient for heat exchanger and energy analysis on heat exchanger.
4. Ability to analyze and calculate physical mechanism of mass transfer, the rate of mass diffusion, and simultaneous heat and mass transfer.

References

1. Yunus A. Cengel (2006). Heat and Mass Transfer: A Practical Approach, 3rd Ed., McGraw Hill, New York, . Pearson, Prentice-Hall.
2. Incropera, F. P. DeWitt, D. P. (2007). Fundamentals of Heat and Mass Transfer. John Wiley Inc.. London.
3. Holman, J.P. (2002) Heat Transfer, 8th SI Metric Edition. McGraw-Hill. New York.
4. Baehr, H. D. Stephan, K. (2006). Heat and Mass Transfer. 2nd Edition. Springer. New York.
5. Welty, J. R. Wicks, C.E. Wilson,R.E. Rorrer, G. (2008). Fundamentals of Momentum, Heat and Mass Transfer . John Wiley & Sons, New York.

PDT378/2
PRECISION AGRICULTURE TECHNOLOGY

Course Synopsis

This course covers the essential aspects of Precision Agriculture (PA) concepts including soil/landscape and crop spatial variability, GIS, DEM, GPS, sensors, variable rate machinery, PA software, remote sensing; geostatistics, sampling, experimental designs, precision integrated crop management, data acquisition, processing, and management and socio-economical and e-marketing aspects.

Course Outcomes

1. Ability to illustrate the concept, component and application of precision farming in agriculture.
2. Ability to apply spatial information and precision agriculture technologies to improve soil and crop management, environmental and socio-economical aspects.
3. Ability to analyze geo-referenced data using spatial information technologies.

References

1. Morgan M. and D. Ess. (2003). The precision-farming guide for agriculturists. 2nd Ed. John Deere Publishing. Moline, Illinois, USA.
2. Heywood, I. Cornelius S. and Carver, S. (2006). An Introduction to Geographical Information Systems 3rd Ed., Pearson Education Limited. England.
3. Lilesand, T.M. and Keifer, R.W. (2007). Remote Sensing and Image Interpretation, John Wiley & Sons, University of California.
4. Thurston, J., Poiker, T. dan Moore, J. (2003). Integrated Geospatial Technologies – A Guide to GPS, GIS and Data Logging, Canada: John Wiley & Sons, Inc.
5. Kavanagh, B.F. (2009), Surveying: Principles and applications, 8th Ed. Prentice Hall, New York, NY.

PDT379/3
WATER RESOURCES MANAGEMENT

Course Synopsis

This course introduces principles of surface and ground water hydrology and their applications in water resources engineering, 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 water resources management principles, regulatory issues, management of water resources for sustainable development, tools for water resources management; economic analysis, water supply, water demand, climate change and water resources management, extremes (floods and droughts), water management in the Malaysia practices and use of computer-based tools in solving water resources management problems.

Course Outcomes

1. Abilityto analyze principle of water resources, planning and management.
2. Ability to infer the components of hydrologic cycle and the affect to human daily lives.
3. Ability to analyze hydrologic data for engineering design and management.

References

1. Chin, D.A., (2006) Water-resources Engineering, Prentice Hall, Upper Saddle River, NJ,
2. Thomas V.C. (2009) Principles of Water Resources: History, Development, Management, and Policy 3rd Edition, John Wiley. United State of America.
3. Simonovic, S.P. (2009) Managing water resources: Methods and tools for a systems approach, Earthscan, London.
4. Mays, L.W. (2005) Water Resources Engineering, John Wiley. United State of America.
5. Cech, T. V., (2002) Principles of Water Resources, John Wiley & Sons, Inc. Durbin.

PDT380/3
AUTOMATIONS IN AGRICULTURAL SYSTEMS

Course Synopsis

This course covers advanced study on instrumentation with emphasis on selection of measurement techniques and transducers to sense physical properties of biological materials with application to agricultural, food processing industries and biological system. Application of biosensors in agriculture, design of automation system and machine/gentry for agricultural systems.

Course Outcomes

1. Ability to identify and apply the concepts of automated machines and equipment and to agricultural related problems.
2. Ability to operate with existing biosensor systems and transducers, as well as to design new sensors.
3. Ability to identify and assemble industrial sensors in farming system

References

1. Mikell, P. G. (2008). Automation, Production Systems and Computer-Integrated Manufacturing . Pearson, Prentice-Hall. United State of America
2. Considine, D.M. editor in chief. (1986). Standard Handbook of Industrial Automation. Chapman and Hall. New York.
3. Lansky, Z.J. Schrader, L.F. (1986). Industrial Pnuematic Control. Marcel-Dekker. New York.
4. Rehg, J. A. (2002). Introduction to Robotics in CIM Systems.5th Edition. Prentice Hall. University of Michigan
5. Dunn, I. J. Heinzle, E. Ingham, J. Prenosil, J. E. (2003). Biological Reaction Engineering Dynamic Modelling Fundamentals with Simulation Examples. 2nd Edition, John Wiley. Federal Republic of Germany.

PDT381/4
FINAL YEAR PROJECT 1

Course Synopsis

A short-term research project in engineering operations for producing agricultural systems and technologies including research writing and presentation of the research outcome in the form of thesis and seminar.

Course Outcomes

1. Ability to apply and integrate theory and practical to solve the engineering problems.
2. Ability to develop suitable research methodology for the project.
3. Ability to present and defend effectively project proposal to selected audience.

References

1. Buku Panduan Projek Tahun Akhir UniMAP

PDT382/3
CONTROLLED ENVIRONMENT AGRICULTURE

Course Synopsis

The course covers design of controlled environment agricultural structures which include thermal and environmental engineering analyses appropriate for controlled environment agricultural production facilities for plants and animals. Major topics include psychrometrics, heat transfer, ventilation and heating, air distribution within buildings, and control systems.

Course Outcomes

1. Ability to analyze heat and mass transfer of plants and animals structures.
2. Ability to analyze natural and forced cooling and heating for plants and animals structures.
3. Ability to analyze mechanical and natural ventilation for plants and animal structures.

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. (2002), Microcontroller Based Temperature Monitoring & Control, Newnes, Oxford.
5. Tiwari, G.N. (2003). Greenhouse Technology for Controlled Environment, Alpha Science, New York.

PDT383/3
RENEWABLE ENERGY

Course Synopsis

The course covers the application of various energy resources to generate power useful for processing biological materials and focuses on the technology, production process and engineering of renewable sources of energy which includes solar, wind, wave, and energy from biomass.

Course Outcomes

1. Ability to explain technologies used in generating mechanical and electrical power for biosystems
2. Ability to demonstrate the concepts of renewable energy conversion suitable for production and processing of biological materials.
3. Ability to evaluate the efficiency and performance of different renewable energy generating systems.

References

1. Aldo, V. D. R. (2009). Fundamentals of Renewable Energy Processes. Elsevier Academic Press. Amsterdam.
2. Freris, L.L. and Infield, D.G. (2008). Renewable Energy in Power Systems. John Wiley. D G Infield Publisher: Chichester, U.K
3. Sorensen, B. (2011). Renewable Energy. Academic Press. Britain.
4. Thumann, A. and Mehta, D.P. (200). Handbook of Energy Engineering, Sixth Edition. The Fairmont Press Inc. United State of America.
5. Nelson, C.V. (2009). Wind Energy: Renewable Energy and The Environment. CRC Press. United State of America.

PDT384/3
FOOD TECHNOLOGY

Course Synopsis

This course covers multidisciplinary field of food technology and related industries. Topics covered include food science, food ingredients, nutrition, nutritional information, food spoilage, food production systems, preservation processes, freezing, drying, direct-heating, radiation, extrusion and packaging, freezing, texturization, mechanical separation and food biotechnology.

Course Outcomes

1. Ability to differentiate the principles of food technology.
2. Ability to interpret ingredients and nutrition in food.
3. Ability to solve problems involved in food production.

References

1. Meireles, A. 2009. Extracting bioactive compounds for food products, CRC Press, NY
2. Campbell-Platt, G. 2009. Food Science and Technology. John Wiley, New York.
3. Martinez, J.L. 2008. Supercritical fluid extraction of nutraceuticals and bioactive compounds, CRC Press, NY.
4. Heldman, D.R. and Singh, R.P. Food Process Engineering.
5. Toledo, R.T. Fundamental of Food Process Engineering.

PDT385/3
BIOMATERIAL ENGINEERING (ELECTIVE)

Course Synopsis

This course covers structure and properties of biomaterial and related solids, physical and chemical bases for properties exhibited by materials, polymeric biomaterials, metallic biomaterials, ceramic biomaterials and composite materials. Material properties including mechanical, electrical, magnetic and thermal behaviour, applications of biomaterials in agricultural systems, relationship between physical and chemical structure of materials and biological system response, selection, fabrication and modification of materials for specific applications, biomaterials processing and degradation, implant requirements, host-implants reactions including wound healing response and inflammatory response, physiological and biomechanical basis for soft-tissue implants, design of modified biomaterials, bulk and surface characterization of materials and regulatory and ethical concerns dealing with the implementation and commercialisation of biomaterials.

Course Outcomes

1. Ability to analyze the biomaterial physical, chemical and biological properties.
2. Ability to design the processing system for a biomaterial.
3. Ability to recommend the commercialization potential of biomaterial

References

1. Chu P K and Liu X . 2008. Biomaterials Fabrication and Processing Handbook. CRC Press
2. J. A. Schey. 2000. Introduction to Manufacturing Processes, Third Edition. McGraw-Hill Higher Education: Boston.
3. Stroshine,R. 2007. Physical Properties of Agricultural Materials and Food Products, Purdue University.
4. Nuri, N. 2007. Physical Properties of plant and animal materials, Taylor and Francis.
5. Rao,M.A. and Rizvi, S. S. H. 2005. Engineering Properties of Foods. Taylor and Francis.

PDT386/3
INTEGRATED AGROSYSTEMS (ELECTIVE)

Course Synopsis

An advanced course integrating principles of crop production, animal husbandry, aquaculture, soils and environmental sciences in agricultural systems. Topics include concept and principles of biologically integrated farms, components, interactions, techniques and energy flows of integrated farms.

Course Outcomes

1. Ability to compare and contrast between integrated farming and conventional farming.
2. Ability to categorize the components, interactions and energy flows in an integrated farming system.
3. Ability to demonstrate sustainable practices of integrated farming systems.

References

1. Panda, S.C. 2006. Crop Management and Integrated Farming.Agrobios.
2. Gardiner, D.T. and Miller, R.W. 2008. Soils in Our Environment. 11th edition. Upper Saddle River: Pearson Prentice Hall.
3. Taylor, R.E. and Field, T.G. 2007. Scientific Farm Animal Production, 9th edition. Upper Saddle River: Prentice Hall
4. Anderson, W.P. 2007. Weed Science: Principles and Application. Long Grove: Waveland Inc.
5. Southgate, P. And Lucas, J.S. 2003. Aquaculture: Farming Aquatic Animals. Ames, Iowa: Iowa State University Press.

PDT476/6
FINAL YEAR PROJECT 2

Course Synopsis

A short-term research project in engineering operations for producing agricultural systems and technologies, including research writing and presentation of the research outcome in the form of thesis and seminar.

Course Outcomes

1. Ability to apply and integrate theory and practical to solve the engineering problem.
2. Ability to develop suitable research methodology for the project.
3. Ability to present and defend effectively project proposal to selected audience.
4. Ability to evaluate the commercialization potential for proposed project

References

1. Buku Panduan Projek Tahun Akhir UniMAP

PDT477/3
POST-HARVEST TECHNOLOGY

Course Synopsis

This course introduces the overview of post-harvest handling technology of selected commodities that emphasizes on the basic of pre-harvest, harvest factors and post harvest handling technology fresh production, post-harvest treatment and processing, packaging operation and appropriate equipment, post harvest pest management, quality assurance and preparation of fresh cuts, and socio-economics of post harvest.

Course Outcomes

1. Ability to analyze the physical properties of agricultural products in order to apply the appropriate post-harvest handling technology.
2. Ability to distinguish the packaging operation and propose the appropriate equipment for handling this operation.
3. Ability to differentiate the preharvest and harvest factors that affects on postharvest quality.

References

1. Ofelia,K.B and Elda,B.E. (2010). Postharvest Technology for Southeast Asian Perishable Crop, Second Edition, Philippines.
2. Chakraverty,A. (2006). Handbook of post-harvest technology: Cereals, Fruits, Vegetables, Tea and Spice, Marcel Dekker
3. Wills, R.B.H, Mc Glasson and Graham, (2007). Post Harvest and Introduction to the Physiology and Handling of Fruit, Vegetable and Ornamentals, University of New Jersey Word Press
4. Kays, S.J. (1998). Postharvest Physiology of Perishable Plant Products, CBC pub. New Delhi.
5. Knee,M. 2002. Fruit quality and Its Biological Basis. Sheffield Academic Press. UK.

PDT478/3
AGRICULTURAL WASTE MANAGEMENT AND UTILIZATION ENGINEERING

Course Synopsis

This course covers the agricultural sources of pollution (pesticides, commercial fertilizer, on-farm food processing wastes and animal manure) and their effect on the environment. Physical, chemical and biological properties of agricultural waste materials, treatment processes of agricultural wastes, methods of land application of agricultural wastes, and technologies for utilization of agricultural wastes for biogas production and animal feed.

Course Outcomes

1. Ability to recommend suitable physical, chemical and/or biological treatment of industrial and agricultural organic wastes.
2. Ability to design systems for the collection, handling, treatment and utilization of wastes.
3. Ability to propose suitable utilization technique for agricultural waste and wastewater to sustain an environmental

References

1. Liu, S. 2007. Food and Agricultural Wastewater Utilization and Treatment, Wiley-Blackwell.
2. Inc, M. E., Tchibanoglous, G. Burton, F.L. Stensel, H.D. 2003. Wastewater Engineering: Treatment, Disposal and Reuse 4th Edition. McGraw Hill,New Delhi.
3. Unger, P.W., 1994. Managing Agricultural Residues. Lewis Pub., USA.
4. William, T.P., 2005. Waste Treatment and Disposal. 2nd Edition, John Wiley, England.
5. Hammer, M.J and Hammer M.J Jr, 2008. Water and Wastewater Technology 6th Edition in SI Unit, Prentice Hall, Upper Saddle River, NJ.

PDT479/3
BIO-RENEWABLE SYSTEMS (ELECTIVE)

Course Synopsis

An in-depth introduction to bio-renewable concepts in relation to converting bio-renewable resources into bio-energy, bio-based products, feedstock production, economics, logistics and marketing of products and co-products.

Course Outcomes

1. Ability to differentiate biorenewable resources.
2. Ability to compare and contrast the products, co-products, production processes, economics and marketing of bio-renewable resources.
3. Ability to analyze conversion of bio-renewable resources into bio-energy and bio-based products.

References

1. Brown, R.C. and Stevens, C. (eds). 2011. Thermochemical Processing of Biomass: Conversion into Fuels, Chemicals and Power. Willey. New York.
2. Blaschek, H.P., Ezeji, T. and Scheffran, J. 2010. Biofuels from Agricultural Wastes and Byproducts. Wiley-Blackwell. New York.
3. Clark, J.H., E. Fabien and Deswarte, I. 2008. Introduction to Chemicals from Biomass. Wiley. New York.
4. Dewulf, J. and Langenhove, H.V. (eds). 2006. Renewables-Based Technology: Sustainability Assessment. Wiley. New York.
5. Zatzman, G. 2011. Sustainable Energy Pricing. Wiley. New York.

PDT480/3
FOOD PROCESSING ENGINEERING (ELECTIVE)

Course Synopsis

This course covers multidisciplinary field of applied physical sciences that combines science and engineering education for food and related industries. Topics covered include introduction to food engineering, fluid flow theory, heating and cooling processes for foods, thermal processes, food freezing and freeze concentration, evaporation and freeze concentration, food dehydration, filtration, sedimentation and centrifugation, membrane process, extrusion and cleaning and sanitation.

Course Outcomes

1. Ability to categorize the appropriate physical characteristic according to food processing.
2. Ability to differentiate the principles of food engineering operations.
3. Ability to analyze the problem that involved in food engineering operations and propose the solutions**.**

References

1. Singh, R. P. Heldman, D.R. (2009). Introduction to Food Engineering. 4th ed. Academic Press. Elsevier.
2. Heldman, D. R. and Singh, R. P. (1981). Food Process Engineering. AVI Publishing Co. Westport, CT.
3. Toledo, R.T. (2007). Fundamental of Food Process Engineering. 3rd ed. Aspen Publisher. New York.
4. P.G. Smith.(2011). Introduction to Food Process Engineering, 2nd Ed. Springer. New York.
5. Shafiur Rahman (2009). Food Properties Handbook, 2nd Ed., CRC Press. Boca Raton, FL.

PDT481/3
ADVANCES IN AGROTECHNOLOGY (ELECTIVE)

Course Synopsis

This course covers inventions, achievements, acceptance and challenges in the use of modern agricultural technologies to increase yield and quality of agricultural produce with emphasis on the application, transfer and management of technologies that regulate crop and soil quality in relation to social, technical and environmental conditions.

Course Outcomes

1. Ability to apply modern technologies in the production, handling and processing of agricultural products.
2. Ability to distinguish modern agricultural technologies that would improve quantity and quality of agricultural products.
3. Ability to experiment with new technologies and alternative solutions in agricultural production.

References

1. Burton, L.D. 1998. Agriscience and Technology. Thompson & Delmar Learning, NY.
2. Burton, L.D. 2002. Agriscience: Fundamentals and Application, Thompson & Delmar Learning, NY
3. Yeoshua, S. B. 2005. Environmentally Friendly Technologies for Agricultural Produce Quality. Boca Raton, FL: Taylor & Francis.
4. Field, H. L. and Solie, J. 2007. Introduction to Agricultural Engineering Technology: A Problem Solving Approach. New York, NY: Springer.
5. Prevost, P. 1997. Fundamentals of modern agriculture. Science Publisher Inc., New Hampshire.

PDT482/3
FOOD AND HERBAL CROP PRODUCTION TECHNOLOGY (ELECTIVE)

Course Synopsis

This course covers crop production practices of important food crops (paddy, maize/corn, sweet potato and cassava) in meeting the energy requirements and ensuring food security and food safety as well as selected herbal crops with pharmaceutical/nutraceutical/medicinal properties

Course Outcomes

1. Ability to distinguish appropriate crop production technology.
2. Ability to apply good agricultural practices in food and herbal crop production.
3. Ability to select new technology to increase yield.

References

1. Hillocks, R.J.,Thresh, J.M. and Belloti, A. 2002. Cassava: Biology, production and utilization. CABI Publication, Oxford.
2. Oztekin, S. and Martinov, M. 2007. Medicinal and aromatic crops: harvesting, drying and processing. CRC Press, NY
3. Manrique, L.A. 1998. Sweet potato: Production principles and practices. Manrique International Agrotech, Honolulu.
4. Smith, C.W., Betran, J. and Runge, E.C.A. 2004. Corn: Origin, history, technology and production. Wiley, New Jersey.
5. Smith, C.W. and Dilday, R.H. 2002. Rice: origin, history, technology and production. Wiley, New Jersey.

BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY [Honours] [PRODUCT DEVELOPMENT]

Programme Objectives [PEO]

PEO 01
To produce competent Engineering Technologists who are able to apply principles of science, engineering and modern technology in solving current and future problems related to Product Development Engineering technology.

PEO 02
To produce Engineering Technologists in product development field who perform work and duty ethically with high moral values and responsibility to God, nation and societies.

PEO 03
To produce creative and innovative Engineering Technologist in research and development in fulfilling the nation's requirements.

PEO 04
To produce Engineering Technologists who are able to communicate effectively with good leadership as well as able to function in teamwork environment.

PEO 05
To produce Engineering Technologists that shows enthusiasm in engaging long-life learning through continuity of learning, technical practices and professional development.

Programme Outcomes [PO]

PO1
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialization principles to define and apply engineering procedures, processes, systems or methodologies.

PO2
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialization;

PO3
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns;

P04
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources;

PO5
Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations;

PO6
Function effectively as individuals, and as members or leaders in diverse technical teams;

PO7
Communicate effectively with the engineering community and society at large;

PO8
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities;

PO9
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices;

PO10
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development;

PO11
Demonstrate an awareness of management, business practices and entrepreneurship;

PO12
Recognize the need for professional development and to engage in independent and lifelong learning.

STRUCTURE CURRICULUM BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (Honours) (PRODUCT DEVELOPMENT) – RY57

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
Discipline Core (108)	PDT 101/3 Statics and Dynamics	PDT 122/3 Material Science	PDT 201/3 Strength of Materials	PDT 240/3 Applied Ergonomics and Safety	PDT 341/3 Industrial Dialogue		PDT 442/3 Commercialization Culture	PDT 400/12 Industrial training
	PDT 126/3 Design Fundamental	PDT 128/2 Design Visualization	PDT 229/3 Design Integration	PDT 230/3 Design Studio I	PDT 330/3 Design Studio II	PDT 313/4 Final Year Project I (FYP I)	PDT 413/6 Final Year Project II (FYP II)	
	PDT 127/2 Design Appreciation	PDT 111/3 Manufacturing Process			PDT 343/3 Economic Principles			
	PDT 106/3 Engineering Graphics	PDT 131/3 Computer Aided Industrial Design I (CAID I)	PDT 231/3 Computer Aided Industrial Design II (CAID II)	PDT 232/3 Product Data Management (PDM)	PDT 344/3 Innovation Management & Product Development	PDT 346/3 Production Management for Designers		
	PDT 133/2 Workshop Technology	PDT 134/3 Design Practice	PDT 234/3 Rapid Prototyping I (RP I)	PDT 235/3 Rapid Prototyping II (RP II)		PDT 3XX/3 Elective 1	PDT 4XX/3 Elective 2	
		PDT 120/3 Basic Electrical and Electronic	PDT 236 /2 Computer Programming		PDT 345/3 Consumer Behaviour	PDT 347/3 Product Study & Professional Practice		
Common Core (15)	PQT 111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II	PQT 213/3 Mathematics for Engineering Technology III				PTT 333/3 Engineering Technology Management	
							PTT 444/3 Engineering Technologist in Society	
University Required (19)	UZW XXX/1 Co-Curriculum	UZW XXX/1 Co-Curriculum	UZW XXX/1 Co-Curriculum	UUW 224/2 Engineering Entrepreneurship	UVW 410/2 University Malay Language	UUW 233/2 Islam & Asia Civilisation (TITAS)		
	UVW XXX/2 Option Subject or UUT 122/2 Skill Technology in Communication		Found. Eng. 2/2	UUW 322/2 Thinking Skills		UUW 235/2 Ethnic Relation		
				UVW 212/2 English for Technical Communication				
Total Credit	19	21	20	18	17	17	18	12
Total Unit for Graduation = 142								

COURSES SYLLABUS

PDT101/3 Statics and Dynamics

Course synopsis

This course comprises two parts, namely; statics and dynamics. In statics, the basic principles of engineering mechanics such as forces, moments and friction are introduced. Students are required to apply this basic knowledge in analysing the equilibrium of rigid bodies, as well as the stability of a structure. The subjects of dynamics cover the concept of kinematics and kinetics. Kinematics treats the geometric aspects of the motion, whereas kinetics analyses the forces that cause the motion. Analyses in relation to kinetic problems are solved using acceleration method, principle of work and energy, and principle of impulse and momentum.

Course outcomes

1. Ability to apply and analyse the basic principles of physics related to static such as force, moment, Newton's First , second and Third Law, trusses, frame and machine.
2. Ability to apply and analyse the structures and frameworks problems by constructing, sketching and/or drawing free body diagram in ensuring static equilibrium.
3. Ability to apply and analyse the kinematics and kinetics for particles and systems of particles.
4. Ability to apply and analyse the planar kinematics and kinetics of a rigid body.

References

1. Hibbeler, R. C., Engineering Mechanics Statics. 11th ed., Prentice Hall (2007)
2. Hibbeler, R. C., Engineering Mechanics Dynamics. 11th ed., Prentice Hall (2007)
3. Beer, F. B. and Johnston, E. R. Jr., Vector Mechanics for Engineers: Statics and Dynamics. 8th ed., Canada, McGraw_Hill (2004)
4. Beer and E.R. Johnson Jr., 'Vector Mechanics tor Engineer: Statics 8th ed. In SI Units', McGraw Hill (2004).
5. Beer and E.R. Johnson Jr., 'Vector Mechanics tor Engineer: Dynamics 8th ed. In SI Units', McGraw Hill (2004)
6. Meriam, J. L. and Kraige, L. G., Engineering Mechanics: Statics. 5th ed., USA, SI ver. Wiley (2003).
7. Meriam, J. L. and Kraige, L. G., Engineering Mechanics: Dynamics. 5th ed., USA, SI ver. Wiley (2003).

PDT106/3 Engineering Graphics

Course synopsis

This course provides the skills to students the basics of Engineering Drawing, Computer Aided Drafting (CAD) and their engineering applications. The course covers the detail of Engineering Drawing for beginners followed with projection systems, oblique and isometric sketches. The course also introduced the Computer Aided Drafting using dedicated software, AUTOCAD, which focuses on product design in 2D and 3D environment. Fundamental knowledge in dimensioning and geometrical tolerance (GDT) enhances student's ability in interpreting and assessing information from basic raw data of an engineering drawing.

Course outcomes

1. To apply the basic drafting, sketching engineering components, and common term used in engineering drawing.
2. To apply orthographic, auxiliary view, cross section and isometric in engineering drawing.
3. To apply geometric, dimensioning, and tolerancing (GDT) in engineering drawing.
4. To apply detail and assembly drawing in engineering drawing.

References

1. Frederick E. Giesecke, Henry Cecil Spencer, John Thomas Dygdon, Alva Mitchell, Ivan Leroy Hill, James E Novak, "Technical Drawing" 10th Ed., Prentice Hall, 2002.
2. James H. Earle, "Engineering Design Graphics", IIth ed.,Pearson Prentice-Hall, 2004.
3. James D. B., "Engineering graphics with AutoCAD 2007", Pearson, 2007.
4. G. R. Cogorno, "Geometric Dimensioning and Tolerancing for Mechanical Design", McGraw-Hill, 2006.
5. R.K Dhawan, "Lukisan Mesin: Dalam Unjuran Sudut Pertama", Cetakan Pertama, Golden Books Centre Sdn. Bhd., 2002.

PDT133/2 Workshop Technology

Course synopsis

In this course, explanation about safety aspects in workshop will be covered,followed by fundamental measurement techniques , and use of measurement equipment such as Vernier Caliper , Chiseling , Sawing , etc. Students will be introduced to fabrication, sheet metal forming, and welding processes which consists of introduction to basic knowledge of various cutting methods and hand tools, such as file, hacksaw, chisel, and etc.

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 that it used in the industry to transform raw material to finished products. Practical work will help students gain effective understanding.

Course outcomes

1. Work in a group, communicate effectively; apply basic industrial safety regulation as well as emergency first aid techniques.
2. Ability to apply and understand engineering drawing and able to transfer for model/prototype fabrication.
3. Define and operate the conventional machining.

References

1. Steve F. Krar, Arthur R.Gill, peter Smid. Technology of Machine Tools. 6th ed. McGraw Hill, 2007.
2. S.Kalpakjian, S.R. Schimd (2001), Manufacturing Engineering and Technology. 5th ed. Prentice Hall International.
3. Mikell P. Groover (2007), Fundamentals of Modern Manufacturing. 3rd ed. John Wiley & Sons, Inc.
4. E.Paul DeGarmo, JT. Black, Ronald A. Kosher (1997). Materials and Processes in Manufacturing. 8th ed., John wiley & Sons, Inc.
5. John A.Schey. Introduction to Manufacturing Processes . Mc Graw Hill,2000.

PDT126/3 Design Fundamental

Course synopsis

The subject introduces students to the theory and practice of art. In this course, the elements of art (line, color, shape/ form, space, value, and texture) and the principles of art (balance, harmony, unity, emphasis, repetition, rhythm, contrast, and composition) are discussed and practiced through student individual or group projects. Students will be exposed to the topics about Nature of Design; Design Process and Communication; Design Techniques and Critiques. The most important topic in this course is visual language, which comprises of exploration towards visual elements and design principles. In addition, students will be exposed and experienced the aesthetics value of an art work, through creating graphical images or 3 dimensional objects including presentations and critique sessions.

Course outcomes

1. Ability to describe and apply design elements and principles in design projects and assignments.
2. Ability to analyze aesthetic value of 2 dimensional artwork and 3 dimensional objects of the design output.
3. Ability to recognize/realize the important of leadership and teamwork in producing projects or assignments for better output.

References

1. Mark and Mary Willenbrink, (2006) Drawing For the Absolute Beginners, Cincinnati, Ohio: North Light Books.
2. David Dabner,(2004) Graphic Design School: The Principles and Practices of Graphic Design, London: Thames & Hudson.
3. Duane Preble and Sarah Preble, (2002) Art Forms: An Introduction To the Visual Arts, Upper Saddle River, N.J: Prentice Hall.
4. Jeanne Kopacz, Colour In Three-Dimensional Design, New York: McGraw-Hill.
5. Linda Holtzschue. (2004) Understanding Color: An Introduction for Designers, 2nd ed., New York: John Wiley & Sons, 2002.
6. Otto G.Ocvirk, (2006) Art Fundamentals: Theory and Practice (10th edition), Boston: McGraw-Hill.
7. Thomas J.Barry, (2002) Creativity in the Classroom and Life: A Nurturing Approach, Tanjung Malim: Penerbiit Universiti Pendidikan Sultan Idris,.
8. Rudolf Arnheim, (1997) Art and Visual Perception: A Psychology of the Creative Eye. Berkeley: University of California Press.

PDT127/3 Design Appreciation

Course synopsis

This course is designed to incorporate an understanding of the vast range of works of art. It is a chronological survey of major artwork, movements and monuments since the earliest cave drawings. The first part of this course introduces students to the history and appreciation of art, including exploration of the elements and principles of the visual arts. Students will be introduced to the study and history of the visual arts with focus on the unique characteristics, representative artists and works; and common art forms and genres of various art historical periods. The second part of this course is the historical study to the progression of industrial design/ product design professions and the important aspects of their involvement and contributions in product design. Finally, students will be introduced to the

art of product styling and the important of product semantics in the process of creating a product.

Course Outcome

1. Ability to understand, identify and evaluate the issues and challenges of industrial technologies ethics.
2. Ability to translate and explain the factor ofdesign history and revolution and the effects to the industrialization sector.
3. Ability to discuss in group and evaluate the aspects of industrial revolution technology and the effects to the social and cultural.

References

1. Bernhard, E.B. (2005). Design: The History, Theory and Practice of Product Design. New York: Princeton Architectural Press.
2. D' Alleva, A. (2006). Look! Art History Fundamentals. Jersey City: Prentice Hall.
3. Nasser, D.K. (2006). Islamic Art in Detail, Boston: Harvard University Press.
4. Sheila, R. C. (2006). Islamic Art in Detail, Boston: Harvard University Press.
5. Stokstad, M. (2004). Art history. Jersey City: Prentice Hall Inc.

PDT122/3 Material Science

Course synopsis

This course introduces students to historical perspective of materials science and engineering fundamentals characteristics begin from understanding the atomic structures, atomic bonding in solids, crystal structures, mechanical and physical properties of materials. Students will then apply the understanding on properties of materials through phase diagram, transformations and heat treatment processing on ferrous and non-ferrous alloys, polymer and advanced materials.

Course outcomes

1. Ability to describe and explain the materials' atomic structures, bonding, crystal structure and imperfections.
2. Ability to explain and analyse the mechanical, physical properties of materials.
3. Ability to explain and analyse the metal alloys microstructure, phase diagram and heat treatment processes.
4. Ability to describe and explain machinability of ferrous and non-ferrous metal alloys, polymer materials and advanced materials.

References

1. William D. Callister, Introduction to Materials, John-Wiley & Sons.
2. Serope Kalpakjian, Steven R. Schmid (2010)."Manufacturing Engineering and Technology."6th ed Prentice Hall.
3. William F. Smith, Javad Hashemi, 2006, Foundation of Materials Science and Engineering, Fourth edition, McGraw Hill.
4. Budinski, K.G, 2006, Engineering Materials Properties and Selection, 8th edition, Prentice Hall.
5. Shackeford, J.F, 2005, Introduction to Materials Science for Engineers, 6th edition, Prentice Hall.

PDT128/3 Design Visualization

Course synopsis

This course aims at addressing important issues in the visual design. The course will cover fundamental design concepts in a logical sequence which will provide students with good visual design. The most important topic in this course is visual language, which comprises of exploration towards visual elements and design principles. In addition, the student will learn about aesthetics value of an art work, such as graphical images and 3 dimensional objects. The student will undergo lecture series on related topics and experience some design projects included presentations and critique sessions.

Course Outcome

1. Ability to describe and apply design elements and principles in design projects and assignments.
2. Ability to analyze aesthetic value of 2 dimensional artwork and 3 dimensional objects of the design output.
3. Ability to recognize/realize the important of leadership and teamwork in producing projects or assignments for better output.
4. Ability to construct and produce 2 dimensional and 3 dimensional objects using various drawing and modeling techniques with appropriate tools and instruments.

References

1. Cerver, Francisco Asencio [ed.]. (2007) School of Drawing. New York: Artrium International.
2. David Dabner, (2007) Graphic Design School: The Principles and Practices of Graphic Design, London: Thames & Hudson.
3. Julien Martinez Calmettes, (2006) Best of 3D Virtual Product Design, Singapore:Page One Publishing Private Ltd.
4. Linda Holtzschue, (2006) Understanding Color: An Introduction for Designers, 2nd ed., New York: John Wiley & Sons.

5. Mark Oldach, (2008) Creativity for Graphic Designers, Cincinnati: F&W Publications, Inc.
6. Simon, Danaher, (2008) The Complete Guide To Digital 3D Design, Cambridge: ILEX,.

PDT111/3 Manufacturing Process

Course synopsis

This course explores the manufacturing process which used in industry to convert raw material into finished product. This course is devided into five sections. First, the introduction to manufacturing technology will be given, followed by material selection in manufacturing and heat treatment process. Secondly, the casting technology and various metal casting processes will be introduced including sand casting, investment casting, vacuum casting and other casting processes. Thirdly, overview of forming and shaping process will be given on rolling, forging, extrusion, drawing, sheet-metal forming, powder metallurgy, processing of ceramics, injection molding, and rapid prototyping process. Fourthly is about various joining process such as brazing, soldering, adhesive bonding, and mechanical fastening processes.

Course outcomes

1. Ability to describe the concept & methodologies of manufacturing technology and fundamental of materials in manufacturing.
2. Ability to describe and analyze the concept & methodologies of solidification processes.
3. Ability to analyze and evaluate the concept of forming and shaping processes.
4. Ability to analyze and evaluate the concept & methodologies of joining and assembly technology.

References

1. Groover, M.P. Fundamentals of Modern Manufacturing; Materials, Processes, and Systems, 4th Ed., John Wiley & Sons, Inc., 2010.
2. Kalpakjian S, Schmid S.R. Manufacturing Engineering and Technology, 4th ed., Prentice Hall Inc. 2001
3. Schey, J.A. Introduction to Manufacturing Processes, 3rd Ed., Mc Graw Hill, 2000.
4. Philip F. Ostwald, Jairo Munoz (1997). *Manufacturing Processes and Systems.* 9th ed., John Wiley & Sons.
5. E.Paul DeGarmo, J T. Black, Ronald A. Kohser (1997). *Materials and Processes in Manufacturing.* 8th ed., John Wiley & Sons, Inc.

PDT 131/2 Computer Aided Industrial Design I (CAID I)

Course synopsis

This course focuses on giving exposure and skill to students about the basics of 3D modeling and its application in engineering field by using 3D Modeling software. This course includes details on 3D modeling followed by producing 2D drawing, assembly drawing, exploded drawing, surface modeling, rendering and animation. All this skill will help student to produce technical drawing and virtual prototype or model. This skill is very demanding in industry.

Course Outcomes

1. Design 3d model of components by using Catia software.
2. Apply and construct technical/2d drawing using Catia software.
3. Apply and construct assembly drawing and exploded drawing using Catia software.
4. Apply and construct 3d animation and rendering for the components using Catia software.

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. R.K Dhawan, “Lukisan Mesin: Dalam Unjuran Sudut Pertama”, Cetakan Pertama, Golden Books Centre Sdn. Bhd., 2002.
4. N. Zulkifli, M. H. Omar & F. F. Mohamed, “Computer Aided Drafting”, UUM.
5. Frederik E. Giesecke, Alva Mithell, Hendry Cecil, Ivan Leyoy Hell, Robert Olin, John Thomas Dygdon & James E. Novak, “Engineering Graphics”, 8th edition, Pearson, 2004.

PDT 120/3 Basic Electrical and Electronic

Course Synopsis

This course provides basic knowledge of solving DC and AC electrical circuits. It also covers the fundamentals of electrical machines. The electronics section includes basic semi conductor diodes and transistors as well as the fundamentals of digital systems. At the end of the semester students will be able to understand, analyze and apply basic electrical and electronics concept and principles.

Course Outcomes

1. Ability to implement and analyze basic electrical circuits.

2. Ability to analyze single phase and three phase a.c circuits.
3. Ability to analyze the three phase induction motors.
4. Ability to implement and analyze basic electronics circuits.

References

1. Hambley, A. R., Electrical Engineering: Principles and Applications, 5th ed., Pearson (2011)
2. Hughes, E., Electrical and Electronic Technology, 11th ed. Pearson (2012).
3. Zekayat, S. A., Electrical Engineering Concepts and Applications , Pearson(2012)
4. Floyd, T.L., *Electronic Devices*. 9th ed. Prentice Hall, Inc, 2012.
5. Floyd, T.L., *Digital Fundamentals*, 10th ed. Prentice Hall, Inc, 2009.

PDT 229/3 Design Integration

Course Synopsis

This subject introduce the role of industrial designer profession consist of explanation on the job scope and knowledge and required skills. Furthermore, the subject exposes the students to the development of visual and creative thinking within the context of industrial design field, with special emphasis on the development of product form. Through lecture sessions and design assignments, students will be focused and exposed to the aesthetic, styling and classification of products; concepts and design development method; producing product visualization/ presentation techniques including concept sketching and rendering techniques; model making and basic documentation skills inclusive of design presentation skills. The student will exposed and familiarized with the workshop environment and regulation and utilize and use those facilities for model making.

Course Outcomes

1. Ability to plan, perform and reflect on different phase in a design process.
2. Ability to plan and embark on design research to support the design process.
3. Ability to produce a product model and adapt with the workshop facilities and modeling materials.
4. Ability to communicate an opinion, design idea, concept, and other information clearly and convinced the audience using language, gestures, and presentation materials.
5. Ability to demonstrate and apply relevant basic engineering principles and material properties and manufacturing processes.

References

1. P. Trott (2007). Innovation Management & Product Development, Prentice Hall.
2. B. Laurel, P. Lunenfeld (2007). Design Research: Methods and Perspectives. The MIT Press.
3. M. Crawford (2006) New Products Management. McGraw-Hill.
4. K.T. Ulrich, S.D. Eppinger (2006). Product Design and Development. McGraw-Hill.
5. W. Lidwell, K. Holden, J. Butler (2007).Universal Principles of Design: 100 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach through Design. Rockport Publishers.

PDT 231/3 Computer Aided Industrial Design II (CAID II)

Course Synopsis

Once an Industrial Designer has completed the conceptual design stage of a project the details required for manufacture need to be resolved and prototypes made. It is at this stage that Computer Aided Design (CAD) is used. 3D CAD allows the details of the design to be resolved. Rapid prototypes can be made directly from the CAD data for design testing and verification. Modifications to the CAD data can be made quickly. Once the design is satisfactory, the 3D CAD models can then be used to generate photo-realistic images and engineering drawings so that the new product can be manufactured.

Course Outcomes

1. Apply three-dimensional transformations and viewing operations in computer-aided product design.
2. Apply curve, surface, and solid modelling in computer-aided product design.
3. Understand product data management (PDM) technologies and the acquisition of PDM systems.
4. Understand and appreciate virtual engineering technologies and how they can be applied to product life-cycle design.

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.

PDT 236/2 Computer Programming

Course Synopsis

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

Course Outcomes

1. Ability to describe and apply design elements and principles in design projects and assignments.
2. Ability to analyze aesthetic value of 2 dimensional artwork and 3 dimensional objects of the design output.
3. Ability to recognize/realize the important of leadership and teamwork in producing projects or assignments for better output.

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 Scientifics", 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.

PDT 240/3 Applied Ergonomics and Safety

Course Synopsis

This course addresses ergonomics knowledge in product design. It explains the application of anthropometrics data in the design of products, equipment and tools. 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 and the disabled in the design. It also looks into ergonomic hazards, safety analysis & prevention, and the product safety.

Course Outcomes

1. Ability to define and explain the application and importance of ergonomics in design, and human capability and limitations.
2. Ability to apply anthropometric data in product or workplace design, and perform analysis and evaluation.
3. Ability to explain interaction design and usability issues, and apply usability principles and framework in product design
4. Ability to address human needs through the use of ergonomics principles in product or workplace design.
5. Ability to identify, analyze and evaluate design problems by using suitable ergonomics methods.
6. Ability to apply ergonomics knowledge in equipment and tools design.

References

1. Helander, M. (2006) A Guide to Human Factors & Ergonomics. Boca Raton: CRC Press.
2. Standon, N. (2005) Handbook of Human Factors and Ergonomics Methods. London: CRC Press
3. Sanders, M. and McCormick, E. (1993) Human Factors in Engineering and Design. McGraw-Hill.
4. Green, W. S. and Jordan, P. W. (1999) Human Factors in Product Design. Taylor & Francis, Florida

PDT 230/3 Design Studio I

Course Synopsis

This course aims to develop an understanding of customers and product marketability trough the subject theme of "Customers/User Centered Design". Student will use appropriate engineering approaches and methods to analyze user needs and formulate solution to the design problems. Students are required to use and manipulate 3D CAD based software to construct product detailing and specifications and analyzing basic product reliability and performance. Additionally, student must use the software output to produce product illustrations and digital rendering techniques for product presentation.

Course Outcomes

1. Ability to establish market segment and user requirements trough proper market study and ability to formulate that study into appropriate design solution.
2. Ability to analyze the customer's requirement and formulate those requirements into product solution based on engineering principles for better marketability.
3. Ability to use and manipulate 3D software to construct and analyze product solution.
4. Ability to create digital product illustrations and technical GDT (Geometric Dimensioning and Tolerance) drawing which support student's verbal presentation.

References

1. P. Trott (2007). Innovation Management & Product Development, Prentice Hall.
2. B. Laurel, P. Lunenfeld (2007). Design Research: Methods and Perspectives. The MIT Press.
3. M. Crawford (2006) New Products Management. McGraw-Hill.
4. K.T. Ulrich, S.D. Eppinger (2006). Product Design and Development. McGraw-Hill.
5. W. Lidwell, K. Holden, J. Butler (2007).Universal Principles of Design: 100 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach through Design. Rockport Publishers.

PDT 232/3 Product Data Management (PDM)

Course Synopsis

This lesson provides an engaging context to introduce students to the advance processes of computer aided design and manufacture (CAD/CAM). Students analyze the reasons behind using CAD/CAM to develop selected products concept before identifying the advantages and disadvantages of its use. Students are given an opportunity to practice their advance CAD skills by responding to a design concept. The lesson is supported by instructional worksheets, and demonstrates the importance of the use of advance CAD/CAM tools and equipments in the process of realizations of a design or product concepts.

Course Outcomes

1. Be able to evaluate the success of a product concept against a design brief and identify areas for improvement.
2. Ability to analyse the different characteristics of products designed and manufactured using computers and those manufactured by hand.
3. Have a good understanding of how to accomplish a design brief using advance CAD/CAM and able to analyse the limitations.
4. Ability to perform diverse roles as designers and consequently their responsibility in order to fulfil product or design requirements.
5. Ability to evaluate the main design considerations and the advantages of using CAD/CAM in translating and producing the finest products or equipment with the highest quality.

References

1. Chua Chee Kai, Leong Kah Fai and Lim Chu-Sing Rapid Prototyping(Mar 2003): Principles and Applications (2nd Edition)
2. Ian Gibson, David W. Rosen, and Brent Stucker (Dec 14, 2009).Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing by
3. Rodger Burden (May 19, 2003) Rapid Prototyping: Principles and Applications PDM: Product Data Management.
4. Fontaine J.P. La, M.G.R. Hoogeboom, and J.S. Konst (Aug 24, 2009)Product Data Management: A Strategic Perspective
5. Mikel Sorli and Dragan Stokic (Jul 24, 2009)Innovating in Product/ Process Development: Gaining Pace in New Product Development.

PDT 341/3 Industrial Dialogue

Course Synopsis

This lesson provides up to date knowledge and facts in current design issues from seminars type sessions and lecture by invited experts in design related discipline. Students have to produce a report referring each discussed issue throughout seminars session. Students have to produce a comprehensive report with a verbal presentation at the end of the semester on selected topics given by course coordinator.

Course Outcomes

1. Ability to analyse and recognize design issues through direct interaction between experts in different disciplines related to design field.

2. Ability to construct opinions and able to criticize issues discussed in seminar sessions presented by experts.
3. Ability to formulate and present extensive and comprehensive report in identified design issue and able to present it professionally in in-house seminar session.

References

1. Dialogue Mapping: Building Shared Understanding of Wicked Problems by E. Jeffrey Conklin (Paperback - Nov 18, 2005)
2. Deconstructing Product Design: Exploring the Form, Function, Usability, Sustainability, and Commercial Success of 100 Amazing Products by William Lidwell and Gerry Manacsa (Hardcover - Nov 1, 2009)
3. Emotional Design: Why We Love (or Hate) Everyday Things by Donald A. Norman (Paperback - May 10, 2005)
4. Unstoppable Confidence by Kent Sayre (Kindle Edition - Jun 20, 2008) - Kindle eBook

PDT 330/3 Design Studio II

Course Synopsis

The student will expose and gain knowledge on the subject of design affordance and semantic throughout the course. Study and analysis about user interaction in relation to the design concept is the most important subject to appreciate by the student. Furthermore, sustainable design and manufacturing is the second topic to be discussed in this course. The course will enhance student designing skill by focusing the engineering study on materials and manufacturing aspects which implements into design projects. The design should be electrical or electronic products which involve the use of instrumentation and control. Student will develop an understanding of Failure Mode and Effects Analysis (FMEA), a risk assessment technique for systematically identifying potential failures in a system or a process throughout the product life cycle

Course Outcomes

1. Ability to apply and formulate design affordance and semantic aspects on a product concept for better user interaction
2. Ability to respond regarding sustainable design issues and use the “Quality Function Deployment” (QFD) method in the design process.
3. Ability to analyze and decide material properties and the manufacturing processes to produce/manufacture the design concept.
4. Ability to design and formulate a product based on product performance analysis using “Failure Modes Effect Analysis” (FMEA) factors.

References

1. P. Trott (2007). Innovation Management & Product Development, Prentice Hall.
2. B. Laurel, P. Lunenfeld (2007). Design Research: Methods and Perspectives. The MIT Press.
3. M. Crawford (2006) New Products Management. McGraw-Hill.
4. K.T. Ulrich, S.D. Eppinger (2006). Product Design and Development. McGraw-Hill.
5. W. Lidwell, K. Holden, J. Butler (2007).Universal Principles of Design: 100 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design Decisions, and Teach through Design. Rockport Publishers.

PDT 343/3 Economic Principles

Course Synopsis

This is an introduction to cost and management accounting. The course is designed to provide an understanding of the main elements which determine the cost of a product. The course also focuses on the application of fundamental costing methods and techniques and covers some aspects of managerial accounting which are mainly used for decision making purposes.

Course Outcomes

1. To explain costing techniques such as marginal and absorption costing which are relevant for decision making.
2. To apply cost-volume-profit analysis and interpret the results.
3. To prepare, interpret and understand the role of budgets.
4. To explain standard costing and variance analysis.

References

1. Drury, C (2007)”Cost Accounting” 4th Edition International Thomson Business Press.
2. Rujukan : 1. Hongren, Datar & Foster (2008), Accounting, A Managerial Emphasis, 11th Edition, Prentice Hall.
3. Hansen (2008), Cost Management, Accounting and Control, 4th Edition, Thomson, South Western.
4. Hilton (2008), “Managerial Accounting’ 4th Edition, Irwin McGraw-Hill.

5. Barfied, Raibon & Kinney (2008), Cost Accounting, Traditions & Innovations Thomson, 5th Edition, South Western.
6. Ruzita Jusoh (2006), "Perakaunan Pengurusan Matrikulasi", Penerbit Fajar Bakti Sdn.Bhd

PDT 344/3 Innovation Management & Product Development

Course Synopsis

This course addresses the integration problems in innovative product design, comprehensive management development and industrial finance structure.

Course Outcomes

1. To appreciate and understand basic management, innovation management and product development.
2. Understand and apply the strategies to commercialize products.
3. Able to manage opportunity & risk in product development.

References

1. Dussage P, Harts S, Ramantosa B, John Wiley & Sons,2008 Strategic technology management.
2. Rosseger, Gerhard (ed.)(2008) Management Of Technological Change,Elsevier Science Pub.
3. Trott P(2005),Innovation and New Product Development, Prentice Hall.

PDT 345/3 Consumer Behaviour

Course Synopsis

Major concepts, research and applications based on natural science study of human behaviour, perception and price tag study, personality theory and application of advertisement, consciousness and memory, consumer involvement and decision making, behavioural methods and consumer analysis.

Course Outcomes

1. Describe the different types of consumers and their impact on commercial environments.
2. Explain the concept consumer in a marketing context.
3. Identify and list different types of consumer in a marketing context.
4. Demonstrate understanding of the concept customer market.
5. Identify and describe the different customer markets.

References

1. Consumer Behaviour by Martin M Evans, Ahmad Jamal, and Gordon Foxall (Apr 21, 2006)
2. Consumer Behavior (10th Edition) by Leon Schiffman and Leslie Kanuk (Aug 7, 2009)
3. Consumer Behavior, Ninth Edition by Michael R. Solomon (Jan 17, 2010)
4. Basics Marketing: Consumer Behaviour by Hayden Noel (Sep 10, 2009)
5. Contemporary Issues in Marketing and Consumer Behaviour by Elizabeth Parsons and Pauline Maclaran (Apr 29, 2009)

PDT 346/3 Production Management for Designers

Course Synopsis

This course addresses the management of operation in manufacturing and services firm. It introduces students to the fundamental concepts of modern production management and discusses its importance to the overall strategy and competitiveness of a firm. Students will learn about the main approaches to supporting the decision process in designing and operating the production and logistics system of an enterprise. Long-term, medium-term and short-term plans which include forecasting, aggregate planning, materials requirement planning (MRP), lot sizing scheduling, project scheduling, supply chain management, inventory management, production planning, materials handling, JIT, Lean production system and human resources, and job design are covered.

Course Outcomes

1. Acquire a fundamental knowledge of modern approaches for production and logistics management.
2. Ability to do forecasting and determine the accuracy of the forecast methods.
3. Ability to develop an aggregate plan and construct the gross and net materials requirement plan.
4. Ability to solve the inventory and scheduling problems.
5. Ability to examine, deliberate and solve the operation management related cases.

References

1. Heizer, J. & Render, B. "Operations Management", 8/E, Prentice Hall, 2006.

2. Krajewski, L.j. & Ritzman, L.P. "Operations Management: Strategy and Analysis", 8/E, Prentice Hall 2006.
3. Reid, R.D. & Sanders, N. R. "Operations Management", Wiley 2006.
4. Nahmias,S. "Production and Operation Analysis", 5/E, McGraw Hill, 2005.
5. Stevenson, W. "Operations Management", 8/E, McGraw Hill, 2005.
6. Chase, R.B., Aquilano, N. J. & Jacobs, F. R. "Operations Management For Competitive Advantage", 11/E, McGraw Hill, 2006.

PDT 347/3 Product Study & Professional Practice

Course Synopsis

Case study where the product and its system are analysed in the aspects of design, engineering, marketability, quality and production. Lectures may be given by academic staff, industrial design and engineering experts. Professional approach in industry and consulting. Project organization and management. Professional and ethical responsibilities, contracts, fee determination, copyrights, design registration and law.

Course Outcomes

1. To understand the corporate identity of a product.
2. To incorporate the corporate identity in the product design life cycle.
3. Able to analyze in the aspects of design, engineering, marketability, quality and production.
4. Able to understand the process of product documentation.

References

1. Financial Management for Design Professionals: The Path to Profitability by Steve L.Wintner and Michael Tardif (Paperback - Dec. 1, 2006)
2. Strategic Planning for Design Firms by Raymond Kogan and Cara Bobchek (Paperback - Apr. 3, 2007)
3. Design-Build: Planning Through Development by Jeffrey L. Beard, Edward C. Wundram, and Michael C. Loulakis (Apr 13, 2001)
4. Professional Responsibility: Problems of Practice and the Profession by Nathan M. Crystal (Aug 14, 2008)
5. Half a century of the Patent Documentation Group (PDG) 1957-2007 [An article from: World Patent Information] by M. Philipp and B. Appleton (Jun 1, 2007)

PDT 442/3 Commercialization Culture

Course Synopsis

This course aims at developing student capability, professionalism and working culture in planning, preparation and managing of product design promotion and exhibition event. The student will be exposed by visiting local trade exhibitions and practices negotiation techniques. The students have to complete the product package with their own branding and corporate identity included promotion of their Final Year project. At the end of the course the student will prepare and launch an exhibition event which manages by them.

Course Outcomes

1. Ability to perform and work in a group, communicate effectively and able to work independently.
2. Ability to analyze the concept of the commercialization relations to its culture.
3. Ability to analyze the product lifecycle and it relationship with commercialization aspects.

References

1. Darius Rafinejad,"Innovation, Product Development and Commercialization: Case Studies and Key Practices for Market Leadership"2007
2. Making Innovation Work: How to Manage It, Measure It, and Profit from It by Tony Davila, Marc J. Epstein, and Robert Shelton (Aug 1, 2005)
3. Commercialization of Innovative Technologies: Bringing Good Ideas to the Marketplace by C. Joseph Touhill, Gregory Touhill, and Thomas O'Riordan (Apr 7, 2008)
4. Technology Commercialization: DEA and Related Analytical Methods for Evaluating the Use and Implementation of Technical Innovation by Sten A. Thore (Apr 30, 2002) the New Economy and Public Policy: Schumpeterian Perspectives by Uwe Cantner, Elias Dinopoulos, and Robert F. Lanzillotti (Nov 9, 2010)

PDT 313/4 Final Year Project

Course synopsis

A projects based course that exposes students to solve, analyze, design and research engineering problems in the field of manufacturing engineering, machining or product design.

Course outcomes

1. Ability to apply and integrate theories and lab, known how that has been learnt to solve engineering problems.
2. Ability to produce either a new design or toimprove on an existing design.
3. Ability to choose a suitable research methodology for the research project being undertaken.
4. Ability to write. Present and defend the technical report (desertation) for the projects undertaken.

BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY [Honours] [MATERIALS PROCESSING]

PROGRAMME OBJECTIVES (PEO)

PEO 1
Applying knowledge of materials processing technology in different areas of materials engineering and possess sufficient technical skills to work in the industry.

PEO 2
Demonstrate as a knowledgeable and talented engineering technologist in problem solving skills, in addition to materials processing, characterization and testing in materials processing technology field.

PEO 3
Upholding the importance of professionalism and ethics of materials processing profession to form a cultured and more developed society.

PEO 4
Nurturing materials engineering technologist who are committed to the importance of life-long learning and continuous improvement.

PROGRAMME OUTCOMES (PO)

PO 01
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialisation principles to defined and applied engineering procedures, processes, systems or methodologies.

PO 02
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialisation.

PO 03
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns

PO 04
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources.

PO 05
Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations.

PO 06
Function effectively as individuals, and as members or leaders in diverse technical teams.

PO 07
Communicate effectively with the engineering community and society at large.

PO 08
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities .

PO 09
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices.

PO 10
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development.

PO 11
Demonstrate an awareness of management, business practices and entrepreneurship.

PO 12
Recognise the need for professional development and to engage in independent and lifelong learning

STRUCTURE CURRICULUM BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (Honours) (MATERIALPROCESSING) – RY58

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
Discipline Core (108)	PDT 151/2 Introduction to Materials Processing Technology	PDT 155/3 Quality Control	PDT 251/3 Thermo-fluids	PDT 255/3 Process Control	PDT 361/3 Technical Ceramic Processing	PDT 351/3 Materials Failure Analysis	PDT 451/3 Materials Selection & Design	PDT 400/12 Industrial training
	PDT 101/3 Statics and Dynamics	PDT 152/3 Materials Chemistry	PDT 252/3 Strength of Materials	PDT 256/3 Materials Characterization	PDT 362/4 Metal Fabrication Technology	PDT 352/2 Design of Die & Moulds	PDT 471/6 FYP 2	
	PDT 180/3 Engineering Science	PDT 153/3 Materials Structure & Properties	PDT 253/2 Materials Processing Lab	PDT 261/3 Whiteware Ceramic Processing	PDT 363/3 Rubber & Latex Processing	PDT 371/4 FYP 1	Elective 2/4	
	PDT 106/3 Engineering Graphics	PDT 154/3 Materials Testing	PDT 264/3 Electronic Materials	PDT 262/3 Metal Extraction Technology	PDT 364/3 Composite Materials Processing	Elective 1/4		
	PDT 133/2 Workshop Technology	PDT 120/3 Basic Electrical and Electronic	PDT 236 /2 Computer Programming	PDT 263/4 Plastic Processing				
Common Core (15)	PQT 111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II	PQT 213/3 Mathematics for Engineering Technology III				PTT 333/3 Engineering Technologist Management	
							PTT 444/3 Engineering Technologist in Society	
University Required (19)	UUW 233/2 Islam & Asia Civilisation (TITAS)	UZW XXX/1 Co-Curriculum	UVW 212/2 English for Tech. Comm	UUW 224/2 Engineering Entrepreneurship	UUW 235/2 Ethnic Relation	UUT 122/2 Skills and Technology in Communication		
	UZW XXX/1 Co-Curriculum	Found. Eng. 2/2	UZW XXX/1 Co-Curriculum		UVW 410/2 University Malay Language	UUW 322/2 Thinking Skills		
Total Credit	19	21	19	18	17	17	19	12
Total Unit for Graduation = 142								

Elective : PDT 462/4 Metal Joining (E) / PDT 464 Electronic Packaging (E) / PDT 461/4 Advanced Ceramic Technology (E) / PDT 463/4 Advanced Polymer Technology (E)

COURSE SYNOPSIS

COURSES SYLLABUS

PDT101/3
Statics and Dynamics

Course synopsis

This course comprises two parts, namely; statics and dynamics. In statics, the basic principles of engineering mechanics such as forces, moments and friction are introduced. Students are required to apply this basic knowledge in analyzing the equilibrium of rigid bodies, as well as the stability of a structure. The subjects of dynamics cover the concept of kinematics and kinetics. Kinematics treats the geometric aspects of the motion, whereas kinetics analyses the forces that cause the motion. Analyses in relation to kinetic problems are solved using acceleration method, principle of work and energy, and principle of impulse and momentum.

Course outcomes

1. Ability to apply and analyse the basic principles of physics related to static such as force, moment, Newton's First , second and Third Law, trusses, frame and machine.
2. Ability to apply and analyse the structures and frameworks problems by constructing, sketching and/or drawing free body diagram in ensuring static equilibrium.
3. Ability to apply and analyse the kinematics and kinetics for particles and systems of particles.
4. Ability to apply and analyse the planar kinematics and kinetics of a rigid body.

References

1. Hibbeler, R. C., Engineering Mechanics Statics. 11th ed., Prentice Hall (2007)
2. Hibbeler, R. C., Engineering Mechanics Dynamics. 11th ed., Prentice Hall (2007)
3. Beer, F. B. and Johnston, E. R. Jr., Vector Mechanics for Engineers: Statics and Dynamics. 8th ed., Canada, McGraw_Hill (2004)
4. Beer and E.R. Johnson Jr., 'Vector Mechanics tor Engineer: Statics 8th ed. In SI Units', McGraw Hill (2004).
5. Beer and E.R. Johnson Jr., 'Vector Mechanics tor Engineer: Dynamics 8th ed. In SI Units', McGraw Hill (2004)

PDT106/3
Engineering Graphics

Course synopsis

This course provides the skills to students the basics of Engineering Drawing, Computer Aided Drafting (CAD) and their engineering applications. The course covers the detail of Engineering Drawing for beginners followed with projection systems, oblique and isometric sketches. The course also introduced the Computer Aided Drafting using dedicated software, AUTOCAD, which focuses on product design in 2D and 3D environment. Fundamental knowledge in dimensioning and geometrical tolerance (GDT) enhances student's ability in interpreting and assessing information from basic raw data of an engineering drawing.

Course outcomes

1. Ability to apply the basic drafting, sketching engineering components, and common term used in engineering drawing.
2. Ability to apply orthographic, auxiliary view, cross section and isometric in engineering drawing.
3. Ability to apply and analyse geometric, dimensioning, and tolerancing (GDT) in engineering drawing.
4. Ability to apply detail and assembly drawing in engineering drawing.

References

1. Frederick E. Giesecke, Henry Cecil Spencer, John Thomas Dygdon, Alva Mitchell, Ivan Leroy Hill, James E Novak, "Technical Drawing" 10th Ed., Prentice Hall, 2002.
2. James H. Earle, "Engineering Design Graphics", IIth ed.,Pearson Prentice-Hall, 2004.
3. James D. B., "Engineering graphics with AutoCAD 2007", Pearson, 2007.
4. G. R. Cogorno, "Geometric Dimensioning and Tolerancing for Mechanical Design", McGraw-Hill, 2006.
5. R.K Dhawan, "Lukisan Mesin: Dalam Unjuran Sudut Pertama", Cetakan Pertama, Golden Books Centre Sdn. Bhd., 2002.

PDT133/2
Workshop Technology

Course synopsis

In this course, explanation about safety aspects in workshop will be covered,followed by fundamental measurement techniques , and use of measurement equipment such as Vernier Caliper , Chiseling , Sawing , etc. Students will be introduced to fabrication, sheet metal forming, and welding processes which consists of introduction to basic knowledge of various cutting methods and hand tools, such as file, hacksaw, chisel, and etc.

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 that it used in the industry to transform raw material to finished products. Practical work will help students gain effective understanding.

Course outcomes

1. Work in a group, communicate effectively; apply basic industrial safety regulation as well as emergency first aid techniques.
2. Ability to apply and understand engineering drawing and able to transfer for model/prototype fabrication.
3. Define and operate the conventional machining.

References

1. Steve F. Krar, Arthur R.Gill, peter Smid. Technology of Machine Tools. 6th ed. McGraw Hill, 2007.
2. S.Kalpakjian, S.R. Schimd (2001), Manufacturing Engineering and Technology. 5th ed. Prentice Hall International.
3. Mikell P. Groover (2007), Fundamentals of Modern Manufacturing. 3rd ed. John Wiley & Sons, Inc.
4. E.Paul DeGarmo, JT. Black, Ronald A. Kosher (1997). Materials and Processes in Manufacturing. 8th ed., John wiley & Sons, Inc.
5. John A.Schey. Introduction to Manufacturing Processes . Mc Graw Hill,2000.

PDT 151/2
Introduction to Materials Processing Technology

Course Synopsis

This is a course for undergraduate students majored in materials engineering technology. It is designed to teach the basic knowledge to processing methods used to manufacture materials such as metal, ceramic, polymeric and composites components. The topics covered will include casting, joining, deformation processing, machining, powder processing of metals and ceramics, polymer processing, coating processes, microelectronics manufacturing, materials selection, and manufacturing process selection**.**

Course outcomes

1. Able to learn about understand on materials and available manufacturing processes for metals, ceramics, polymers, composites and coatings.
2. Able to relate material processing to structure and performance pertaining to several different types of material;
3. Able to develop an understanding of how material processes affect the material microstructure, properties, cost, energy, and power requirements, shape limitations and dimensional tolerances and time to manufacture components
4. Able to use fundamentals of materials science and engineering to perform basic materials selection and determine processing conditions needed to achieve desired shapes and properties

References

1. Engineering Material Technology Structures, Processing, Properties and Selection, 5th Edition , James A. Jacobs and Thomas F. Kilduff, Pearson Prentice Hall, 2005
2. Fundamentals of Manufacturing, 2nd Edition, Philip D. Rufe, Society of Manufacturing Engineers, 2002.
3. New Materials Processes and Methods Technology, Mel Schwartz, CRC Taylor & Francis, 2006
4. Introduction to Manufacturing Processes, 3rd Edition, John A. Schey (2000)

PDT 180/3
Engineering Science

Course synopsis

This course provides the skills to students the basics of Engineering Drawing, Computer Aided Drafting (CAD) and their engineering applications. The course covers the detail of Engineering Drawing for beginners followed with projection systems, oblique and isometric sketches. The course also introduced the Computer Aided Drafting using dedicated software, AUTOCAD, which focuses on product design in 2D and 3D environment. Fundamental knowledge in dimensioning and geometrical tolerance (GDT) enhances student's ability in interpreting and assessing information from basic raw data of an engineering drawing.

Course outcomes

1. To apply the basic drafting, sketching engineering components, and common term used in engineering drawing.
2. To apply orthographic, auxiliary view, cross section and isometric in engineering drawing.

3. To apply geometric, dimensioning, and tolerancing (GDT) in engineering drawing.
4. To apply detail and assembly drawing in engineering drawing.

References

1. Frederick E. Giesecke, Henry Cecil Spencer, John Thomas Dygdon, Alva Mitchell, Ivan Leroy Hill, James E Novak, "Technical Drawing" 10th Ed., Prentice Hall, 2002.
2. James H. Earle, "Engineering Design Graphics", IIth ed.,Pearson Prentice-Hall, 2004.
3. James D. B., "Engineering graphics with AutoCAD 2007", Pearson, 2007.
4. G. R. Cogorno, "Geometric Dimensioning and Tolerancing for Mechanical Design", McGraw-Hill, 2006.
5. R.K Dhawan, "Lukisan Mesin: Dalam Unjuran Sudut Pertama", Cetakan Pertama, Golden Books Centre Sdn. Bhd., 2002.

PDT122/3
Material Science

Course synopsis

This course introduces students to historical perspective of materials science and engineering fundamentals characteristics begin from understanding the atomic structures, atomic bonding in solids, crystal structures, mechanical and physical properties of materials. Students will then apply the understanding on properties of materials through phase diagram, transformations and heat treatment processing on ferrous and non-ferrous alloys, polymer and advanced materials.

Course outcomes

1. Ability to describe and explain the materials' atomic structures, bonding, crystal structure and imperfections.
2. Ability to explain and analyse the mechanical, physical properties of materials
3. Ability to explain and analyse the metal alloys microstructure, phase diagram and heat treatment processes.
4. Ability to describe and explain machinability of ferrous and non-ferrous metal alloys, polymer materials and advanced materials..

References

1. William D. Callister, Introduction to Materials, John-Wiley & Sons.
2. Serope Kalpakjian, Steven R. Schmid (2010)."Manufacturing Engineering and Technology." 6th ed Prentice Hall.
3. William F. Smith, Javad Hashemi, 2006, Foundation of Materials Science and Engineering, Fourth edition, McGraw Hill.
4. Budinski, K.G, 2006, Engineering Materials Properties and Selection, 8th edition, Prentice Hall.
5. Shackeford, J.F, 2005, Introduction to Materials Science for Engineers, 6th edition, Prentice Hall.

PDT 120/3
Basic Electrical and Electronic

Course Synopsis

This course provides basic knowledge of solving DC and AC electrical circuits. It also covers the fundamentals of electrical machines. The electronics section includes basic semi conductor diodes and transistors as well as the fundamentals of digital systems. At the end of the semester students will be able to understand, analyze and apply basic electrical and electronics concept and principles.

Course Outcomes

1. Ability to implement and analyze basic electrical circuits.
2. Ability to analyze single phase and three phase a.c circuits.
3. Ability to analyze the three phase induction motors.
4. Ability to implement and analyze basic electronics circuits.

References

1. Hambley, A. R., Electrical Engineering: Principles and Applications, 5th ed., Pearson (2011)
2. Hughes, E., Electrical and Electronic Technology, 11th ed. Pearson (2012).
3. Zekayat, S. A., Electrical Engineering Concepts and Applications , Pearson(2012)
4. Floyd, T.L., *Electronic Devices*. 9th ed. Prentice Hall, Inc, 2012.
5. Floyd, T.L., *Digital Fundamentals*, 10th ed. Prentice Hall, Inc, 2009.

PDT 152/3
Materials Chemistry

Course Synopsis

This course is designed to introduce the students aspect of thermodynamics including first law and second law of thermodynamics, Reaction kinetics such as effect of reactants and products concentration, effect of temperature, determination of order and velocity constant of reaction, electrochemistry and interface phenomenon.

Course Outcomes

1. Able to recognize the first law of thermodynamics in materials.
2. Able to classify the importance of entropy function in the second and third law of of thermodynamics.
3. Able to demonstrate the effect reactant and products concentration, effect of temperature, and diffusion in solid state.
4. Able to calculate and identify the electrochemistry, surface energy, interfacial energy expect gas /liquid interfacial, absorption and colloid.

References

1. Azizan Aziz dan Kamarudin Hussin, Pengenalan Kimia Metalurgi, Penerbit USM, 2000
2. Raymond Chang, Chemistry, 9th Edition, International Edition, McGraw Hill, 2005.
3. Levine, I.N., Physical Chemistry, 5 th Edition, New York, McGraw Hill, 2002.
4. Moore, J.J., Chemical Metallurgy, 2nd Edition, London, Butterwoths, 1998.
5. Brian Smith, E., Basic Chemical Thermodynamics, 5th Edition, USA, Imperial College Press, 2004.
6. Aleksishvili, M and Sidamonidze, S., Problems in Chemical Thermodynamics and Solutions,USA, World Scientific, 2002

PDT 153/3
Materials Structure and Properties

Course Synopsis

This course is designed to introduce some fundamentals of materials engineering; materials structure, solid defects and basic theory of diffusion. Introduction to mechanical and physical properties for various types of engineering materials, how these properties are measured and what these properties represent.

Course Outcomes

1. Able to identify the type of atomic bonding and materials structure.
2. Able to classify various types of defect and basic concept of diffusion in materials.
3. Able to examine physical and mechanical properties of various types of engineering materials.
4. Able to analyze the factor that affected the physical and mechanical properties of materials

References

1. Callister, W.D. Jr. Materials Science and Engineering: An Introduction. 5th Ed. New York: John Wiley, 2000
2. Smith, W.F. Principles of Materials Science and Engineerings. 2nd Ed. Singapore: McGraw Hill, 1990
3. Donald R. Askeland & Pradeep P. Phule, The Science and ngineering of Materials. 4th Ed. Thomson Brooks/Cole, 2003.

PDT 154/3
Materials Testing

Course Synopsis

This course is designed to expose students the theory and practical aspects of materials testing using destructive and non-destructive tests such as compression test, charpy impact testing, hardness test, magnetic particle test and liquid penetration test.

Course Outcomes

1. Able to identify the importance of materials testing, the types of materials testing, the basic of materials imperfection and impurities in solids.
2. Able to demonstrate the destructive and non-destructive materials tests using testing machines.
3. Able to analyze the result and defects that exist on inspection materials through destructive and non-destructive testings.
4. Able to analyze physical and mechanical properties of materials through various testing techniques such as compression test, charpy impact testing, hardness test, magnetic particletest and liquid penetration test.

References

1. W.D. Callister, Jr. & D.G. Rethwisch, 3rd Ed. Fundamentals of Materials Science and Engineering. John Wiley & Son, 2008
2. erope Kalpakjian. (1995). Manufacturing Engineering and Technology, Third Edition. Addison-Wesley Publishing Company.
3. John Witey; (1993).Failure of Materials in Mechanical Design: Analysis, Prediction,Preventation. New York.
4. Charles Hellier, (2001), Handbook of nondestructive evaluation, McGraw-Hill.

PDT 251/3
Thermo-fluids

Course Synopsis

This course will cover the basic knowledge, comprehension and application of law of thermodynamic to understand the relationship between

the properties that matter exhibits as it changes its condition. The first part includes review of thermodynamic concept, statistic thermodynamic and solution. The second part covers the phase equilibrium, thermodynamic of phase diagram, crystal defect, phase transformation unary and heterogeneous system, solution, phase equilibrium, surface and interface, defects in crystal, phase transformation and energy of interfaces.

Course Outcomes

1. Ability to apply basic concept and process that relate to the material thermodynamics.
2. Ability to employ a basic concept and process of thermodynamic for further understanding in phase transformation, solid state reaction and thermodynamic application to materials.
3. Ability to relate and apply the knowledge on thermodynamics of interfaces, the thermodynamics of electrolysis and defect in crystals to the materials process.

References

1. R. T. DeHoff, Thermodynamics in Materials Science, Taylor & Francis, 2006.
2. H.G. Lee, Chemical Thermodynamics for Metals and Materials, Imperial College Press, 1999
3. R. T. DeHoff, Thermodynamics in Materials Science, McGraw-Hill, 1993.
4. J. Susanto, Termodinamik Gunaan: Masalah dan Contoh Penyelesaian, Dewan Bahasa dan Pustaka, 1988

PDT 201/3
Strength of Materials

Course Synopsis

Stress analysis, stress theory, strain analysis, relationship of stress-strain and stress-strain temperature. Axial load, torsional loading, bend loading, bending stress and strain deflection. Elastic deflection failure, excessive yeilding failure, fracture failure, excessive deflection failure and progressive failure. Methods of integration, moment area methods, methods of superpotion, enegy methods and plastic analysis. Combined axial and bending load, combined axial, bending and torsion load. Buckling of column, end support condition and empirical formula. Rivet and bolt analysis (average shear strength and tensile strength), connection analysis.

Course Outcomes

1. Ability to analyze general basic concept strength of materials
2. Ability to measure, examine and analyze the materials behaviours when different mode of load applied.

References

1. Hibbler, R.C (2003), Mechanic of Materials, 5th edition, Prentice Hall
2. Megson, T.H.G.(2002), Structural and stress analysis, Butterworth-Heinemann
3. Hamzah, M.O.(1988), Pengantar analisis struktur, USM

PDT 253/3
Materials Processing Lab

Course Synopsis

The purpose of this laboratory is to familiarize students with experimental set-up and use of metallurgical apparatus. In addition, the students will learn hands on experience in examination of different materials through metallographic examination, tensile property characterization, different hardness testing methods, and effect of different thermal processing on the mechanical properties and microstructure. Safety aspects and regulations on conducting scientific experiments are also briefed and taught.

Course Outcomes

1. Able to identify different types of materials processing.
2. Able to determine the parameters involve in each of the processing technique.
3. Able to propose a suitable processing technique of the materials.

References

1. W.D. Callister., Materials Science and Engineering - An Introduction, 7th Edition, NJ : John Wiley and Sons Inc., 2007.
2. Kenneth G. Budinski & Michael K. Budinski, Engineering Materials-Properties & Selection, 9th Edition, Pearson, 2010.
3. Serope Kalpakjian & Steven Schemid, Manufacturing Engineering and Technology, 5th Edition, NJ : Pearson Education, 2006.
4. Donald R. Askeland, Pradeep P. Phulé, The Science and Engineering of Materials, 5th Edition, Canada : Thomson, 2006.

5. William F. Smith & William Smith, Foundations of Materials Science and Engineering, 3rd Edition, William F. Smith, William Smith, New York : McGraw Hill, 2004.

PDT 264/3
Electronic Materials

Course Synopsis

Materials and the interfaces between them are the key elements in determining the functioning of electronic devices and systems. This course develops the fundamental parameters of the basic solid material types and their relationships to electrical, thermal, mechanical, and optical properties. The application of these materials to the design and fabrication of electronic components is described, including integrated circuits, passive components, and electronic boards, modules, and systems.

Course Outcomes

1. Able to-identify fundamental knowledge of material properties important to electronic systems including electrical conductivity, coefficient of thermal expansion, thermal conductivity, and strength.
2. Able to perform simple trade offs between basic material properties to recommend candidate materials for specific applications
3. Able to relate knowledge of material structure to various material properties and phase diagrams
4. Able to identify and state reasons for the selection of the common electronic materials used in integrated circuits, printed wiring board assemblies, etc

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. Electronic Materials, Harry L Kwok, PWS Pub. Co. 1997
4. Introduction to Semiconductor Materials and Devices, M.S.Tyagi, Wiley 1991.
5. Principles of Plasma Discharges and Materials Processing, Michael A Lieberman, Alan J. Lictenberg, Wiley 2005

PDT 236/2
Computer Programming

Course Synopsis

Once an Industrial Designer has completed the conceptual design stage of a project the details required for manufacture need to be resolved and prototypes made. It is at this stage that Computer Aided Design (CAD) is used. 3D CAD allows the details of the design to be resolved. Rapid prototypes can be made directly from the CAD data for design testing and verification. Modifications to the CAD data can be made quickly. Once the design is satisfactory, the 3D CAD models can then be used to generate photo-realistic images and engineering drawings so that the new product can be manufactured.

Course Outcomes

1. Apply three-dimensional transformations and viewing operations in computer-aided product design.
2. Apply curve, surface, and solid modelling in computer-aided product design.
3. Understand product data management (PDM) technologies and the acquisition of PDM systems.
4. Understand and appreciate virtual engineering technologies and how they can be applied to product life-cycle design.

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.

PDT 255/3
Process Control

Course Synopsis

Basic concept for process control system, continuous and batch control. Implemention control algorithm for selected processes. Instrumentation selection for process control. Project management and implementation. Process control design and implementation.

Course Outcomes

1. Able to identify objective for control, process and able to estimate the essential of process control.
2. Able to write balance equation, solve differentiation equation and able to analyze dynamic process.
3. Able to design transfer function close loop for analysis of stabilization loop.
4. Able to remote the control equipment by close loop and open loop method.
5. Able to analyze and remote the control equipment to physical equipment.

References

1. Donald R.C, (1991) Process System analysis and Control, 2nd ed., MaGraw Hill International Editions
2. D.E Seborg, T.F Edgar, D.A Mellichamp (2003), Process Dynamic and Control, Wiley and Sons
3. Thomas E Marlin (2000) Process Control:Designing Processes and Control System for Dynamic Performance, Mc GrawHill.

PDT 256/3
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 followed by spectroscopic technique and analytical.

Course Outcomes

1. Able to identify suitable characterization technique such as XRD, XRF, SEM, DTA, TGA and others to characterize ceramic, metal, polymer and composite materials.
2. Able to apply a materials characterization concept and method.
3. Able to examine a material via various characterization techniques (modern engineering tools) such as XRD, XRF, SEM, DTA, TGA and others.
4. Able to analyze physical and chemical properties of materials through various characterization technique such as XRD, XRF, SEM, DTA, TGA and others for selection materials purpose.

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.
6. Eugene, Z., Bertin, P (1975). Principles and Practice of X-ray Spectrometric Analysis, Plenum PressThomas E Marlin (2000) Process Control: Designing Processes and Control System for Dynamic Performance, Mc GrawHill.

PDT 261/3
Whiteware Ceramic Processing

Course Synopsis

Introduction to the traditional whiteware ceramics materials including types, properties and applications. Student will be exposed to the traditional ceramics processing including different shaping techniques, drying, firing and glazing.

Course Outcomes

1. Able to discuss traditional ceramic raw materials including properties and production technique.
2. Able to compare different types of shaping technique in traditional ceramic processing.
3. Able to explain mechanism in drying stages.
4. Able to demonstrate firing and glazing process.

PDT 262/3
Metal Extraction Technology

Course Synopsis

This course will introduce student to mineral processing and general principle in extracting metal from ore: hydrometallurgy, elecrometallurgy and pyrometallurgy. This course will exposed student to the advantages mineral processing, crushing, grinding, sizing, classification, gravity concentration, magnetic and electrostatic separation and flotation. Hydrometallurgy: Leaching: process and mode of leaching. Leaching technique: in-situ leaching, dump leaching, heap leaching, vat leaching, bacterial leaching, electrochemical leaching, Counter current leaching system. Electrometallurgy: Electrorecovery and electropurification: principles, electrochemical, electrod potential, overpotential, limited

potential, electrochemical/elecrolysis cell. Pyrometallurgy: Ore treatment by roasting, calcination, and sintering. Melting and smelting, matte smelting. Reduction of iron ore from blast furnace. Direct smelting/melting.

Course Outcomes

1. Ability to discuss and practice the principle and process involved in mineral processing.
2. Ability to discuss and differentiate the theory in hydrometallurgy, electrometallurgy and pyrometallurgy.
3. Ability to demonstrate mineral or metal extraction process from its ore using hydrometallurgy, electrometallurgy and pyrometallurgy.
4. Able to explain extraction process of some metals that have been established worldwide.

References

1. A.R. Burkin, "Chemical Hydrometallurgy: Theory and principle", London Imperial College Press, 2001.
2. G.K. Errol, "Introduction To Mineral Processing", Mineral Engineering Services, Australia, 1989.
3. Samsul Bahar Sadli, "Asas proses Metalurgi", Dewan Bahasa dan Pustaka, Kuala Lumpur, 1998.
4. Fathi Habashi,"Handbook of Extractive Metallurgy, Volume II", Wiley-VCH, 1997.
5. Chiranjib Kumar Gupta, "Chemical Metallurgy", Wiley-VCH, 2003.

PDT 263/3
Plastic Processing

Course Synopsis

This course will provide students with a broad knowledge on the aspect of thermoplastic and thermoset processing methods, parameters, and also knowledge on the thermoplastic and thermoset compounding and additives. This course also will expose student to environmental of plastic product.

Course Outcomes

1. Able to discuss the concept of plastic materials and illustrate the physical basis of plastic processing
2. Able to prepare plastic product from different techniques parameter for thermoplastic and thermoset processing
3. Able to asses the finishing and assembly of plastic processing end product
4. Able to practice the environmental aspect of plastic product

References

1. A.Brent Strong, Plastics Materials and Processing, 1st edition, Prentice Hall, 2000.
2. Manas Chanda, Salil K.Roy, Plastic Technology Handbook, 3rd edition, Marcel Dekker Inc,2003.
3. D.H Morton-Jones, Polymer Processing, Chapman and Hall Ltd, 1989
4. Suresh G.advani, E.Murat Sozer, Process modelling in Composites Manufacturing, Marcel Dekker Inc,2003

PDT 364/3
Composite Materials Processing

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, 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 processing.

Course Outcomes

1. Able to define, classify and describe on each composite material.
2. Able to distinguish different phases in composite system and differentiate the effects of each phase's parameters to the final composite properties.
3. Able to understand the failure behaviour and strengthening mechanism of composite materials and also evaluate and predict the properties of different composite materials.
4. Able to analyse problems and come out with new idea and relevant opinion in order to develop better composite system.
5. Able to demonstrate and well understanding the fabrication of each composite materials using conventional and advanced processing.

References

1. Mathew, F.L., Rawlings, R.D., Composite Materials: Engineering and Science, Chapman & Hall, 1998.
2. D. Hull, T. W. Clyne, An Introduction to Composite Materials, 2nd Edition, 1996.
3. Ronal F.G. , Principles of Composite Material Mechanic, McGraw-Hill, 1994.
4. Schwartz, M.M, Composite Materials Handbook, McGraw-Hill, 1992.

PDT 361/3
Technical Ceramic Processing

Course Synopsis

Introduction to the technical ceramics including properties and applications. Student will be exposed to the modern technical ceramic, glass and glass ceramics processing technology including raw materials preparation, different shaping techniques, sintering and finishing.

Course Outcomes

1. Able to discuss technical ceramic raw materials preparation technique.
2. Able to compare different shaping technique of technical ceramic products.
3. Able to demonstrate glass and glass ceramics processing technology.
4. Able to explain mechanism of solid state sintering and finishing technique.

PDT 362/3
Metal Fabrication Technology

Course Synopsis

Metal fabrication technology program focused towards sheet metal, plates and structure fabrication in the engineering and construction field. Metal fabrication technology will exposed student to the heavy metal plating used in building structure and wall panels, oil and gas, power station, pipeline building in the transportation of liquid and gas, large storage boilers and vessels, platform for oil and rigs and heavy industrial plant. Student will be provided with strengthening of theoretical knowledge with high degree of design and practical work usage of modern CNC metal fabrication machinery, equipment and state-of-the-art CAD/CAM solutions. The main objective of the course is to prepare students to the needs and demands of the current and future industry with regards to fabrication, welding, inspection and testing.

Course Outcomes

1. Ability to discuss and practice the principle and process involved in metal fabrication process.
2. Ability to discuss and differentiate the theory in metal fabrication.
3. Ability to demonstrate metal fabrication process using shearing, punching, forming and welding.
4. Able to explain and design metal fabrication process using CAD/CAM and CNC.

PDT 363/3
Rubber and Latex Processing

Course Synopsis

This course expose student to basic knowledge, principle, and concept of rubber and latex processing. This course also focus on compounding, formulation, production, characterization and testing of latex and rubber processing.

Course Outcomes

1. Able to explain basic of polymer lattice and rubber.
2. Able to differentiate types of polymer lattice and rubber processing techniques.
3. Able to formulate, prepare and assess different latex compounds and testing on rubber.
4. Able to propose and assess main latex processing technique, handling and controlling rubber processing machines.

References

1. Gent, A. N. Engineering with Rubber: How to Design Rubber Components. 2nd ed. Hanser Publishers, Munich (2001).
2. Mark, J. E. The Science and Technology of Rubber. 3rd ed. Elsevier Inc., USA (2005).
3. Brown, R. Physical Testing of Rubber. 4th ed. Springer, USA (2006)
4. Blackley, D. C. (1997). “Polymer Latices: Science and Technology”, 2nd Edition, Vol. 1 - 3: Chapman & Hall, London.

PDT 351/3
Materials Failure Analysis

Course Synopsis

A comprehensive overview of the field, this course covers three principal areas of interest such as procedures for failure analysis, root-caused of failure, failure mechanisms and recommendation to prevent future failure.The forensic analysis of product/component failures is also studied from beginning to end for certain case studies that normally happen in industries. The module also provides hands-on experience on material failure analysis during laboratory work and on site visit. Student also exposed with technical report writing technique through mini project.

Course Outcomes

1. Be able to implement general procedures, techniques and precautions of in failure analysis.
2. Be able to analyse the exposed and extract the hidden information presented by failed product/ component that may resulted from wide variation of failure factors.
3. Be able to develop corrective and preventive actions based on failure analysis findings.
4. Ability to evaluate what material failure analysis is, in terms of profitability and liability.

References

1. Brooks, C.R., Choudhury, A., Brooks, C.R. 2001 Failure Analysis of Engineering Materials. McGraw-Hill. . New York
2. Becker, William T.; Shipley, Roch J. 2002 ASM Handbook, Volume 11 - Failure Analysis and Prevention.
3. Moalli, J. 2001. Plastics Failure - Analysis and Prevention. William Andrew Publishing/Plastics Design Library.
4. McEvily, A.J. 2002. Metal Failures: Mechanisms, Analysis, Prevention. John Wiley & Sons. New York

PDT 352/3
Design of Die & Moulds

Course Synopsis

The aim of this course is to derive knowledge on mould design for plastic injection moulding purposes and general die design. The generate knowledge will provide an effective skill to counter and solve the common problem approach in mould and die basis.

Course Outcomes

1. Able to describe and discuss the concept of mould and die design.
2. Able to analyze the detail of mould and die design and its purpose to get an optimum processing conditions.
3. Able to compose the optimize mould design and die design condition for different type of molding requirement.
4. Able to simulate the development of mould and die design and evaluate the obtain data.

References

1. Micheali, W (1992) Extrusion Dies for plastics and rubber: Design and Engineering. Munich: Hanser Publishers.
2. Michaeli, W.; Greif, H.; Kretzschmar, G.; Ehrig, F. (2001) Training in Injection Molding. Munich: Hanser Publishers.
3. Paquin, J.R. (1986), Die Design Fundamentals, New York: Industrial Press.
4. Smith, D.A. (1990), Die Design Handbook, New York: Society of Manufacturing Engineers.

PDT 451/3
Materials Selection & 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 focuses of this course are fundamentals of the design process, specifications, decision-making, materials selection, materials process, experimental design, statistic process control and preliminary design. The course integrates vertically and horizontally concepts from all areas of engineering technology and material processing and into a practical design project designed to train the students in the design practice.

Course Outcomes

1. Able to define and describe fundamental materials design and selection.
2. Able to relate materials knowledge, processing, microstructure and performance and their implication with materials design.
3. Able to design and make a selection material using a method: performance index and efficiency of materials, weibull modulus, base on mechanical factors, semi quantitative and others.

References

1. Engineering Design, A Materials and Processing Approach, George E. Dieter, McGraw-Hill Company, Third Edition, 2000.
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. McGraw Hill.
4. Mahmud M. Farag. 1989. Selection of Materials and Manufacturing Process for Engineering Design. Prentice Hall.
5. The Engineering Design Process, Atila Ertas and Jesse C. Jones, John Wiley & Sons, Inc., 1993.

PDT 464/4
Electronic Packaging

Course Synopsis

Introduction on the overview of microelectronic packaging such as function of an electronic package, packaging hierarchy, and brief history of microelectronic packaging technology. In addition, they will be introduced to few types of electronic packages such as Ball Grid Array (BGA), Land Grid Array (LGA), Flip Chip (FC), Direct Chip Attach (DCA) etc.

Course Outcomes

1. Able to understand the packaging hierarchy and identifying the latest types of electronic packages used in various semiconductor industries.
2. Able to understand the materials involved and the production processes. This includes ability to analyze the design, thermal problems and creating methods to overcome these problems in gaining the optimum performance.
3. Able to compare the advanced electronic assembly-automated with the conventional one and identify the challenges, facilities involved also its applications in wireless industry-based products.

References

1. Richard K. Ulrich, Willian D.Brown. (2006). Advanced Electronic Packaging. 2nd Edition. Publisher: John Wiley & Sons, Inc.
2. Rao R. Tummala. (2001). Fundamentals of Microsystems Packaging. Publisher: McGraw-Hill.
3. Charles A. Harper. (2000). Electronic Packaging and Interconnection Handbook. 3rd Edition. Publisher: McGraw-Hill.
4. John Lau, S.W. Rickey Lee. (1999). Chip Scale Package-Design, Materials, Process, Reliability and Applications. Publisher: McGraw-Hill.
5. John Lau, C.P. Wong, John L. Prince, Wataru Nakayama. (1998). Electronic Packaging: Design Materials, Process and Reliability. Publisher: McGraw-Hill

PDT 461/4
Advanced Ceramic Technology

Course Synopsis

Introduction to advanced ceramics materials and technology. Student will be exposed to the different techniques in advanced ceramics processing including fabrication of porous ceramics, ceramic coating, electroceramics and composites ceramic.

Course Outcomes

1. Able to discuss how a range of industrial ceramic materials is made and the critical steps in these processes.
2. Able to compare different porous ceramic fabrication techniques relating to control and modification of its microstructure.
3. Able to demonstrate ceramic nanomaterial processing.
4. Able to design ceramic composites, materials selection and discuss new developments in ceramic processing technology.

References

1. Ceramic Processing, Mohamed N. Rahaman, CRC Press, 2006.
2. Advanced Ceramic Processing & Technology, Jon G.P. Biner, Noyes Publication, New Jersey 1990.
3. Phase Diagrams in Advanced Ceramics, Allen M. Alper, Academic Press, 1995.
4. Ceramic Processing and Sintering, Mohamed N Rahaman, CRC Press, 2003.

PDT 463/4
Advanced Polymer Technology

Course Synopsis

This course aims to expose students on concepts of various technology of polymers including natural and synthetic polymers. Details fundamental of polymer properties such as classification of polymers and polymerizations will be emphasized. The course will further discuss and explain the preparation and manufacture of polymer resin. At the end of the course, students should be able to arrange different types of manufacturing technology for various types of polymers.

Course Outcomes

1. Able to differentiate the various properties used to designate or specify various polymers.
2. Able to arrange different mechanisms of polymerization in various types of polymers.
3. Able to relate manufacturing, processing, analysis and applications of long chain molecules.

References

1. Plastic materials, J.A. Brydson, Newnes Butterwarths (London) 1989.
2. Text book of polymer science, Bill meyer, F.W.Jr. (3rd ed.) John Wiely&sons 1984
3. Introduction to plastics, J.H. Brison and C.C. Gosselin, Newnes, London 1968.
4. Polymeric Materials, C.C.Winding and G.D.Hiatt Mc Graw Hill Book Co. 1961
5. Polymer Science, N. V. Viswanathan and V. R. Gowariker. New Age International 1986

PROGRAM ENGINEERING TECHNOLOGY
BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (Hons.) (SPORTS TECHNOLOGY)-RYXX

Programme Objectives (PEO)

PEO 1
To produce competent Engineering Technologists who are able to apply principles of science, engineering and modern technology in solving current and future problems related to sport technology.

PEO 2
To produce Engineering Technologists in sport technology field who perform work and duty ethically with high moral values and responsibility to God, nation and societies.

PEO 3
To produce creative and innovative Engineering Technologist in research and development in fulfilling the nation's requirements.

PEO 4
To produce Engineering Technologists who are able to communicate effectively with good leadership as well as able to function in teamwork environment.

PEO 5
To produce Engineering Technologists that shows enthusiasm in engaging long-life learning through continuity of learning, technical practices and professional development.

Programme Outcomes (PO)

PO 1
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialisation principles to define and applied engineering procedures, processes, systems or methodologies.

PO 2
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to their discipline or area of specialisation.

PO 3
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs with appropriate consideration for public health and safety, as well as cultural, societal, environmental and sustainability concerns.

PO 4
Plan and conduct experimental investigations of broadly-defined problems, using data from relevant sources.

PO 5
Select and apply appropriate techniques, resources and modern engineering tools, with an understanding of their limitations.

PO 6
Function effectively as individuals, and as members or leaders in diverse technical teams.

PO 7
Communicate effectively with the engineering community and society at large.

PO 8
Demonstrate an awareness of and consideration for societal, health, safety, legal and cultural issues and their consequent responsibilities.

PO 9
Demonstrate an understanding of professional ethics, responsibilities and norms of engineering technology practices.

PO 10
Demonstrate an understanding of the impact of engineering practices, taking into account the need for sustainable development.

PO 11
Demonstrate an awareness of management, business practices and entrepreneurship.

PO 12
Recognise the need for professional development and to engage in independent and lifelong learning

CURRICULUM STRUCTURE BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (HONOURS) (SPORT TECHNOLOGY)-RYXX

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	V	VI	VII	VIII
Discipline Core (108)	PDT 101/3 Statics and Dynamics	PDT 122/3 Material Science	PDT 201/3 Strength of Materials	PDT 3XX/4 Computer Aided Engineering Analysis	PDT 3XX/3 Ergonomics & Safety	PDT 313/4 Final Year Project I	PDT 413/6 Final Year Project II	PDT 400/12 Industrial training
	PDT 1XX/3 Human Anatomy & Physiology	PDT2XX/3 Sports Biomechanics	PDT 2XX/3 Physiology of Sports & Exercise	PDT 2XX/3 Motor Learning & Control	PDT 3XX/4 Sports Performance Analysis	Elective I /3	Elective II /3	
	PDT 106/3 Engineering Graphics	PDT 111/3 Manufacturing Process	PDT 2XX/3 Sports Materials	PDT 2XX/3 Machine Elements	PDT 3XX/3 Sports Equipment	PDT 3XX/4 Sports Equipments Performance & Testing	Elective III /3	
	PDT 109/2 Workshop Practise	PDT 1XX/3 Introduction to Sports Technology	PDT 251/3 Thermo-fluids		PDT 3XX/3 Sports Facilities & Arenas	PDT 4XX/4 Design Process & Management		
		PDT 120/3 Basic Electrical and Electronic	PDT 236/2 Computer Programming	PDT 2XX/3 Instrumentation & Measurement	PDT 3XX/3 Microcontroller			
Common Core (15)	PQT 111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II	PQT 213/3 Mathematics for Engineering Technology III				PUT XXX/3 Technologist in Engineering Management	
							PUT XXX/3 Technologist & Society	
University Required (19)	UUW 233/2 Islam & Asia Civilisation (TITAS)	UZW XXX/1 Co-Curriculum	UVW 212/2 English for Tech. Comm	UUW 224/2 Engineering Entrepreneurship	EUW 410/2 University Malay Language	UUT 122/2 Skills and Technology in Communication		
	UZW XXX/1 Co-Curriculum	Found. Eng. 2/2	UZW XXX/1 Co-Curriculum	UUW 235/2 Ethnic Relation				
				UUW 322/2 Thinking Skills				
Total Credit	17	21	20	19	18	17	18	12
Total Unit for Graduation = 142								

COURSE SYLLABUS

PDT101/3 Statics and Dynamics

Course synopsis

This course comprises two parts, namely; statics and dynamics. In statics, the basic principles of engineering mechanics such as forces, moments and friction are introduced. Students are required to apply this basic knowledge in analysing the equilibrium of rigid bodies, as well as the stability of a structure. The subjects of dynamics cover the concept of kinematics and kinetics. Kinematics treats the geometric aspects of the motion, whereas kinetics analyses the forces that cause the motion. Analyses in relation to kinetic problems are solved using acceleration method, principle of work and energy, and principle of impulse and momentum.

Course outcomes

1. Ability to apply and analyse the basic principles of physics related to static such as force, moment, Newton's First , second and Third Law, trusses, frame and machine.
2. Ability to apply and analyse the structures and frameworks problems by constructing, sketching and/or drawing free body diagram in ensuring static equilibrium.
3. Ability to apply and analyse the kinematics and kinetics for particles and systems of particles.
4. Ability to apply and analyse the planar kinematics and kinetics of a rigid body.

References

1. Hibbeler, R. C., Engineering Mechanics Statics. 11th ed., Prentice Hall (2007)
2. Hibbeler, R. C., Engineering Mechanics Dynamics. 11th ed., Prentice Hall (2007)
3. Beer, F. B. and Johnston, E. R. Jr., Vector Mechanics for Engineers: Statics and Dynamics. 8th ed., Canada, McGraw_Hill (2004)
4. Beer and E.R. Johnson Jr., 'Vector Mechanics tor Engineer: Statics 8th ed. In SI Units', McGraw Hill (2004).
5. Beer and E.R. Johnson Jr., 'Vector Mechanics tor Engineer: Dynamics 8th ed. In SI Units', McGraw Hill (2004)
6. Meriam, J. L. and Kraige, L. G., Engineering Mechanics: Statics. 5th ed., USA, SI ver. Wiley (2003).
7. Meriam, J. L. and Kraige, L. G., Engineering Mechanics: Dynamics. 5th ed., USA, SI ver. Wiley (2003).

PDT106/3 Engineering Graphics

Course synopsis

This course provides the skills to students the basics of Engineering Drawing, Computer Aided Drafting (CAD) and their engineering applications. The course covers the detail of Engineering Drawing for beginners followed with projection systems, oblique and isometric sketches. The course also introduced the Computer Aided Drafting using dedicated software, AUTOCAD, which focuses on product design in 2D and 3D environment. Fundamental knowledge in dimensioning and geometrical tolerance (GDT) enhances student's ability in interpreting and assessing information from basic raw data of an engineering drawing.

Course outcomes

1. To apply the basic drafting, sketching engineering components, and common term used in engineering drawing.
2. To apply orthographic, auxiliary view, cross section and isometric in engineering drawing.
3. To apply geometric, dimensioning, and tolerancing (GDT) in engineering drawing.
4. To apply detail and assembly drawing in engineering drawing.

References

1. Frederick E. Giesecke, Henry Cecil Spencer, John Thomas Dygdon, Alva Mitchell, Ivan Leroy Hill, James E Novak, "Technical Drawing" 10th Ed., Prentice Hall, 2002.
2. James H. Earle, "Engineering Design Graphics", IIth ed.,Pearson Prentice-Hall, 2004.
3. James D. B., "Engineering graphics with AutoCAD 2007", Pearson, 2007.
4. G. R. Cogorno, "Geometric Dimensioning and Tolerancing for Mechanical Design", McGraw-Hill, 2006.
5. R.K Dhawan, "Lukisan Mesin: Dalam Unjuran Sudut Pertama", Cetakan Pertama, Golden Books Centre Sdn. Bhd., 2002.

PDT170/3 Human Anatomy and 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 and metabolism, lymphatic and immune system, the endocrine system, urinary system and also the reproductive system. At the end of the course, the students are expected to master the anatomical

and physiological aspects of the human body and able to apply basic engineering principles in solving health problems.

Course outcomes

1. Ability to illustrate and describe the human anatomy.
2. Ability to discuss physiological function of various organ systems.
3. Ability to compare and distinguish important homeostasis abnormalities in human physiology.

References

1. Marieb, E.N, "Essentials of Human Anatomy & Physiology", 9th Ed., Benjamin- Cummings, 2009.
2. Seely,R.R., Stephens, T.D., & Tate, P.,"Essentials of Anatomy and Physiology", 5th Ed., McGraw Hill, 2005.
3. Tortora, G.J. and Grabowski,"Principles of Anatomy and Physiology",10th Ed.,Wiley, 2002.
4. Marieb, E., Human Anatomy and Physiology, ", 5th Ed.,Benjamin-Cummings, 2000.
5. Van Wynsberghe, D.M., Noback, C.R. and Carola, R., Human Anatomy and Physiology", 3rd Ed., Mc-Graw Hill, 1995.

PDT272/3 Sports Biomechanics

Course synopsis

This is an introductory course to sports biomechanics which covers the engineering mechanics, anatomy and basic applications on the analysis of the human body as mechanical systems. This course aims to integrate the knowledge of fundamental anatomy and mechanics to develop a deeper understanding of the field of human movement science especially in sports activities. This subject aims to introduce students to the fundamentals of biomechanics and to relate these to mechanical actions of, by and on the body.

Course outcomes

1. Ability to define, explain and compare the biomechanics and anatomy terminologies and their relationships.
2. Ability to analyze kinematics and kinetics problems for particles and rigid bodies.
3. Ability to solve engineering problems by choosing appropriate method that related to statics and dynamics.

References

1. Susan J.H., "Basic Biomechanics", 5th Edition, 2007.
2. Ellen Kreighbaum and Katharine M Barthels, "Biomechanics: A qualitative approach for studying human movement", 4th Edition, 1996
3. David A.W., "Biomechanics and Motor Control of Human Movement", 3rd Edition, 2005.
4. Joseph H., Kathleen M.K., "Biomechanical Basis of Human Movements", 2nd Edition, 2003.
5. Iwan W.G., "Principles of biomechanics & Motion Analysis", 3rd Edition, 2006.

PDT271/3 Sports Materials

Course synopsis

A solid foundation of materials science and engineering is required to successfully design sports equipment and to understand its structural properties. Sports equipment covers the full range of traditional biological materials like wood to advanced spacecraft materials. The appropriate selection and design of sports materials enhances the performance of athletes and prevents injuries. This course introduces the fundamental concepts of materials by specific properties and applications of materials for the design of sports equipment. One topic provides the design guide for protective equipments. The section on materials testing covers the fundamental concepts of experimental design and specific application to sports equipment.

References

1. Jenkins M: Materials in Sports Equipment, Vol. 1. CRC Press / Woodhead Publishing, Cambridge, 2003.
2. Subic A. Materials in Sports Equipment, Vol. 2. CRC Press / Woodhead Publishing, Cambridge, 2007.
3. Gibson LJ, Ashby MF. Cellular Solids. 2nd ed. Cambridge University Press, Cambridge, 1997.
4. Mills N: Polymer Foams Handbook. Butterworth-Heinemann/Elsevier, Oxford, 2007.
5. Askeland D.R. The Science and Engineering of Materials 3rd SI Edition, Chapman and Hall 1999.
6. Callister W.D., Materials Science and Engineering, an Introduction, 7ed, Wiley, 2007.
7. Ashby M.F., Materials Selection in Mechanical Design, 3ed, Elsevier, 2005.
8. Hull, D., An introduction to Composite Materials, Cambridge University Press, 1st ed, 1981.
9. Chawla. K. K., Composite Materials-Science and Engineering, Springer, 2nd ed, 1998.

PDT120/3 Basic Electrical and Electronic

Course Synopsis

This course provides basic knowledge of solving DC and AC electrical circuits. It also covers the fundamentals of electrical machines. The electronics section includes basic semi conductor diodes and transistors as well as the fundamentals of digital systems. At the end of the semester students will be able to understand, analyze and apply basic electrical and electronics concept and principles.

Course Outcomes

1. Ability to implement and analyze basic electrical circuits.
2. Ability to analyze single phase and three phase a.c circuits.
3. Ability to analyze the three phase induction motors.
4. Ability to implement and analyze basic electronics circuits.

References

1. Hambley, A. R., Electrical Engineering: Principles and Applications, 5th ed., Pearson (2011)
2. Hughes, E., Electrical and Electronic Technology, 11th ed. Pearson (2012).
3. Zekayat, S. A., Electrical Engineering Concepts and Applications , Pearson(2012)
4. Floyd, T.L., *Electronic Devices*. 9th ed. Prentice Hall, Inc, 2012.
5. Floyd, T.L., *Digital Fundamentals*, 10th ed. Prentice Hall, Inc, 2009.

PDT122/3 Material Science

Course synopsis

This course introduces students to historical perspective of materials science and engineering fundamentals characteristics begin from understanding the atomic structures, atomic bonding in solids, crystal structures, mechanical and physical properties of materials. Students will then apply the understanding on properties of materials through phase diagram, transformations and heat treatment processing on ferrous and non-ferrous alloys, polymer and advanced materials.

Course outcomes

1. Ability to describe and explain the materials' atomic structures, bonding, crystal structure and imperfections.
2. Ability to explain and analyse the mechanical, physical properties of materials.
3. Ability to explain and analyse the metal alloys microstructure, phase diagram and heat treatment processes.
4. Ability to describe and explain machinability of ferrous and non-ferrous metal alloys, polymer materials and advanced materials..

References

1. William D. Callister, Introduction to Materials, John-Wiley & Sons.
2. Serope Kalpakjian, Steven R. Schmid (2010)."Manufacturing Engineering and Technology."6th ed Prentice Hall.
3. William F. Smith, Javad Hashemi, 2006, Foundation of Materials Science and Engineering, Fourth edition, McGraw Hill.
4. Budinski, K.G, 2006, Engineering Materials Properties and Selection, 8th edition, Prentice Hall.
5. Shackeford, J.F, 2005, Introduction to Materials Science for Engineers, 6th edition, Prentice Hall.

PDT106/3 Engineering Graphics

Course synopsis

This course provides the skills to students the basics of Engineering Drawing, Computer Aided Drafting (CAD) and their engineering applications. The course covers the detail of Engineering Drawing for beginners followed with projection systems, oblique and isometric sketches. The course also introduced the Computer Aided Drafting using dedicated software, AUTOCAD, which focuses on product design in 2D and 3D environment. Fundamental knowledge in dimensioning and geometrical tolerance (GDT) enhances student's ability in interpreting and assessing information from basic raw data of an engineering drawing.

Course outcomes

1. To apply the basic drafting, sketching engineering components, and common term used in engineering drawing.
2. To apply orthographic, auxiliary view, cross section and isometric in engineering drawing.
3. To apply geometric, dimensioning, and tolerancing (GDT) in engineering drawing.
4. To apply detail and assembly drawing in engineering drawing.

References

1. Frederick E. Giesecke, Henry Cecil Spencer, John Thomas Dygdon, Alva Mitchell, Ivan Leroy Hill, James E Novak, "Technical Drawing" 10th Ed., Prentice Hall, 2002.
2. James H. Earle, "Engineering Design Graphics", IIth ed.,Pearson Prentice-Hall, 2004.
3. James D. B., "Engineering graphics with AutoCAD 2007", Pearson, 2007.
4. G. R. Cogorno, "Geometric Dimensioning and Tolerancing for Mechanical Design", McGraw-Hill, 2006.
5. R.K Dhawan, "Lukisan Mesin: Dalam Unjuran Sudut Pertama", Cetakan Pertama, Golden Books Centre Sdn. Bhd., 2002.

PDT133/2 Workshop Technology

Course synopsis

In this course, explanation about safety aspects in workshop will be covered,followed by fundamental measurement techniques , and use of measurement equipment such as Vernier Caliper , Chiseling , Sawing , etc. Students will be introduced to fabrication, sheet metal forming, and welding processes which consists of introduction to basic knowledge of various cutting methods and hand tools, such as file, hacksaw, chisel, and etc.

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 that it used in the industry to transform raw material to finished products. Practical work will help students gain effective understanding.

Course outcomes

1. Work in a group, communicate effectively; apply basic industrial safety regulation as well as emergency first aid techniques.
2. Ability to apply and understand engineering drawing and able to transfer for model/prototype fabrication.
3. Define and operate the conventional machining.

References

1. Steve F. Krar, Arthur R.Gill, peter Smid. Technology of Machine Tools. 6th ed. McGraw Hill, 2007.
2. S.Kalpakjian, S.R. Schimd (2001), Manufacturing Engineering and Technology. 5th ed. Prentice Hall International.
3. Mikell P. Groover (2007), Fundamentals of Modern Manufacturing. 3rd ed. John Wiley & Sons, Inc.
4. E.Paul DeGarmo, JT. Black, Ronald A. Kosher (1997). Materials and Processes in Manufacturing. 8th ed., John wiley & Sons, Inc.
5. John A.Schey. Introduction to Manufacturing Processes . Mc Graw Hill,2000.

PDT 236/2 Computer Programming

Course Synopsis

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

Course Outcomes

1. Ability to describe and apply design elements and principles in design projects and assignments.
2. Ability to analyze aesthetic value of 2 dimensional artwork and 3 dimensional objects of the design output.
3. Ability to recognize/realize the important of leadership and teamwork in producing projects or assignments for better output.

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 Scientifics", 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.

PDT111/3 Manufacturing Process

Course synopsis

This course explores the manufacturing process which used in industry to convert raw material into finished product. This course is devided into five sections. First, the introduction to manufacturing technology will be given, followed by material selection in manufacturing and

heat treatment process. Secondly, the casting technology and various metal casting processes will be introduced including sand casting, investment casting, vacuum casting and other casting processes. Thirdly, overview of forming and shaping process will be given on rolling, forging, extrusion, drawing, sheet-metal forming, powder metallurgy, processing of ceramics, injection molding, and rapid prototyping process. Fourthly is about various joining process such as brazing, soldering, adhesive bonding, and mechanical fastening processes.

Course outcomes

1. Ability to describe the concept & methodologies of manufacturing technology and fundamental of materials in manufacturing.
2. Ability to describe and analyze the concept & methodologies of solidification processes.
3. Ability to analyze and evaluate the concept of forming and shaping processes.
4. Ability to analyze and evaluate the concept & methodologies of joining and assembly technology.

References

1. Groover, M.P. Fundamentals of Modern Manufacturing; Materials, Processes, and Systems, 4th Ed., John Wiley & Sons, Inc., 2010.
2. Kalpakjian S, Schmid S.R. Manufacturing Engineering and Technology, 4th ed., Prentice Hall Inc. 2001
3. Schey, J.A. Introduction to Manufacturing Processes, 3rd Ed., Mc Graw Hill, 2000.
4. Philip F. Ostwald, Jairo Munoz (1997). *Manufacturing Processes and Systems.* 9th ed., John Wiley & Sons.
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PDT270/3 Physiology of Sports & Exercise

Course synopsis

The purpose of this course is to increase the student's knowledge and understanding about human physiology and the adaptations that occur during sport and exercise activities. Sport and exercise physiology is a branch of physiology that deals with the functioning of the human body during sports activities and exercise. An understanding of how the body responds to acute and chronic exercise is crucial for the physical educator, athletic trainer, coach, fitness expert, or exercise physiologist. Emphasis is placed on bioenergetics as well as circulatory, respiratory and neuromuscular responses to the physical stress of exercise. Also discussed are the effects of environmental factors and ergogenic aids on athletic performance.

Course outcomes

1. Ability to describe and explain of how the body responds during sports and exercise activities.
2. Ability to explain the interactions of metabolism, circulation, and structural adaptations in response to exercise and training.
3. Ability to describe the influence of nutrition, environmental factors and ergogenic aids on the sport performance.

References

1. W. Larry Kenney, Jack Wilmore, David Costill, 'Physiology of Sport and Exercise-5th Edition', 2011.
2. W. McArdle, F. Katch and V Katch, 'Exercise Physiology; Theory and application to fitness and performance' 2nd edition, New York, NY. Lippincott, Williams and Williams, 2000.

PDT274/3 Machine Elements

Course synopsis

This module is to introduce a wide range of machine elements and to understand their behaviour and use in machines; to choose proper standard machine elements and check its functionality, to calculate main geometrical and functional parameters of non standard machine elements. To ground structures of machine elements, display the essence of various calculations.

Course outcomes

1. Ability to describe and demonstrate about structure, classification, main parameters of the machine elements, criteria of functionality, methods of computations of typical machine elements.
2. Ability to describe and choose proper standard machine elements and check its functionality for specific system design.
3. Ability to explain and apply proper design parameters to solve problems of machine elements in mechanical system.

References

1. J. E. Shiqley, Ch. R. Mischke. Mechanical Engineering. Design.- McGraw-Hill, 2001.
2. Jack A. Collins. Mechanical Design of Machine Elements and machines. John Wiley and Soons, 2003.

3. Norton R.L. Machine Design / Second Edition. Prentice Hall, 2000.

PDT370/4 Computer Aided Engineering Analysis

Course synopsis

The course will equip students with the necessary knowledge to use finite element analysis to solve problems related to solid mechanics, dynamics, heat-transfer and acoustics. FEA is a design/research tool that is extensively used in industry and research institutions. Students will also gain hands-on experience in using commercial finite element analysis software to solve realistic engineering problems.

Course outcomes

1. Ability to apply and analyse the effective problem-solving techniques to simple engineering problems.
2. Ability to demonstrate and apply the computer-based methods for data processing and engineering problem solving.
3. Ability to apply and evaluate various appropriate computer methods/ software tools to solve particular engineering problems.

References

1. Nitin S. Gokhale, Sanjay S. Despande, Dr. Anand N. Thite (2008), Practical Finite Element Analysis .
2. Tu, J., Yeo, G.H. and Liu C. (2008), Computational Fluid Dynamics: A Practical Approach, Butterworth-Heinemann.

PDT371/4 Ergonomics & Safety

Course synopsis

This course introduces application of knowledge about human capabilities and limitations to the design of workplaces, work methods and jobs for optimal safety, efficiency, productivity and comfort.

Course outcomes

1. Ability to increase awareness of the need for and role of ergonomics in occupational health.
2. Ability to obtain basic knowledge in the application of ergonomic principles to design of sport arenas and the prevention of athlete injuries.
3. Ability to describe the breadth and scope of sport ergonomics equipment ans facilities.

PDT374/4 Sports Facilities & Arenas

Course synopsis

This course will provide students with an understanding of the factors involved in planning, designing, equipping and managing sports facilities.

Course outcomes

1. Ability to describe and explain the process related to analyzing, planning, and designing sports facilities.
2. Ability to explain the principles and techniques of construction and equipment bids for sports facilities.
3. Ability to describe and apply methods of operation and maintenance of sports facilities.

References

1. Sawyer, T.H. & Smith, O.S. (1999). The management of clubs, recreation and sport: Concepts and applications. Champaign, IL: Sagamore Publishing.
2. Bridges, F.L., & Roquemore, L.L. (1996). Management for athletic/ sport administration. (2nd ed.).
3. Walker, M.L., & Stotlar, D.K. (1997). Sport facility management. Sudbury, MA: Jones and Bartlett.
4. Farmer, P.J., Mulrooney, A.L., & Ammon, R. (1996). Sport facility planning and management. Morgantown, WV: Fitness Information Technology, Inc..

PDT 313/4 Final Year Project

Course synopsis

A projects based course that exposes students to solve, analyze, design and research engineering problems in the field of mechanical engineering.

Course outcomes

1. Ability to apply and integrate theories and lab, known how that has been learnt to solve engineering problems.
2. Ability to produce either a new design or toimprove on an existing design.
3. Ability to choose a suitable research methodology for the research project being undertaken.
4. Ability to write, present and defence the technical report (desertation) for the projects undertaken.

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INTRODUCTION

The School of Business Innovation and Technopreneurship (PPIPT), Universiti Malaysia Perlis was officially established on June 4th, 2010. The main objective of its establishment is to invigorate the knowledge acquiring process in the fields of business, economics and entrepreneurship across all departments in UniMAP. The establishment of PPIPT also aims to catalyse the development of entrepreneurship in Perlis.

Since July 2009, PPIPT has been offering two bachelor degree programs, namely the Bachelor of Business with Honours specialising in Engineering Entrepreneurship, and the Bachelor of Business with Honours specialising in International Business. The Engineering Entrepreneurship program enables students to be directly involved in business organisations through its business incubator program. This incubator program runs for twelve weeks during the semester break weighing 6 credit hours, through the placement of students in selected business incubators throughout the country. Students are exposed to new product development stage up to the commercialisation stage. They have the opportunity to develop valuable networking with entrepreneurs and business leaders through activities organised from time to time. In addition, the basic knowledge of engineering that encompasses various disciplines of engineering are also exposed in the program. Students are trained to become entrepreneurs and become a catalyst for economic growth through business and entrepreneurial activities that will be a key driver towards achieving a developed nation status by 2020.

Meanwhile, the Bachelor of Business program specialising in International Business provides opportunities for students to enrol in at least one of the seven foreign language courses offered in UniMAP which includes Mandarin, Thai, Arabic, Japanese, Korean, Russian and German. The foreign language courses are to be taken in four consecutive stages. Through the International Business program, students have the opportunity to undergo a 16-week Industrial Training which is divided into two parts. In Part 1, students are required to attend 8 weeks of Industrial Training after one year of study. Whereas in Part 2, students will be attending another 8 weeks of Industrial Training after their second year of study. Students are permitted to do their Industrial Training either in local or overseas settings. The School of Business Innovation and Technopreneurship, Universiti Malaysia Perlis (UniMAP) believes that Industrial Training is an important part of students' career preparation. It should be used to help students to identify their career path in any businesses related fields; to gain experience and expertise in students' area of interest; to determine the level of skills needed by the students to develop in order to become successful after their graduation. In addition, students have the opportunity to both observe and participate in a range of real world business experiences related to their studies.

In 2011, PPIPT introduced the Master of Business Administration (MBA) specialising in Engineering Management. This is a unique program as it is designed to meet the engineers' needs and requirements to become future managers in any organisations or companies. In 2012, PPIPT offers more graduate programs namely the Master of Science (MSc) and the Doctorate degrees in various fields related to business, which includes finance, accounting, marketing, management and entrepreneurship.

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BACHELOR OF BUSINESS (HONOURS) (ENGINEERING ENTREPRENEURSHIP) AND BACHELOR OF BUSINESS (HONOURS) (INTERNATIONAL BUSINESS)

BACHELOR OF BUSINESS (HONOURS) (ENGINEERING ENTREPRENEURSHIP)

PROGRAM EDUCATIONAL OBJECTIVE (PEO):

1. Graduates who are entrepreneurs.
2. Graduates who are entrepreneurial leaders in the chosen field as demonstrated through career advancement.
3. Graduates who pursue continuous educational opportunities.
4. Graduates who contribute to society.
5. Graduates who contribute through research and development.

PROGRAM OUTCOMES (PO):

1. Ability to apply knowledge of entrepreneurship, business management and basic engineering.
2. Ability to identify problems, create solutions and innovate to improve decision making and problem solving.
3. Ability to apply business operation practices and principles used in the current business environment.
4. Ability to communicate effectively.
5. Ability to demonstrate an in-depth understanding of entrepreneurship, the process of innovation and the need for sustainable development.
6. Ability to understand professional and ethical responsibilities.
7. Ability to operate with multi-disciplinary teams.
8. Ability to recognize the need for, and engage in life-long learning.
9. Ability to understand social, cultural and environmental responsibilities of an entrepreneur/manager.
10. Ability to recognize potential utilities of engineering applications as business opportunities.

BACHELOR OF BUSINESS (HONOURS) (INTERNATIONAL BUSINESS)

PROGRAM EDUCATIONAL OBJECTIVE (PEO):

1. Graduates who are managers
2. Graduates who are business leaders experienced in global/ international business environment
3. Graduates who pursue continuous educational opportunities
4. Graduates who contribute to society
5. Graduates who contribute through research and development

PROGRAM OUTCOMES (PO):

1. Ability to apply knowledge of business management in the work environment
2. Ability to identify problems, create solutions and innovate to improve decision making and problem solving
3. Ability to apply business operation practices and principles used in the current business environment
4. Ability to communicate effectively
5. Ability to demonstrate an in-depth understanding of entrepreneurship, the process of innovation and the need for sustainable development
6. Ability to understand professional and ethical responsibility
7. Ability to operate with multi-disciplinary teams
8. Ability to recognize the need for, and engage in life-long learning.
9. Ability to understand the social, cultural and environmental responsibilities from a global perspective
10. Ability to adapt to international business environments.
11. Ability to communicate proficiently in foreign languages

CURRICULUM STRUCTURE FOR BACHELOR OF BUSINESS (HONOURS) (ENGINEERING ENTREPRENEURSHIP) – 2015/2016 INTAKE

YEAR	FIRST			SECOND		SEMESTER BREAK	THIRD	
SEMESTER	FIRST	SECOND		FIRST	SECOND		FIRST	SECOND
Business Program Core / Elective Courses	BFT101/3 Business Economics	BFT107/3 Principles of Finance	SEMESTER BREAK	BFT103/3 Business Law & Ethics	BFT219/3 Product Design & Development	BIT291/6 INCUBATOR PROGRAM (12 weeks)	BFT223/3 Human Resource Management	BFT338/3 Strategic Management
	BFT105/3 Introduction to Business	BFT108/3 Principles of Marketing		BFT211/3 Business Innovation	BFT220/3 Technology Entrepreneurship		BFT318/3 Research Methodology	BFT362/3 Business Plan for Engineering Project
	BFT106/3 Principles of Accounting	BFT110/3 Organisational Behaviour		BFT213/3 Business Venture Management	BFT221/3 Operation Management		BFT326/3 Project Management	BFTxxx/3 Elective (Elective 8)
	BFT109/3 Principles of Management	BQT173/3 Business Statistics		BFT218/3 Introduction to Manufacturing Technology	BFT222/3 Managerial Accounting		BFTxxx/3 Elective (Elective 5)	BFTxxx/3 Elective (Elective 9)
	BQT133/3 Business Mathematics	BFTxxx/3 Elective (Elective 1)		BFTxxx/3 Elective (Elective 2)	BFTxxx/3 Elective (Elective 3)		BFTxxx/3 Elective (Elective 6)	BFTxxx/3 Elective (Elective 10)
					BFTxxx/3 Elective (Elective 4)		BFTxxx/3 Elective (Elective 7)	
University Required Courses	UUW410/2 Malay Language	BUW123/3 Business Communication		UZWxxx/1 Co-Curriculum			UUW235/2 Ethnic Relations	UUW322/2 Thinking Skills
	BUW122/2 Skills and Technology in Communication	UUW224/2 Engineering Entrepreneurship		UVW313/2 English for Academic Purposes				
	UZW1xx/1 Co-Curriculum (Uniformed Body)	UZW2xx/1 Co-Curriculum (Uniformed Body)		UUW233/2 Islamic & Asian Civilizations				
122 units	20	21		20	18	6	20	17

Note:
1. Students who have obtained MUET Band 1, 2 or 3 need to take EUW112-Foundation English course in the First Year, First Semester.
2. Elective Courses: Students need to take ELECTIVE courses as listed and offered by PPIPT.

BACHELOR OF BUSINESS (HONOURS) (ENGINEERING ENTREPRENEURSHIP)
ELECTIVE COURSES

RP52 - **Bachelor of Business (Honours) (Engineering Entrepreneurship)**			
No.	**Course Code**	**Course Name**	**Credit Hour**
1	BFT104/3	E-Business	3
2	BFT312/3	Business Analysis	3
3	BFT316/3	Leadership in Organisation	3
4	BFT319/3	Risk Management	3
5	BFT321/3	Services Marketing	3
6	BFT322/3	Supply Chain Management	3
7	BFT325/3	Logistics Management	3
8	BFT328/3	Managing Engineering and Technology	3
9	BFT212/3	Business Franchising & Licensing	3
10	BFT214/3	Engineering Economics	3
11	BFT215/3	Entrepreneurial Finance	3
12	BFT216/3	Entrepreneurial Marketing	3
13	BFT323/3	Family Business	3
14	BFT329/3	Small and Medium Enterprise Development	3
15	BFT112/3	Introduction to Engineering	3
16	BFT113/3	Engineering Drawing	3

CURRICULUM STRUCTURE FOR BACHELOR OF BUSINESS (HONOURS) (INTERNATIONAL BUSINESS) – 2015/2016 INTAKE

YEAR	FIRST		SEMESTER BREAK	SECOND		SEMESTER BREAK	THIRD	
SEMESTER	FIRST	SECOND		FIRST	SECOND		FIRST	SECOND
Business Program Core / Elective Courses	BFT101/3 Business Economics	BFT103/3 Business Law & Ethics	BIT190/3 INDUSTRIAL TRAINING 1 (8 weeks)	BFT107/3 Principles of Finance	BFT221/3 Operation Management	BIT290/3 INDUSTRIAL TRAINING 2 (8 weeks)	BFT351/6 Final Year Project	
	BFT105/3 Introduction to Business	BFT108/3 Principles of Marketing		BFT202/3 International Business Management	BFT222/3 Managerial Accounting		BFT337/3 International Marketing	BFT335/3 International Business Environment
	BFT106/3 Principles of Accounting	BFT110/3 Organizational Behavior		BFT223/3 Human Resource Management	BFT314/3 Cross-Cultural Management		BFTxxx/3 Elective (Elective 4)	BFT338/3 Strategic Management
	BFT109/3 Principles of Management	BQT173/3 Business Statistics		BFTxxx/3 Elective (Elective 1)	BFT318/3 Research Methodology		BFTxxx/3 Elective (Elective 5)	BFTxxx/3 Elective (Elective 8)
	BQT133/3 Business Mathematics			BFTxxx/3 Elective (Elective 2)	BFTxxx/3 Elective (Elective 3)		BFTxxx/3 Elective (Elective 6)	BFTxxx/3 Elective (Elective 9)
							BFTxxx/3 Elective (Elective 7)	
University Required Courses	UVW1x1/2 Foreign Language (Part 1)	UVW1x2/2 Foreign Language (Part 2)		UVW2x3/2 Foreign Language (Part 3)	UVW2x4/2 Foreign Language (Part 4)			UUW322/2 Thinking Skills
	UUW235/2 Ethnic Relations	UVW313/2 English for Academic Purposes		BUW123/3 Business Communication	UUW 224/2 Engineering Entrepreneurship			
	UUW410/2 Malay Language	UZW2xx/1 Co-Curriculum (Uniformed Body)		UZWxxx/1 Co-Curriculum				
	UZW1xx/1 Co-Curriculum (Uniformed Body)	BUW122/2 Skills and Technology in Communication						
		UUW233/2 Islamic & Asian Civilizations						
124 units	22	21	3	21	19	3	18	17

Note:
1. Students who have obtained MUET Band 1, 2 or 3 need to take EUW112-Foundation English course in the First Year, First Semester.
2. Elective Courses: Students need to take ELECTIVE courses as listed and offered by PPIPT.

BACHELOR OF BUSINESS (HONOURS) (INTERNATIONAL BUSINESS)
ELECTIVE COURSES

NO.	CODE	COURSES (CHOOSE 9 ELECTIVE COURSES ONLY)	CREDIT HOURS
1	BFT104/3	E-Business	3
2	BFT325/3	Logistics Management	3
3	BFT316/3	Leadership in Organization	3
4	BFT321/3	Services Marketing	3
5	BFT322/3	Supply Chain Management	3
6	BFT201/3	International Accounting	3
7	BFT203/3	International Economics	3
8	BFT204/3	International Finance	3
9	BFT205/3	International Human Resource Management	3
10	BFT331/3	International Business Decision Making	3
11	BFT341/3	International Trade Law	3
12	BFT344/3	Import Export Management	3
13	BFT342/3	Interactive Skills Workshop for Business	3
14	BFT345/3	Business Intelligence and Analytics	3
15	BFT346/3	Change Management	3
16	BFT330/3	Negotiation and Conflict Resolution	3
		TOTAL CREDIT HOURS	**27**

COURSE SYNOPSIS

BUSINESS CORE COURSES

BFT101/3
BUSINESS ECONOMICS

Course Synopsis

This course applies the tools of economic analysis to issue in business management, developing the student's abilities to problem solving using microeconomic and macroeconomic approaches. The module will focus on the operation of markets for goods and services demand and supply analysis, entrepreneurship, emergence and growth of firms, costs of production, different forms of competition and game theory, the macroeconomic environment and government policy.

References

1. Nellis, J.G. and Parker, D. (2008). Principles of Business Economics, (2nd ed.), Prentice Hall, Pearson
2. Tucker, I.B (2011). Survey of Economics, (7th ed.), South-Western, Cengage Learning.
3. Mastrianna, F.V. (2010). Principles of Economics, (15th ed.), South-Western, Cengage Learning.

BFT103/3
BUSINESS LAW & ETHICS

Course Synopsis

Law governs our daily activities. Similarly, there are certain rules that we have to follow in business transactions. The purpose of having these laws is to provide remedies for the aggrieved parties to take action in the occurrence of any breach of the laws. Business ethics deals with what is right and wrong in organizational decisions, behaviour and policies. Ethics provides the principles and guidelines to assist people in making choices to balance up economic interests and social responsibilities. The main objective of this course is to nurture students' abilities to discuss various laws and ethical issues which affect business operation. Ethical issues exposed include business operations and how business effectively operates.

References

1. Lee Mei Pheng & Ivan Jeron Detta, (2009), Business Law, Oxford University Press.
2. Nuraisyah Chua Abdullah, (2003), Business Law In Malaysia, Pusat penerbitan Universiti Teknologi MARA.
3. Abdullah Haji Abdul Ghani & Mohammad Zainol Abidin Adam, (2010), Business Ethics, Oxford University Hall.

BFT105/3
INTRODUCTION TO BUSINESS

Course Synopsis

This course presents business theories and practice in comprehensive manner. It focuses on an integrated view of business such as developing a business mindset, business in the global economic environment, business organization and management, business operations and technology and financial management.

References

1. Dlabay,L., Burron, J.L. and Eggland, S.A. (2010). 'Intro to Business', Asia Edition . Singapore: Cengage Learning Asia Pte. Ltd.
2. Pride,William M., Hughes R.J, and Kapoor J.R. (2010). Introduction to Business, 10th Edition, South-Western-Cengage Learning Pub
3. Ebert R.J., Griffin, Ricky W. (2011). Business Essentials, (8th edition), New Jersey: Pearson Education Inc.
4. Bovee, Courtland L., Thill, John V. (2011), Business in Action 5th Ed., New Jersey: Pearson Education Inc.
5. McDaniel, Carl., Gitman, Lawrence J. (2008), The Future Business 6th Ed., Thomson South Western.

BFT106/3
PRINCIPLES OF ACCOUNTING

Course Synopsis

This introductory course to business accounting, introduces students to the environment of accounting. The course covers nature of accounting and accounting concepts that are relevant to the preparation and presentation of financial statements. This course also exposes students to the skills of analyzing and interpreting the financial statements.

References

1. Frank A, (2008). 'Business Accounting 1', Pearson Prentice Hall Pub.
2. A. Wong (2007).' Business Accounting', Pearson Prentice Hall Pub.
3. Reeve, J., Warren,C.S and Duchac, J.E. (2007), 'Principles of Accounting',Thomson South-Western.
4. Roshayani, Laily and Maznah (2007), Financial Accounting: An Introduction, McGrew Hill.
5. Weygandt, J.J. Kieso, D.E and Kimmel, P.D. (2007), Accounting Principles, John Wiley & Sons.

6. Wild, J.J., Larson, K.D and Chiappetta, B. (2006), Fundamental Accounting Principles, McGrew Hills.

BFT107/3
PRINCIPLES OF FINANCE

Course Synopsis

This course provides an introduction to financial decision making rooted in current financial theories and in current state of world economic conditions with emphasis on capital markets and their influences on corporate financial decisions. The aim of this course is to provide tools that enable students to summarize new and unforeseen financial related problems.

References

1. Keown, Martin, Perry (2011). Foundations of Finance: The Logics and Practice of Financial Management,, Pearson International Edition 7th Ed.,Pearson Prentice Hall Publication.
2. Titman, Keown and Martin (2011), Financial Management: Principles and Application, Pearson International Edition, 11th Ed., Pearson Prentice Hall Publication.
3. Fabozzi, Modigliani, Jones, (2010), Foundations of Financial Markets and Institutions, Pearson International Edition 4th Ed., Pearson Prentice Hall Publication.
4. Brigham and Ehrhardt (2005), Financial Management: Theory and Practice, International Sudent Edition 11th Ed, South Wester Cengage Learning.
5. Brigham, Houstan, Chian, Lee and Ariffin (2010), Essentials of Financial Mangement 2nd Ed., Cengage Learning.
6. Brigham, Houstan, Chian, Lee and Ariffin (2011), Core Conceppts of Financial Management, Cengage Learning.

BFT108/3
PRINCIPLES OF MARKETING

Course Synopsis

Marketing is one of the three foundations in any business besides operations management and finance. Every business entity small, medium or multinational organizations need to have this component. This course aims to familiarize student with the important concerns of marketing and the importance of how, when, why and where to promote the business.

References

1. P.Kotler, G. Armstrong, (2014), Principles of Marketing An Asian Perspective, Pearson Education South Asia Pte. Ltd.
2. Kurtz, D.L., Young, V. (20018), Principles of Contemporary Marketing, Thomson South-Western, USA.
3. P.Kotler, G. Amstrong (2009), Marketing An Introduction, Pearson Education Inc.
4. P. Kotler, G. Mastrong (2009), Principles of Marketing A Global Perspective, Pearson Education South Asia Pte. Ltd.
5. Hartley, R. H (2006), Marketing Mistakes and Success, John Wiley and Sons.

BFT109/3
PRINCIPLES OF MANAGEMENT

Course Synopsis

This course is about management and managers. Manager is very important in all organizations – regardless of business size, kind, or location-need. And there's no doubt that the world that managers face has changed, is changing, and will continue to change. The dynamic nature of today's organizations means both rewards and challenges for the individuals who will be managing those organizations.

References

1. Robbins, S.P., DeCenzo, D.A., Coulter, M. (2011), Fundamentals of Management, (7th Edition), Pearson.
2. Richard, L.D. (2010), New Era of Management, (9th Edition), South-Western Cengage Learning.
3. Schermerhorn, J. Jr. (2008), Management, (9th Edition), John Wiley & Sons, Inc.
4. Drucker, P. F. (2007), Management Challenges for the 21st Century, Collins Business.

BFT110/3
ORGANIZATIONAL BEHAVIOUR

Course Synopsis

The main reason for studying organizational behaviour is that most of us work in organizations, so we need to understand, predict, and influence the behaviours of others in organizational settings. All of us need organizational behaviour knowledge to address the people issues.

References

1. Quick, J.C & Nelson, D. L (2011), Principles of Orgazational Behavior: Realities and Challenges 7th Ed., Australia: South Western Cengage Learning.
2. George, J. M & Jones, G. R (2012), Understanding and Managing Organizational Behavot 6th Ed., Boston, Pearson.
3. Moorhead, G. & Griffin, R. W (2012), Managing Organizational Behavior 10th Ed., Australia: South Western Cengage Learning.
4. Slocum, J. W& Hellriegel, D. (2011), Principles of Organizational Behavior 13th Ed., Australia: South Western Cengage Learning.
5. Nelson, D. L. & Quick, J.C. (2008), Understanding Organizational Behavior,3rd Ed., Australia: South Western Cengage Learning.
6. Colqiutt, J.S., Le Pine, J.A. & Wesson, M.J. (2010), Organizational Behavior: Essentials for Improving Performing and Commitment, Boston: McGraw-Hill Irwin.
7. Griffin, R. W. & Moorhead, G., (2010), Organizational Behavior: Managing People and Organizations 9th Ed., Australia: South Western Cengage Learning.
8. Newstrom, J.W (2007), Organizational Behavior: Human Behavior At Work 12th Ed., Boston: McGraw-Hill Irwin.

BFT221/3
OPERATION MANAGEMENT

Course Synopsis

This course will be of interest to business programs students because Operation Management is one of the three major foundations in any business organization beside Marketing and Finance/Accounting. Every Business, whether small, medium or Multinational Organization have operations component. This course will familiarize students with the important concerns of operation management decisions.

References

1. Render and Heizer,(2010) Operations Management (10th Edition), Prentice Hall.
2. William J. Stevenson (2007), Operations Management (9th Edition), McGraw-Hill.
3. Krajewski and Ritzman, (2010) Operations Management, Ninth Edition, Prentice Hall.
4. Slack N, Chambers S, Johnston R, (2003), Operation Management 4th ed., Prentice Hall.

BFT222/3
MANAGERIAL ACCOUNTING

Course Synopsis

This course aims to provide students with a pedagogy that helps them to build their decision-making skills and to equip them with manipulative skills in dealing with accounting information to make decisions. Focuses on contemporary issues which include interpreting financial information as a basic function for top management to plan, control and making decision in the internal organization operations. Students also learn how to manage business units effectively.

References

1. Mowen, Hansen and Heitger (2012), Managerial Accounting: The Cornerstone of Business Decisions (4th Edition), South Western Cengage Learning.
2. Brewer, Garrison and Noreen (2010), Introduction to Managerial Accounting (5th Edition), McGraw-Hill.
3. Horngren, Sundem, Stratton, Burgstahler and Schatzberg (2011), Introduction to Management Accounting (15th Edition), Prentice Hall
4. Oliver and Hengren (2010), Managerial Accounting, Prentice Hall.

BFT223/3
HUMAN RESOURCE MANAGEMENT

Course Synopsis

To develop skills in making rationale decisions in managing human resource. A good human resource manager needs to guide their employees, influence their behaviours and motivate them and to become a catalyst to achieve maximum impact of organizational goals.

References

1. Maimunah Aminuddin (2011). Human Resource Management: Principles and Practices (2nd Edition). Shah Alam: Oxford Fajar.
2. Maimunah Aminuddin, (2009), Human Resources Management (Revision Series), Selangor: Oxford Fajar.
3. Mondy, R. W. & Mondy, JB. (2012), Human Reosurce Management (12th Edition), Pearson, Boston.
4. Noe, R. A., hollenbeck, J. R. Gerhart, B. & Wrighta, P.M. (2010), Human Resource Management: Gaining a Competitive Advantage 7th Ed., Boston: McGraw Hill.
5. Dessler, G. (2012), Fundamental of Human Resouce Management 2nd Ed., Pearson Education, New Jersey.
6. Dessler, G. (2011), Human Resource Management 12th Ed., Pearson Education, New Jersey.
7. Dessler. G. & Chwee Huat, T. (2009), Human Resource management: An Asian Perspective 2nd Ed., Prentice Hall, Singapore.

BFT318/3
RESEARCH METHODOLOGY

Course Synopsis

To provide students with the tools and skills required to understand research terminology and types of methods best suited for investigating different types of problems and questions especially in business.

References

1. Mark Saunders, Philip Lewis and Andrian Thornhill, Research Methods for Business Students 5th Edition, (2009), Prentice Hall.
2. Cooper D. R and Schindler P.S. (2010), Business Research Methods 8th Edition, Prentice hall Publications Fourth Edition.
3. Pervez Ghauri and Kjell Gronhaug (2010), Research Methods in Business Studies, Prentice Hall Publications 4th Ed.
4. Sekaran U. (2010) Research Methods for Business: A Skill-Building Approach (5th Ed). John Wiley & Sons.
5. Zikmund, Babin, Carr and Griffin, Business Research Methods 8th Ed. (2009), South Western.

BFT338/3
STRATEGIC MANAGEMENT

Course Synopsis

This is a capstone program that inter-relates the business courses that students have previously taken and is one of the compulsory core courses for all business students.

Prerequisite

- Final Year Student only

References

1. Wheelen, T. L. & Hunger, J. D. (2012). Strategic Management and Business Policy: Toward Global Sustainability (13th edition). United States: Pearson Educ. Inc.
2. Haim, H. A. (2010). Pengurusan Strategik: Konsep dan Kes (3rd. edition). Kuala Lumpur: Pearson-Prentice Hall.
3. Ireland, R.d., Hoskisson, R. E & Hitt, M. A (2011), The Management of Strategy: Concepts and Cases 9th Ed., South Western.
4. David, F. R. (2011). Strategic Management: Concepts and Cases (13th edition). New Jersey: Prentice Hall.
5. Barney, H., & Hesterley, W.S. (2008), Strategic Management and Competitive Advantage: Concepts and Cases 2nd Ed., New Jersey, Pearson International.
6. Dess, G. Lumkin, G.T., & Eistner, B. A (2008), Startegic Management: Text and Cases 4th Ed., United States of America, Mc Graw Hill.
7. Hill, W.L.C & Jones, G. R (2009), Theiry of Strategic Management with Cases 8th Ed., United States of America, south Western.
8. Jennings, D. (2002), Startegic Management: AN Evaluation of the Use of Three Learning Methods, Journal of Management Development, Vol. 21 No. 9 pp. 655-665.

BQT133/3
BUSINESS MATHEMATICS Course

Synopsis

The purpose of the course is to provide the students with some mathematical techniques which could help them to make better decisions in dealing with business challenges. Topics learnt include: Matrix Algebra, Financial Mathematics, Differential Calculus and Integral Calculus.

References

1. Brechner R, (2008). Contemporary Mathematics for Business and Consumers, South-Western College Pub.
2. Slavin S., Stouffer T.(2007). Business Math, John Wiley.
3. Shannon J. (1995). Mathematics for Business, Economics and Finance, John Wiley and Son

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 the variable, discrete and continuous probability distributions, sampling and sampling distributions, estimation, hypothesis tests, regression and correlation, and introduction to multiple regression.

References

1. Mark, L. B., Levine, D. M. & Krehbiel, T.C. (2008). Basic Business Statistics. (11th edition), Prentice Hall.
2. Bowerman, O. & Orris, P. (2008). Essentials of Business Statistics. (2nd edition), McGraw Hill/Irwin.
3. Weiers, R. M. (2007). Introduction to Business Statistics. Duxbury Press, An International Thomson Publishing Company.

CORE COURSES FOR ENGINEERING ENTREPRENEURSHIP (RP52)

BFT211/3
BUSINESS INNOVATION

Course Synopsis

The course explains business opportunities emerging in both business and society's contemporary needs. Main focus of this course is to manipulate student's thinking skills especially in creative and innovative aspects. As a result they shall produce new products, services or processes for customers who would address issues of market segmentation and saturation and changing customer values and user requirements. Creativity and innovation are vital elements for all level of business in order to grow and expand.

References

1. Pervaiz Ahmed and Charlie Shepherd (2010). Innovation Management: Context, strategies, systems and processes (10th ed). Financial Times Press.
2. Mahmood, R., et. all. (2009). Prinsip-prinsip Keusahawanan: Pendekatan Gunaan (2nd ed). Sintok: CENGAGE-Learning.
3. Aman Shah, S.H & Mohd Ali, Abd. R. (2008). Entrepreneurship. Selangor: Oxford Fajar Sdn Bhd.

BFT213/3
BUSINESS VENTURE MANAGEMENT

Course Synopsis

This course is indeed an extension subject of Introduction to Business (BFT 105). Students need to apply the knowledge that has been gained earlier for the implementation of the business venture and management process and strategies. The main objective of this course is to equip students with communication skills to make good business venture management decisions, and to formulate cost effective business strategies and programs, if we want to attain business organizational objectives. It requires students to integrate, in an optimal manner, the appropriate strategies associated with each element of the marketing mix (4Ps) to produce a comprehensive business venture management plan.

References

1. Barringer, B.R. and Ireland, R.D (2012), Entrepreneurship Succesfully Launching New Ventures. (3rd Edition), Pearson Education, Singapore.
2. Timmons, J.A. (2009), New Venture Creation, Entrepreneurship for the 21st Century, 8th Ed., Mc Graw Hill Intenational Edition, Singapore.
3. Kathleen, R.A. (2012), New Venture Creation, (5th Edition), South Western Cengage Learning, Singapore.
4. Scarborough N.M (2011). Essentials of Entrepreneurship and Small Business Management, (Sixth Edition). Pearson, Singapore.

BFT218/3
INTRODUCTION TO MANUFACTURING TECHNOLOGY

Course Synopsis

This course introduces students to some fundamentals of manufacturing technology and its function in product development, production and business. Topics taught include introduction to manufacturing technology and its role in concurrent engineering, metallic and non-metallic material behaviours, casting, forming and shaping processes. Aspects of material removal, joining and surface technology are expose later. Finally, the engineering metrology and quality assurance, manufacturing system and automation, human factors and manufacturing costing.

References

1. Kalpakjian S. and Schmid S. R. (2014), Manufacturing Engineering and Technology, (7th Ed.), Pearson.
2. Grover M. P,(2010) Fundamentals of Modern Manufacturing, (4th Ed.), John Willey & Sons, Inc.
3. P N Rao, (2013), Manufacturing Technology (4th Ed.), Mc Graw Hill Edu. (India).

BFT219/3
PRODUCT DESIGN & DEVELOPMENT

Course Synopsis

This course introduces students to various design aspects in the application of product development. Design plays an importance role in transforming product ideas into physical form which is vital to product development. The design function includes engineering design and industrial design. It is complemented by marketing and manufacturing.

References

1. Karl T. Ulrich and Steven D. Eppinger (2012), Product Design and Development, 5th Intenatinal edition Ed., Mc Graw Hill International Edition.
2. Baxter, M. (1995), Product Design: Practical Methods for Systematic Development of New Product, CRC Press.
3. Priest, J. W. and Sanchez, J. M. (2001), Product Development and Design for Manufacturing: A Collaborative Approach to Producibility and Reliability (2nd Edition), Marcel Dekker, Inc.

4. Dieter, G.E. and Schmidt, L.C (2009), Engineering Design 4th Ed., Mc Graw Hill.
5. Cross, N. (2008), Engineering Design Methods: Strategies for Product Design, John Wiley & Sons.
6. Dym, C.L. and Little, P. (2008), Engineering Design: A Project-Based Introduction, John wiley and Sons.

BFT220/3
TECHNOLOGY ENTREPRENEURSHIP

Course Synopsis

This course concentrates on the innovative transformation of knowledge into commercial products and services. Students shall access real technologies for commercial potential in terms of licensing and for venture development. The course begins by examining concepts associated with technology commercialization. Concepts are introduced to improve and accelerate the commercialization process, from decisions made by scientist at the research bench, through the development, patenting, and licensing of new technologies, to the formation of entrepreneurial enterprises. Intellectual property studies are to be included in this course too.

References

1. Byers, T.H., R.C & Nelson, A.J. (2011). Technology Venture: From Idea to Enterprise, Third Edition. McGraw-Hill.
2. Merges, Menell & Lemley (2007). Intellectual Property in the New Technological Age, Statutory Supplement.
3. Swanson, J.A. and Baird, M.L. (2003). Engineering Your Start-Up (2nd ed). Belmont, CA: Professional Publications.
4. Kamariah Ismailet al (2009), Technology Entreprenuership, Pearson Education.
5. Izaidin Abdul Majid & Kamariah Ismail (2009), Entrepreneurial Management and Technology-based Firms, Lambert Academic Publisher, Koln. Germany.
6. Fang Zhou (2008), Information Technology Entrepreneurship and Innovation, IGI Global Snippet.

BFT326/3
PROJECT MANAGEMENT

Course Synopsis

In this course, students shall learn basic management concepts and models that could enhance successful management of projects in engineering and technology. Topics include, structured approach to project management, project life cycle, project selection and evaluation, organizational concepts in project management, project planning, conflict and negotiation, budgeting and cost estimation, scheduling, resource allocation, monitoring, information systems and project evaluation and control, project reviewing and project termination.

References

1. Pinto, J.K., (2010). Project Management – Achieving Competitive Advantage, (2th Edition). Pearson.
2. Clements & Gido (2012). Effective Project Management, (2th Edition). South-Western Cengage Learning.
3. Meredith & Mantel, Jr. (2006). Project Management - A Managerial Approach. (6th edition). John Wiley & Sons, Inc.
4. Kerzner, H. (2005), Project Management: A Systems Approach to Planning, Scheduling and Controlling, Wiley.
5. Wysocki, R.K., (2006), Effective Project Management: Traditional, Adaptive, Extreme, Wiley.

BFT362/3
BUSINESS PLAN FOR ENGINEERING PROJECTS

Course Synopsis

This course provides an exposure to the students to write a business plan proposal which combine business and basic engineering aspect. Students shall have an opportunity to put their learning into practice in a specific business plan format with specific product project. The product or project to be included in the proposal shall reflect from various sources such as the faculty, industry or student's project.

Prerequisite

- BFT213 Business Venture Management
- Result must be D+ and above

References

1. Barringer, B.R. (2009). Preparing Effective Business Plans. Ph.D. Pearson Education Inc.

BIT291/6
INCUBATOR PROGRAM

Course Synopsis

This course exposes students to the actual entrepreneurship and business world. Students will be stationed in business incubators, and have been assigned to one of the newly startup

companies or enterprise. Students shall experience challenges which include start up a company / business the company procedures, banking activities, development of new product, business networking, management of the company and others. Exposure to business world shall trigger students into fostering an entrepreneurial network.

References

1. UniMAP Business Incubator Guideline (September 2010)
2. UniMAP Business Incubator Log Book

CORE COURSES FOR INTERNATIONAL BUSINESS (RE09)

BFT202/3
INTERNATIONAL BUSINESS MANAGEMENT

Course Synopsis

This course covers broad survey of the field of international business and provides the foundations for further specialisation in this field. It begins with a brief overview of international business and focus on the concept of globalisation. The main objective of this course is to provide students with an understanding and knowledge of international business management concepts. This course also views thinking aspects of international business linked to management, organizations and contemporary culture. It encourages students to apply theories and ideas to practice and to relate them to their own experiences via various examples and many study cases from the business world and a range of practical activities.

References

1. Cavusgil S. Tamer, Kinght Gary & Riesenberger John R. (2012), International Business: Environment & Operations 13th Ed., Pearson.
2. Daniels J. D., Radebaugh L. H., & Sullivan D. P. (2011), International Business: Environments and Operations, (13th Edition), Pearson.
3. Griffin R. W., & Pustay M. W. (2010), International Business, (6th Edition), Pearson.
4. Wild. John. J.& Wild Kenneth L. (2012), International Business: The Challenges of Globalization 6th Edition, Pearson.
5. Peng Mike W. (2011), Global Business 2nd Ed., South western Cengage Learning.

BFT314/3
CROSS CULTURAL MANAGEMENT

Course Synopsis

The increase of diversity and globalization in business require employees, especially managers, to develop cross-cultural competence, to work effectively in international assignments, on cross-cultural teams. This due to diversification customers and clients needs, and to effectively compete or collaborate with competitors, suppliers, partners, and relevant stakeholders, such as governments and other public bodies. Effective training and exposure to cultural differences around the world can help employees learn to be more successful in a variety of business settings. This course seeks to provide students with an understanding of effective cross-cultural management and the challenges occurred internationally. It focuses on culture and management, culture and communication and culture and communication.

References

1. Joelle M. and Roger P. (2011), Understanding Cross-cultural Management, (Second Edition), Prentice Hall.
2. Ember C. R and Ember M. (2011), Cultural Anthropology, (13th Edition), Pearson.
3. Schneider, S.C and Barsoux, J.L (2003), Managing Across Culture, (Second Edition), Prentice Hall.
4. Holden, N. J. (2002), Cross Culture Management, Prentice Hall.
5. David. C. Thomas (2008), Cross Culture Management Essential Concept, 2nd ed., SAGE Publications, Inc.

BFT335/3
INTERNATIONAL BUSINESS ENVIRONMENT

Course Synopsis

This course introduces students to the world of international business environment and devises global strategies in response to changes in the internal and external influences of the business environment. Students also learn various methods of collecting, analysing and organising information and communicating ideas and information, which are core processes of business research and case studies.

References

1. Daniels J.D., Radebaugh L. H., Sullivan D. P. (2013), International Business: Environment Operations, 13/E, Pearson.
2. Cavusgil S.T., Knight G., Riesenberger J. R. (2012), International Business: The New Realities, 2/E, Pearson.

3. Inkpen A., & Ramaswamy, K. (2005), Global Strategy: Creating and Sustaining Advantage across Borders, Oxford University Press, USA.
4. Pankaj Ghemawat (2007) Redefining Global Strategy: Crossing Border in a World Where Differences Still Matter, Harvard Business School Press.
5. Peng M. W. (2011), Global Business 2nd Edition, South-Western: Cengage Learning.

BFT337/3
INTERNATIONAL MARKETING

Course Synopsis

This course familiarize student with the importance of international marketing and the economic, political, and cultural trend differences among countries as they influence marketing.

References

1. Keegan, W., Green, M. (2011). Global Marketing, (6th edition), Pearson Prentice-Hall.
2. C. Samuel Craig and Susan P. Douglas (2005). International Marketing Research .Wiley.
3. P. Kotler, H. Kartajaya, H. D Huan, S. Liu (2008), Rethinking Marketing 2nd Ed., Pearson Prentice Hall.
4. Alexander Chernev (2007), Strategic Marketing Analysis, 2nd Ed., Brightstar Media, Inc.

BFT351/6
FINAL YEAR PROJECT

Course Synopsis

The course reflects student's abilities to select appropriate research area and then present a substantial piece of work that prove his/her intellectual abilities to the fullest. A well-written project paper is a useful document to employer. The course also provides skills to students who wish to pursue their studies to post graduate level. Student shall learn 'project management' of a substantial piece of work and techniques associated with writing and assembling a large document. These skills shall assist students when it comes to similar ventures in the future.

Prerequisite

- Final year student only

References

1. Fisher C. (2007), Researching and writing a dissertation: A guidebook for business students. Prentice hall.
2. Johnson R.A and Wichen D.W (2007), Applied Multivariate Statistical Analysis, (6th Ed), Pearson International Edition.
3. Ghauri P. and Gronhaug K. (2010), Research Methods in Business Studies, (4th Ed), Prentice Hall.
4. Barry J. babin, Jon C. Carr and Mitch Griffin (2010), Business Research Methods, 8th Ed., International Edition.
5. Julie Pallant (2007), SPSS Survival Manual: A Step By Step Guide To data analysis Using SPSS 3rd Ed.

BIT190/3
INDUSTRIAL TRAINING 1
BIT290/3
INDUSTRIAL TRAINING 2

Course Synopsis

Industrial training is viewed as an important strategy for students as exposure to the real work situation. These two series of course shall equip them with the necessary skills needed as graduate. It is hoped that students will benefit from the series as well as to provide experience of real working world. In addition, students may use this opportunity to and make the best preparation to enter real working world.

References

1. UniMAP Industrial Training Guideline Rev A (July 2008)
2. UniMAP Industrial Training Log Book

ELECTIVE COURSES FOR ENGINEERING ENTREPRENEURSHIP (RP52)

BFT113/3
ENGINEERING DRAWING

Course Synopsis

This course provides exposure and skills to student in basic Engineering Drawing, Computer Aided Drafting (CAD) and its applications in product design. The course will cover the details of Engineering Drawing for beginners followed by projection systems, oblique and isometric sketches, before going on to Computer Aided Drafting software, which focuses on product design in 2D. Knowledge in dimensioning and geometrical tolerance (GDT) will enhance student's ability in interpreting and assessing information from basic raw data of an engineering drawing which can be used for business applications.

References

1. Madsen, D.A. and Madsen, D.P. (2011), Engineering Drawing & Design, 5th ed. Cengage Learning.
2. Bertoline, G.R., Wiebe, E.N., Hartman, N.R., and Ross, W.A. (2011), Fundamentals of Graphics Communication, 6th ed., McGraw-Hill.

3. French, T.E. (2012), A Manual Of Engineering Drawing: For Students And Draftsmen, Nabu Press.
4. Jensen C., Helsel J.D., and Short D.R (2007), Engineering Drawing & Design, 7th Ed. mc Graw Hill.
5. Jensen, C. H and Helsel J. D (2007), Interpreting Engineering Drawings 7th Ed., Thomsons/Delmar Learning.
6. Yarwood, A. (2010), Introduction to AutoCAD 2011 @D and 3D Design, Elsevier.

BFT104/3
E-BUSINESS

Course Synopsis

This course is a comprehensive guide to all aspects of deploying e-business and e-commerce within organization. The course is divided into 3 parts: An introduction to e-business and e-commerce; reviewing alternative strategic approaches and applications of e-business; and how strategy can be implemented.

References

1. Chaffey, D. (2009). E-Business and E-Commerce Management: Strategy, Implementation and Practice (4th Edition). Harlow: Financial Times Prentice Hall.
2. Laudon, K.C. & Traver, C.G. (2009). E-Commerce: Business, Technology, Society (5th Edition). New Jersey: Pearson Prentice Hall.
3. Turban, E. et al. (2009). Introduction to Electronic Commerce (2nd Edition). New Jersey: Pearson Prentice Hall.
4. Canzer, B. (2003), E-Business: Strategic Thinking and Practice, Boston: Houghton Mifflin Company.
5. Cassidy, A. (2002), A Practical Guide to Planning for E-Business Success: How to E-Enable Your Enterprise, Florida: St. Lucie Press.

BFT 112/3
INTRODUCTION TO ENGINEERING

Course Synopsis

This course introduces students to the basic engineering concepts/fields and how they can be applicable in manufacturing systems across industries. It also covers issues from engineering disciplines. These key engineering issues shall be translated into entrepreneurial opportunities. For example, how bioprocess engineering can be used in agriculture, food, perfume and pharmaceuticals. Or cause and effect of climate change to the environment. Or the usage of electrical and electronics engineering in power generation and broadcast transmission systems.

References

1. Jensen J.N. (2005). A user's guide to engineering. Pearson Prentice Hall.
2. Moaveni S. (2010). Engineering Fundamentals: An Introduction to Engineering. Cengage Learning.
3. Jensen J.N. (2005). A user's guide to engineering. Pearson Prentice Hall.
4. Wright, Paul H. (2002). Introduction to Engineering. (3rd ed). John Wiley & Sons. New York.
5. McCarty, N. (2009), Engineering: A Beginner Guide, OneWorld.

BFT212/3
BUSINESS FRANCHISING AND LICENSING

Course Synopsis

This course intends to assist students in developing a clear picture of franchisees and franchisors and to provide them with some insights that will help them to make own decisions when entering the field. Students will learn the concept of franchising and licensing comprehensively. There are 3 focus area in the course: First, a franchisor and franchisee are independent business people who must manage their separate business affairs; second, the franchisor and franchisee are dependent upon each other in order to be successful in business; and third, the franchisor-franchisee relationship bring with it an interdependent contractual obligation that is legally binding upon both parties.

References

1. Judd, R.J. & Justis, R.T. (2008). Franchising: An Entrepreneur's Guide (4th Edition). Australia: Thomson.
2. Gartner, W.B. & Bellamy, M.G. (2008). Enterprise. Australia: South-Western Cengage Learning.
3. Lambing, P.A. & Kuehl, C.R. (2007). Entrepreneurship (4th Edition). New Jersey: Pearson Prentice Hall.
4. Norita Deraman et.al (2007), Keusahawanan, Kuala Lumpur: Mc Graw Hill Education.
5. Shane, S.A (2005), From Ice-cream to the Internet: Using Franchising to Drive the Growth and Profits of Your Company, New Jersey: Pearson Prentice Hall.

BFT214/3
ENGINEERING ECONOMICS

Course Synopsis

The main purpose this course is to introduce students to methods and modern techniques of engineering economic analysis for decision making, evaluations of economic alternatives, cost control, capital budgeting, managerial cost accounting, deterministic inventory theory and decision-making under uncertainty. It provides a background of economic principles that engineers encounter in working on development projects. Students are

also analyse the financial and economic concepts that are required in engineering project financial performance, from the conceptual stage to the engineering and design stages.

References

1. Chan, S. P. (2008). Fundamentals Engineering Economics, (2nd. Ed), Prentice-Hall. (2008)
2. Chan, S.P. (2006). Contemporary Engineering Economics, (4th ed.), Prentice-Hall.
3. Newnan, D., Eschenbach, T. and Lavelle, J. (2004). Engineering Economic Analysis. (9th ed.) Oxford University Press, USA
4. O'Sullivan/Sheffin (2001), economics: Principles and Tools, prentice Hall.
5. Sullivan, William G., E. and Luxhoj, T. J. (2006), Engineering Economy: Fundamnetal of Engineering Economics 13th Ed., Upper Sadder River, NJ: Pearson Prentice Hall.

BFT215/3
ENTREPRENEURIAL FINANCE

Course Synopsis

The subject covers a broad range of core financial aspects that are pertinent for entrepreneurs in starting a business and understanding the financial aspects of running a business may be an overwhelming experience. The course discusses sole proprietorships, partnerships, limited liability companies, and private corporations. Key financial topics, such as financial statements, break-even analysis, working capital management, and time value of money are also explained and examined. The class will also study important topics in finance and describes how mastering these topics can positively impact business success. Students are also expected to master the financial tools of Time-Value-of-Money and financial statement analysis - Discusses horizontal, vertical, and ratio analysis of financial statements in detail. Other topics of discussion include financial distress and mergers and acquisition, and also personal financial planning which is relevant for entrepreneurs.

Prerequisite

- BFT107 Principles of Finance
- Result must be D+ and above

References

1. Leach and Melicher (2012), Entrepreneurial Finace 4th Ed., South Western Publications, USA.
2. Smith, R.L. and Smith Kiholm, J. (2004). Entrepreneurial Finance (2nd Edition), Wiley Publishing.
3. Mohd Noor Mohd Shariff, Rosli Mohd Saad, Siti Hajar Mohd Ali (2006). Financial Analysis for Entrepreneur, Pearson Prentice Hill.
4. J. Chris Leach and Ronald W. Melicher (2009), Finance for Entrepreneurs 3rd Ed., South western CENGAGE Learning.
5. Adelman, J.P. and Marks, M.A. (2010). Entrepreneurial Finance (5th Edition), Pearson International Edition.

BFT216/3
ENTREPRENEURIAL MARKETING

Course Synopsis

Entrepreneurial Marketing is an art and science in choosing target markets and getting, keeping, and growing customers through creating, delivering, and communicating superior customer value. Eentrepreneurial marketing seeks to meet organizational objectives by effectively satisfying customers in a dynamic environment. This course provides an overview of marketing processes, marketing principles, entrepreneurial environment and provides students with the opportunity to apply the key concepts to practical business situations.

Prerequisite

- BFT108 Principles of Marketing
- Result must be D+ and above

References

1. Bjerke, B. and Hultman, C., (2004), 'Entrepreneurial Marketing: The Growth of Small Firms in the New Economic Era ', Edward Elgar Pub.
2. Buskirk, B. and Lavik, M., (2003), 'Entrepreneurial Marketing: Real Stories and Survival Strategies', South-Western College Pub; 1st Edition.
3. Lodish, Morgan and Killianpur, Entrepreneurial Marketing (2006), Wiley Publishing.
4. Lodish, M.L., Morgan, H.L and Archambeau, S. , Marketing That Works: How Entrepreneurrial Marketing Can Add Sustanable Value to Any Sized Company (2007), Wharton School Publishing.
5. Schindehutte, M., Morris, M. and Pitt, L., (2009),'Rethinking Marketing: The Entrepreneurial Imperative', Prentice Hall.

BFT312/3
BUSINESS ANALYSIS

Course Synopsis

This course is an analysis of financial information arising primarily from the financial reports of entities. Fundamentals analysis techniques are examined in details with particular emphasis on the application of these techniques in equity (shares) valuations

decision. The course comprises three parts where Part One outlines the four basic steps in the fundamental analysis framework: business analysis, accounting analysis, financial analysis and prospective analysis; Part Two are combining the four skills in addressing the question of valuation; Part Three are applying appropriate skills in several different situations such as credit analysis, mergers and acquisition and financial policy decision.

References

1. K.G. Palepu, P.M. Healy and E. Peek. (2010), Business Analysis and Valuation IFRS Edition, 2nd Ed., Cengage Learning.
2. C.h. Gibson (2011) Financial Statement Analysis 12th Ed., Cengage Learning.
3. C. Carlberg 92010) Business Analysis, Microsoft Excelm2010, Que.
4. K. G. Palepu and P.M Healy (2008) Business Analysis & Valuation Using Financial Statement 4th Ed., Cengage Learning.
5. Craig S. Fleisher and Babette E. Bensoussan (2007), Business and Competitive Analysis: Effective Application of New and Classic Methods, FT Press.
6. Barbara A. Carkenord (2008), Seven Step to Mastering Business Analysis, J. Rose Publishing.

BFT316/3
LEADERSHIP IN ORGANIZATION

Course Synopsis

This course is a comprehensive guide to all aspects of leadership in organizations. The course is divided into 11 topics: (i) nature of leadership, (ii) leadership thoeries, (iii) perspective of effective leadersip behavior, (iv) participative leadership, (v) power and influence, (vi) charismatic and transformational leadership, (vii) leading change, (viii) leadership in teams, (ix) cross-cultural leadership, (x) developing leadership skills and (xi) strategic leadership by executives.

References

1. Yulk, G. D. (2009). Leadership in Organizations, (7th Edition), Pearson Prentice-Hall.
2. Daft, R. L. (2011). Leadership, (5th Edition), South-Western, Cengage Learning.
3. Achua, L. (2010). Effective Leadership, (4th Edition), South-Western, Cengage Learning.
4. DuBrin, Andrew J., Principles of Leadership (2010), 4th Ed., South western, Cengage Learning.
5. Afsaneh nahavandi, (2012), The Art and Science of Leadership 6th ed., Paeson Prentice Hall.

BFT319/3
RISK MANAGEMENT

Course Synopsis

The subject covers a broad range of core aspects that are pertinent for entrepreneurs as starting a business and understanding the risk management of running a business. The course discusses fundamentals of risk management, risk management techniques and strategies. Key topics include, risk and its treatment, legal principles of insurance, financial risk management, enterprise risk management, and also personal insurance which is relevant for entrepreneurs.

References

1. Hull, John C. (2007), Risk Management and Financial Institutions, 2nd Ed., Pearson.
2. Hull, John. C. (2011), Fundamentals of Futures and options Market, Global edition, Pearson.
3. Chance, Don M. and Robert Brooks (2010), An Introduction to Derivatives and Risk, South Western, Cengage Learning.
4. Hull, J. C. (2009), Options, Futures, and Other Derivatives, (7th Edition), Pearson International Edition.
5. Mishkin, John. C (2009), Financial Markets and Institutions, 6th Ed., Pearson International Edition.
6. Dorfman Mark S., (2008), Introduction to Risk Management Insurance, 9th Ed., Pearson International Edition.

BFT321/3
SERVICES MARKETING

Course Synopsis

This course focused on a comprehensive reference of managing services in marketing elements in an organization. It is divided into 4 parts: Understanding Service Products,Consumers,and Markets; Applying the 4 P's of Marketing to Services; Managing the Customer Interface and Implementing Profitable Service Strategies.

References

1. Lovelock, C.H. and Wirtz, J. (2011). Services Marketing (7th Edition), Pearson Global Edition
2. Lovelock, C. H. and Wirtz, J. and Chew, P. (2008), Essential of Service Marketing 5th Ed., Mc Graw Hill.
3. Zeithaml, V., Bitner, M.J. and Gremler, D.D. (2008), Services Marketing (5th Edition), McGraw-Hill/ Irwin

4. Schultz, M. and Doerr, J. (2009). Professional Services Marketing, Wiley
5. Bateson, J. E. G and Hoffman, K. D (2008), Service Marketing 4th Ed., South Western Cengage Learning.
6. Fitzsimmons, J. A and Fitzsimmons, M. J. (2011), Service Management 7th Ed., McGraw Hill.

BFT322/3
SUPPLY CHAIN MANAGEMENT

Course Synopsis

This course explored key issues associated with the design and management of industrial supply chains (SC). SC is concerned with the efficient integration of suppliers, factories, warehouses and stores so that products are distributed to customers in the right quantity and at the right time. One of the primary objectives of SC management is to minimize the total SC cost subject to various service requirements.

References

1. Wisner, J. D., Tan,K.C. & Leong,G.K., (2012). Supply Chain Management: A balanced approached (3rd Edition). South-Western Cengage Learning.
2. N. Chandrasekaran, (2010). Supply Chain Management, First Edition, Oxford
3. Chopra S. and Meindl P. (2007). Supply Chain Management, Fourth Edition, Prentice Hall.
4. Bozarth and Handfield, (2008), Operations and Supply Chain Management, @nd Ed., Prentice Hall.
5. Handfield, R. B., Monczka, R. B., Giunipero, L.C., and Patterson, J.L (2011), Sourcing and Supply Chain Management 5th Ed., South Wester Cengage Learning.

BFT323/3
FAMILY BUSINESS

Course Synopsis

The course concerns with a study of family business issues, including ownership and management succession, conflict management, definition of family and business boundaries, and development of family and business values. Case studies of famous and not-so-famous family businesses will be used extensively in the course for the purpose of learning about the family factors and the business factors which influence the success of the family and the family business.

References

1. Ernesto, J. Poza, (2010,) Family Business, (3rd Edition), South-Western Cengage Learning.
2. Hoy, F. & Sharma, P (2010), Entrepreneurial Family Firms, Prentice Hall
3. Phan, P. and Butler, J.E. (2008). Theoretical Developments And Future Research In Family Business (PB) (Research In Entrepreneurship And Management). Information Age Publishing.
4. Poza, J. E (2006), Familiy Business, South Western College Pub.
5. Denise, Kenyon-Rouvinez and Ward, J. (2005), Family Business: Key Issues, Palgrave Macmillan.

BFT325/3
LOGISTICS MANAGEMENT

Course Synopsis

The course focuses on the fundamental principles of contemporary logistics management. It involves the roles and contributions of logistics management in ensuring successful supply chain management process (plan, implementation, control); the efficient, effective forward and reverse flow; storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements. It then focuses on the additional competitive pressures and reengineering possibilities generated by the rapid advances in Information Technology (IT) and Intelligent Transportation Systems (ITS) technologies. The final part of the course covers transportation management which highlights the multi-modal transportation.

References

1. Paul R., Murphy Jr, Donald F. Wood, (2011), Comtemporary Logistics, Pearson Education Inc.
2. Bowersox, Donal J., Closs, David J., Cooper, M. Bixby., (2006), Supply Chain Logistic Management, McGraw Hill Higher Education.
3. Grant, D., lambart, Doughlas M., Stock, James R., Ellram, Lisa M., (2005), Fundamntal of Logistics Management, McGraw Hill Higher Education.
4. Rushton, A., Croucher, P., Baker P., (2006), The Handbook of Logistics and Distribution Management, Kogan Page Ltd.
5. Ronald H. Ballou (2004), Business Logistics/Supply Chain Mangement, 5th Ed., Prentice Hall.

BFT328/3
MANAGING ENGINEERING AND TECHNOLOGY

Course Synopsis

This course introduces students to the management functions of planning, organizing, leading and controlling; analyzes the application of these

functions in research, design, production, technical marketing and project management; and studies evolution of the engineering career and the transition to engineering management.

References

1. Babcock , D. L. and Morse, L. C. (2010). Managing Engineering and Technology: International Version (5th Edition), Pearson Higher Education.
2. Friedman, R. S., Roberts, D. M. and Linton, J. D. (2008). Principle Concepts of Technology and Innovation Management: Critical Research Models. Information Science Reference.
3. Parnell, G. S., Driscoll, Patrick J. and Henderson, D. L. (2008). Decision Making in Systems Engineering and Management. Wiley-Interscience.
4. Chang Ching Ming, (2005), Engineering Management: Challenges In The New Millenium, Paerson/Prentice Hall.
5. Meredith Jack R. and Mantel, Samuel J., Jr. (2010), project Management: A Managerial Approach 7th Ed., Wiley.
6. Senese, Brian P. (2002), Managing Successful High-Tech Product Introduction, Artech House.

BFT329/3
SMALL AND MEDIUM ENTERPRISE

Course Synopsis

The aim of this course is to provide the student with a grounding of the issues involved in small and medium enterprise management. It also covers the differences between SME management and entrepreneurship, development of business plan from an idea, developing a business model, crafting strategy, and implemention of the business plan.

References

1. Moore, C.W., Petty, J.W., Palich L.E. and Longenecker J.G. (2010). Managing Small Business: An Entrepreneurial Emphasis. 15th Edition. South Western: Cengage Learning Publication
2. Hatten T.S (2012). Principles of Small Business Management. 5th Edition. South Western: Cengage Learning Publication
3. Frederick, F.H., Kuratko, D.F., & Hodgetts, R.M., (2010) Entrepreneurship: Theory, Process, Practice, Asia-Pacific Edition, 2nd edition, Melbourne, Cengage.
4. Histrich, R, D., peters, M. P & Shepard, D. A (2008), Entrepreneurship 7th Ed., Boston, McGraw Hill.
5. Ndubsi N. O. & Saleh, A.S (2006), Small & Medium Enterprise (SMEs): Malaysians & Global Perspectives, Kuala Lumpur, Pearson Prentice Hall.
6. Boulton, C. & Turner, P. (2005), Entrepreneurship: Mastering Business in Asia, Singapore Wiley.
7. Jones, O. & Tilley, F. (2000), Competitive Advantage in SMEs: Organising for Innovation and Change, London Wiley.

ELECTIVE COURSES INTERNATIONAL BUSINESS (RE09)

BFT104/3
E-BUSINESS

Course Synopsis

This course is a comprehensive guide to all aspects of deploying e-business and e-commerce within organization. The course is divided into 3 parts: An introduction e-business and e-commerce; reviewing alternative strategic approaches and applications of e-business; and how strategy can be implemented.

References

1. Chaffey, D. (2009). E-Business and E-Commerce Management: Strategy, Implementation and Practice (4th Edition). Harlow: Financial Times Prentice Hall.
2. Laudon, K.C. & Traver, C.G. (2009). E-Commerce: Business, Technology, Society (5th Edition). New Jersey: Pearson Prentice Hall.
3. Turban, E. et al. (2009). Introduction to Electronic Commerce (2nd Edition). New Jersey: Pearson Prentice Hall.
4. Canzer, B. (2003), E-Business: Strategic Thinking and Practice, Boston: Houghton Mifflin Company.
5. Cassady, A. (2002), A Practical Guide to Planning for E-Business Success: How To E-Enanble your Enterprise, Florida: St. Lucie Press.

BFT201/3
INTERNATIONAL ACCOUNTING

Course Synopsis

This course is an extension of Principles of Accounting (BFT 106) course and students need to apply the knowledge that has been gained for the implementation of the accounting regulation and practices. The main objective of this course is to explore more on accounting knowledge of the students and to enhance it by putting the accounting issues uniquely confronted by companies involve in international businesses. The course familiarizes them with international accounting regulations, financial reporting, taxation and other accounting practices that exist across the globe.

Prerequisite

- BFT106 Principles of Accounting
- Result must be D+ and above

References

1. Doupnik and Perera (2011). International Accounting (3rd Edition). McGraw Hill.
2. Choi and Meek. (2010). International Accounting (7th Edition). Pearson-Prentice Hall.
3. Radebaugh, Gray and Black (2006). International Accounting and Multinational Enterprises (6th Edition). Wiley.
4. Shahrokh M. Saudagaran (2004), International Accountingh: A User Perspective 2nd Ed., Thomson South Western.
5. Christopher Nobes and Robert Parker (2010), Comparative International Accounting 11th Ed., Prentice Hall.

BFT203/3
INTERNATIONAL ECONOMICS

Course Synopsis

Student learns the ideas and perspectives of economic theories and thought that build the notion of International Economics. He/she will also learn three major components in International Economic which is International Trade, International Finance, and International Monetary Systems. Later in the chapter student shall use the knowledge to understand the issues and critics in global economy.

Prerequisite

- BFT101 Business Economics
- Result must be D+ and above

References

1. Robert J. Carbaugh (2011), Global Economics, International Edition, 13th Ed., Cengage Learning Asia Pte Ltd Dlabay.
2. Paul R. Krugman, Maurice Obstfeld & Marc J. Melitz (2012), international Economics, Global Edition, Pearson International Inc.
3. Arnold, Roger A. (2003), Economics, 5th Ed., Singapore Thomsons Learning.
4. Baylis, John and Smith, Steve (2005), The Globalization of World Politic, 3rd Ed., Oxford: Oxford University Press.
5. Pugel, Thomas (2006), Intenational Economics, McGrawHill/Irwin.

BFT204/3
INTERNATIONAL FINANCE

Course Synopsis

The subject matter of international finance course consists of issues raised by the special problems of economic interactions between states. This course introduces the main concepts and theories of international finance and illustrates them with applications drawn from the real world. It will address a wide range of issues, including exchange rate risks and management, international capital budgeting, and the asset and liability management for multinational corporations.

References

1. Madura, J. (2010). International Corporate Finance. (10th Edition) South-Western Cengage Learning
2. Eiteman D.K., Stonehill, A.I., and Moffett, M.H. (2010). Multinational Business Finance. (12th Edition) Pearson Prentice Hall
3. Robin, J.A. (2010). International Corporate Finance. (International Edition). McGraw Hill
4. Eun, C. S., Resnick, B. G (2009), Intenational Financial Management 5th Ed., McGraw Hill International Edition.
5. Keown, Martin, Perry, Scott (2010), financial Management: Principles and Applications 10th Ed., pearson Prentice Hall.
6. Greenaway, David (2009), The Wolrld Economy: Global Trade Policy 208, John Wiley & Sons Inc.

BFT205/3
INTERNATIONAL HUMAN RESOURCE MANAGEMENT

Course Synopsis

This course provides an introduction to the critical issues in organizations in locally and internationally managing their human resources. It focuses on the interrelatedness of corporate strategies and the effective management of human resources, which require different policies. The course is based on the notion that competitive firms and economies which require an appropriate structure, policies and strategies to managing their employees at every level of the enterprise. This is true particularly in multinational enterprises (MNEs) and transnational corporations (TCs).

References

1. Dowling, P. J., Festing, M. Engle, A.D. Sr. (2013), International Human Resources Management, 6th Ed., UK: Cengage Learning EMEA.
2. Dowling, Peter J. Denice E. Welch, and Randall S. Schuler (1999), Introduction and Overview: International Human Resources Management, Cincinnati: ITP, Southwestern College Publishing.

BFT316/3
LEADERSHIP IN ORGANIZATION

Course Synopsis

This course is a comprehensive guide to all aspects of leadership in organizations. The course is divided into 11 topics: (i) nature of leadership, (ii) leadership thoeries, (iii) perspective of effective leadersip behavior, (iv) participative leadership, (v) power and influence, (vi) charismatic and transformational leadership, (vii) leading change, (viii) leadership in teams, (ix) cross-cultural leadership, (x) developing leadership skills and (xi) strategic leadership by executives.

References

1. Yulk, G. D. (2009). Leadership in Organizations, (7th Edition), Pearson Prentice-Hall.
2. Daft, R. L. (2011). Leadership, (5th Edition), South-Western, Cengage Learning.
3. Achua, L. (2010). Effective Leadership, (4th Edition), South-Western, Cengage Learning.
4. DuBrin, Andrew J.,(2010), Principles of Leadership, 4th Ed., South Western, Cengage Learning.
5. Afsaneh Nahavandi, (2012), The Art and Science of Leadership 6th Ed., Pearson Prentice Hall.

BFT321/3
Services Marketing

Course Synopsis

This course focused on a comprehensive reference of managing services in marketing elements in an organization. It divided into 4 parts: Understanding Service Products,Consumers,and Markets; Applying the 4 P's of Marketing to Services; Managing the Customer Interface and Implementing Profitable Service Strategies.

References

1. Lovelock, C.H. and Wirtz, J. (2011). Services Marketing (7th Edition), Pearson Global Edition
2. Lovelock, C. H. and Wirtz, J. and Chew, P. (2008), Essential of Service Marketing 5th Ed., Mc Graw Hill.
3. Zeithaml, V., Bitner, M.J. and Gremler, D.D. (2008), Services Marketing (5th Edition), McGraw-Hill/ Irwin
4. Schultz, M. and Doerr, J. (2009). Professional Services Marketing, Wiley
5. Bateson, J. E. G and Hoffman, K. D (2008), Service Marketing 4th Ed., South Western Cengage Learning.
6. Fitzsimmons, J. A and Fitzsimmons, M. J. (2011), Service Management 7th Ed., McGraw Hill.

BFT322/3
SUPPLY CHAIN MANAGEMENT

Course Synopsis

This course explored key issues associated with the design and management of industrial supply chains (SC). SC is concerned with the efficient integration of suppliers, factories, warehouses and stores so that products are distributed to customers in the right quantity and at the right time. One of the primary objectives of SC management is to minimize the total SC cost subject to various service requirements.

References

1. Wisner, J. D., Tan,K.C. & Leong,G.K., (2012). Supply Chain Management: A balanced approached (3rd Edition). South-Western Cengage Learning.
2. N. Chandrasekaran, (2010). Supply Chain Management, First Edition, Oxford
3. Chopra S. and Meindl P. (2007). Supply Chain Management, Fourth Edition, Prentice Hall.
4. Bozarth and Handfield, (2008), Operations and Supply Chain Management, @nd Ed., Prentice Hall.
5. Handfield, R. B., Monczka, R. B., Giunipero, L.C., and Patterson, J.L (2011), Sourcing and Supply Chain Management 5th Ed., South Wester Cengage Learning.

BFT325/3
LOGISTICS MANAGEMENT

Course Synopsis

The course focuses on the fundamental principles of contemporary logistics management. It involves the roles and contributions of logistics management in ensuring successful supply chain management process (plan, implementation, control); the efficient, effective forward and reverse flow; storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements. It then focuses on the additional competitive pressures and reengineering possibilities generated by the rapid advances in Information Technology (IT) and Intelligent Transportation Systems (ITS) technologies. The final part of the course covers transportation management which highlights the multi-modal transportation.

References

1. Paul R., Murphy Jr, Donald F. Wood, (2011), Comtemporary Logistics, Pearson Education Inc.

2. Bowersox, Donal J., Closs, David J., Cooper, M. Bixby., (2006), Supply Chain Logistic Management, McGraw Hill Higher Education.
3. Grant, D., lambart, Doughlas M., Stock, James R., Ellram, Lisa M., (2005), Fundamntal of Logistics Management, McGraw Hill Higher Education.
4. Rushton, A., Croucher, P., Baker P., (2006), The Handbook of Logistics and Distribution Management, Kogan Page Ltd.
5. Ronald H. Ballou (2004), Business Logistics/Supply Chain Mangement, 5th Ed., Prentice Hall.

BFT331/3
INTERNATIONAL BUSINESS DECISION MAKING

Course Synopsis

This course reveals the decision making challenges traps and offers strategies to overcome them. It is designed to help students think analytically the ways that ethical decisions we made - individuals, organizations and society - and provides theories of ethical decision making and as well as practical skills for better decision making.
Applications include negotiations, risk management, institutional design, financial markets, human resource management, the organization of teams, and political movements, among others.

References

1. Ferrell O.C., Fraedrich J., & Ferrell L. (2010), Business Ethics and Policy: Ethical Decision Making and Cases, Asia Edition, (1st Edition), Cengage Learning.
2. Boatright J. R. (2009), Ethics and the Conduct of Business, International Edition, 6/E, Pearson Higher Education.
3. Beauchamp T. L., Bowie N., Arnold D. (2009), Ethical Theory and Business, 8/E, Pearson Higher Education.
4. Gini Al., Marcouux A. M. (2009), Case Studies in Business Ethics, 6/E, Pearson Higher Education.
5. Velasquez M.G. (2006), Business Ethics, A Teaching and Learnig Classroom Edition: Concepts and Cases, 6/E, Pearson Higer Education.
6. Browne M.N., Giampetro-Meyer A., Williamson C., (2004), Practical Business Ethics for the Busy Manager, Pearson Higher Education.

Job Opportunities

Bachelor of Business (Honours) (Engineering Entrepreneurship)

Upon successful completion of their degree program, the Engineering Entrepreneurship graduates have bright opportunities in pursuing their career in business as they are trained and well-equipped to be entrepreneurs. The off-campus incubator experience shall strenghten their confidence level. For those who are looking for business opportunities in the engineering field, this program provides entrepreneurial skills and basic technical skills. In terms of career opportunities, this program provides career and professional opportunities in the fields of finance, investment, production and marketing.

Bachelor of Business (Honours) (International Business)

Meanwhile, the International Business graduates have sufficient knowledge and skills in international business practices. The industrial training program provides opportunities for establishing and developing a strong network with well-known companies and multinational corporations. Graduates of this program are able to link theory to practice and have a global perspective on issues such as international marketing, cross cultural negotiation and human resources. The International Business graduates have gone to careers in multinationals, international organisations and governments.

School of Human Development and Technocommunication (iKOM)

Programmes Offered
• Bachelor of New Media Communication (Hons.)

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INTRODUCTION

School of Human Development and Technocommunication (iKOM) is a new faculty which has been upgraded from a Centre for Communication Technology and Human Development (PTKPI). In the year 2014, IKOM advanced forward as a faculty upon the approval of the Ministry of Education to offer a new program, the Bachelor of New Media Communications. It will also continue to serve as a Service Center that manages the university courses for UniMAP.

VISION

Committed to be the center of the development of social science, communication, information technology, and soft skills in competitive international arena.

MISSION

iKOM will form intellectual humanity, personality, superiority, creativity and innovativeness. It will also create competitiveness and competency through the observation of knowledge and soft skills with quality education, rooted in the aspirations of the University.

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BACHELOR OF NEW MEDIA COMMUNICATION (HONS) RA72
PROGRAMME OBJECTIVES (PEO)

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

The goal of the program offering a Bachelor of New Media Communication (Hons) is to produce graduates with knowledge and skills in communication, new media, management and competitive entrepreneurial, innovative, creative and consistent with the needs of industry.

PROGRAMME OUTCOMES (PO)

PO 01
Able to master the knowledge in the field of communication, new media, and organizational management.

PO 02
To master practical skills and technical knowledge related to communication and media.

PO 03
Able to practice the values of an ethical life, integrity, and social accountability.

PO 04
Able to practice the values, attitudes, and behaviors that conform to the characteristics of professionalism.

PO 05
Able to work and practice effective communication within the team.

PO 06
Ability to think critically and creatively to solve actual problems scientifically.

PO 07
Managerial skills by practicing entrepreneurial characteristics.

PO 08
Ability to manage information and practice of lifelong learning.

PO 09
To have killed practice characteristics of good leadership.

CURRICULUM STRUCTURE
BACHELOR OF NEW MEDIA COMMUNICATION (HONS.) (RA72)

YEAR	FIRST		SECOND		THIRD		
SEMESTER	I	II	III	IV	V	VI	
Discipline Core	KUW101/3 Introduction to Communication Theory	KUW 102/3 Interpersonal Communication in New Media	KUW 201/3 Small Group Communication	KUW 301/3 New Media and Cross Cultural Communication	KUW 401/3 Public Relations and New Media	KUW 404/3 Event Management	INDUSTRIAL TRAINING
	KUW 103/3 Public Speaking	KUW 114/3 New Media and Society	KUW 211/3 Digital Photography	KUW 302/3 Integrated Marketing Communication	KUW 402/3 Managerial Communication	KUW 405/3 Seminar on New Media Communication	
	KUW111/3 Writing for New Media	KUW 115/3 Visual Communication	KUW 212/3 Graphic Design for New Media	KUW 311/3 Digital Video Production	KUW 403/3 Ethics and Law in New Media Communication		
	KUW 112/3 Principles of Communication Network	KUW 116/3 Principles of Human Computer Interface		KUW 312/3 Web Design and Development	KUW 411/3 Digital Media Production		
	KUW 113/3 Introduction to New Media				KUW 412/3 Animation for Integrated Media		
Common Core			KUW 301/3 Research Method	KUW 302/3 Data Reasoning		KUT 441/4 Final Year Project	
			KUW 319/3 Social Psychology				
Elective Core		KUW 121/3 Innovative and Creative Skills	KUW 221/3 New Era Management	KUW 321/3 Invention Skills	KUW 322/3 Electronic Entrepreneurship	KUW 421/3 Strategic and Performance Management	
University Required	*Foundation English	*English for General Purposes	UVW313/2 English for Academic Purpose	UUW 3XX/2 Foreign Language	UUW 4XX/2 Foreign Language		
	UUW 410/2 Bahasa Melayu Universiti	UUW 235/2 Ethnic Relations	UZW 1XX/1 KO-K	UUW 322/2 Thinking Skills			
	UUW 233/2 Tamadun Islam dan Tamadun Asia	UZW 1XX/1 KO-K					
	UZW 1XX/1 KO-K						
120	20	20	21	22	20	13	6

TOTAL UNITS FOR GRADUATION 122
*** Exemptions are subjected to the terms and regulations**

COURSE SYLLABUS

KUW 101/3
INTRODUCTION TO COMMUNICATION THEORY

Course Synopsis

This course aims to give students the theories of communication. Focus is given to the establishment and development of theories and concepts of communication. Apart from discussing the various types of basic theories in communication, the focus will also be given to the theories of communication: interpersonal, group, organization, society, and technology. Overall, this course introduces students about the establishment, change and development theories have communication theory..

References

1. Baran, J.B. & Davis, D.K. (2010) Mass Communication Theory: Foundations, Ferment and Future. 6th ed. Singapore: Wardsworth Cencage Learning
2. Bryant, J. & Zillman, D. () Media Effects: Advances in Theory and Research. Mahwah, New Jersey: Lawrence Erlbaum Associates
3. Holmes, D. (2005) Communication Theory: Media, Technology and Society. Thousand Oaks: SAGE
4. Woods, J.T. (2011) Communication Mosaics: An Introduction to the Field of Communication. Singapore: Wardsworth Cencage Learning
5. Biagi, S. (2009). Media Impact: An Introduction to Mass Media. London: Wadsworth.
6. Dominick, J. R. (2010). The Dynamics of Mass Communication Media in Transition. NewYork: McGraw-Hill.
7. Rosenberry, J & Vicker, L. A. (2009). Applied Mass Communication Theory A Guide For Media Practitioners. Boston: Pearson/ Allyn and Bacon
8. Stanley, J.B. & Dennis, K.D. (2009). Mass Communication Theory: Foundations, Ferment and Future (2nd Ed.). Belmont: Wadsworth.

KUW 111/3
WRITING FOR NEW MEDIA

Course Synopsis

This course aims to expose students to the skills and application method of writing in new media. Students will be able to know the difference in writing, interactive on-line with the traditional method of writing. This course will help improve students' ability to comprehend concepts related to new media writing methods that can be used in the context of the organization.

References

1. Anne Wysocki (2004) Writing New Media: Theory and Applications for Expanding the Teaching of Composition; Utah State University Press; 1 edition
2. Robert L. Hilliard (2011) Writing for Television, Radio, and New Media (Broadcast and Production) Wadsworth Publishing; 10 edition
3. Martin Lister, Jon Dovey, Seth Giddings and Iain Grant (2009) New Media: A Critical Introduction; Routledge; 2 edition
4. Nicholas Gane (2008) New Media: The Key Concepts; Berg Publishers; English Ed edition
5. Lev Manovich (2002) The Language of New Media (Leonardo Books); The MIT Press

KUW 112/3
PRINCIPLES OF COMMUNICATION NETWORKS

Course Synopsis

This course provides an introduction to and overview of the field of principles of communication networks (PCN). PCN is all about the network architecture, link and access technologies. It also a combination of several network layers, services. This course also will explain about the traffic and switch architecture as well as the network security. It integrates theories and methodologies from computer and network communications with many other areas, course readings will span current theory and practice in the communication networks. Students will work on both individual and team projects to design, implement and evaluate the principles of communication networks.

References

1. Principles of Data Communications and Network Security: Practice Orientation, Brian Shin PhD, Montezuma Publishing, 2013 (ISBN-10: 0-7442-2427-6; ISBN-13: 978-0-7442-2427-6)
2. Larry L. Peterson and Bruce S. Davie "Computer Networks: A Systems Approach (5th ed)", Morgan Kaufmann, 2011
3. Andrew S. Tanenbaum, Computer Networks (5th ed), Pearson, 2011.
4. Data and Computer Communications (10th Edition), William Stallings, Prentice Hal, 2013l

KUW 113/3
INTRODUCTION TO NEW MEDIA

Course Synopsis

This course provides a survey of modern cyber culture, including various forms of human communication mediated by the creative application of computer technology, and the developments that have enabled this exploding phenomenon. This course studies the history, theory, and practice of new media in today's networked society; the implications of the convergence of technology and convergence of disciplines; and the societal implications of the new connectedness. Second generation web-based media such as social communities, blogs, wikis, personal web pages will be examined.

Main references supporting the course

1. Levinson, Paul. (2012). New New Media. 2nd edition. US: Allyn & Bacon, Inc.
2. Nayar, Pramod K. (2010). An introduction to new media and cybercultures. Chichester: Wiley-Blackwell.
3. Hui, Wendy Kyong Chun & Keenan, Thomas. (2006). New media, old media: a history and theory reader. New York; London: Routledge.
4. Lister, Martin et. al. (2003). New Media: A Critical Introduction. London: Routledge.

KUW 102/3
INTERPERSONAL COMMUNICATION IN NEW MEDIA

Course Synopsis

This course aims to expose the students to the skills of interpersonal communication in the context of new media. This course will help to improve the students' ability to comprehend the concepts related to interpersonal communication that can be used in the context of organizations, small groups as well as individual level. Students will also be exposed to conflict management skills and interpersonal relationship skills.

References

1. Steven. A. Beebe, Susan J. Beebe, & Mark V. Redmond. (2014). Interpersonal Communication: Relating to others (7th edition). Pearson, Education Inc.
2. Joseph A. DeVito. (2014). The Interpersonal Communication Book (13th edition). Pearson, Education Inc.
3. Owen Hargie and David Dickson. (2011). Skilled Interpersonal Communication: Research, Theory, And Practice (5th edition); Routledge.
4. Julia T. Wood.(2009). Communication in Our Lives (5th edition) Wadsworth Cengage Learning
5. Michael Tomasello. (2008). Origins of human communication; Massachusetts Institute of Technology, London England
6. Richard Ellis. (2009). Communication Skills Stepladders to Success for the Professional (2nd ed); Gutenberg Press, Malta

KUW 103/3
PUBLIC SPEAKING

Course Synopsis

This course provides both theoretical basis and practical instruction to speaking effectively in public. Areas covered include; topic selection, audience analysis, speech preparation and organization, support of speeches with credible research, strategic and creative language use, effective listening and delivery skills, and common types of public speeches. At the end of this course, students should be able to demonstrate the speaking and to be effective communicators in academic settings, workplace and community.

References

1. Cheryl Hamilton (2012). Essentials of Public Speaking (Fifth Edition). Boston, MA, USA: Wadsworth, Cengage Learning.
2. Jo Sprague, Douglas Stuart dan David Bodary (2010). The Speaker's Handbook (Ninth Edition). Boston, MA, USA: Wadsworth, Cengage Learning.
3. Abdul Mua'ti @ Zamri Ahmad (2008). *Panduan Pengucapan Awam* (Edisi Kedua). Dewan Bahasa & Pustaka, Kuala Lumpur.
4. Clella Iles Jaffe (2013). Public Speaking: Concepts & Skills for a Diverse Society (Seventh Edition). Boston, MA, USA: Wadsworth, Cengage Learning.
5. Steven A. Beebe dan Susan J. Beebe (2012). Public Speaking: An Audience-Centered Approach (8th Edition). Boston, MA: Pearson Education, Inc..
6. Boston, MA: Pearson Education, Inc.
7. Sprague, J., Douglas, S. & David B. (2010). *The Speaker's Handbook* (Ninth Edition). Boston, MA, USA: Wadsworth, Cengage Learning.

KUW 114/3
NEW MEDIA AND SOCIETY

Course Synopsis

This course aims to enhance students' knowledge, understanding of the philosophy of communication and new media development in the community. The discussion led to the function and roles of new media in influencing people's lives. Students are also exposed how new media is able to disseminate information to the public. In addition, this course also reviews the rapid development of new media such as radio, television, online news, social media, blogs and technology gadgets nowadays. It also analyzes the impact of new media in the media industry, especially to local communities and abroad.

References

1. Vivian, J (2012). The Media of Mass Communication (Eleventh Edition). Amazon.com: Barnes & Noble.
2. Barrie, G & Machin, D (2009). Media audiences. London: SAGE Publishing Ltd.
3. Carroll, Craig E (2011). Corporate reputation and the news media: agenda-setting within business news coverage in developed, emerging, and frontier markets. New York: Routledge.
4. Dominick, J.R (2010). The Dynamics of Mass Communication Media in Transition. New York: McGraw Hill.
5. Gali, E (2010). *Transitioned media (electronic resource; a turning into the digital realm.* New York: Springer.
6. Jones, Paul (2011). Key concepts in media and communications. Los Angeles: SAGE Publishing Ltd.
7. Juliana Abdul Wahab. (2012). Media, Komunikasi dan Wacana Globalisasi di Malaysia. Pulau Pinang: USM

KUW 115/3
VISUAL COMMUNICATION

Course Synopsis

This course will guide the students understand the basic principles of visual communication and relationship with publishing products either in print or on the move. This course also explains the importance of visual communication in human life. This course will guide students to produce projects that are visually more meaningful. Students will be guided in understanding various concepts of visual perspective view, the history of visual communication and its development, its importance from the perspective of different cultures and their application in a publication. This course will help students to become more critical and sensitive in the use of color, layout, design and selection of tones in attracting attention and leave a meaning to the audience.

References

1. Burrough, Xtine & Martin, Paul. (2013). Visual communication on the web. New York: Routledge.
2. Manghani, Sunil. (2013). Image studies: Theory and practice. London; New York: Routledge.
3. Williams, Rick & Newton, Julianne. (2007). Visual communication: integrating media, art and science/ Rick Williams and Julianne Newton. New York: Lawrence Erlbaum Associates.
4. Smith, K.L., Moriarty, K., Barbatsis, G., & Kenny, K. (Penyt.) (2010). Handbook of Visual Communication: Theory, Methods, and Media. Routledge: Mahwah New Jersey.
5. Jamieson, H. (2007). Visual Communication. More than Meets the Eyes.Bristol, United Kingdom.
6. Martin, P., Ross, S.D. (2003) Images that Injure. Pictorial Stereotypes in the Media. Praeger: Westport Connecticut.

KUW 116/3
PRINCIPLES OF HUMAN COMPUTER INTERFACE

Course synopsis

This course provides an introduction to and overview of the field of human-computer interaction (HCI). HCI is an interdisciplinary field that integrates theories and methodologies from computer science, cognitive psychology, design and many other areas. The course readings will span current theory and practice in interface specification, design and evaluation, as well as current and classic research papers in HCI. Students will work on the individual assignment and team projects to design, implement and evaluate computer interfaces. They should be able to explore the HCI in their projects and present their works.

References

1. Alan Dix, Janet Finlay, Gregory D. Abowd and Russell Beale (2004), Human Computer Interaction, 3rd Edition, Prentice Hall
2. Yvonne Rogers, Helen Sharp, and Jenny Preece (2011), Interaction Design: Beyond Human-Computer Interaction (3rd edition), Publisher: Wiley
3. Wilbert O. Galitz (2007), The Essential Guide to User Interface Design: An Introduction to GUI Design Principles and Techniques (3rd Edition), Publisher: Wiley
4. David Benyon, Phil Turner, and Susan Turner (2005), Designing Interactive Systems: People, Activities, Contexts, Technologies, Publisher: Addison Wesley

5. Ben Shneiderman (1998), Designing the User Interface: Strategies for Effective Human-Computer Interaction (3rd Edition), Publisher: Addison Wesley Longman
6. Jenny Preece, Yvonne Rogers, Helen Sharp, David Benyon, Simon Holland and Tom Carey (1994), Human-Computer Interaction, Publisher: Addison Wesley

KUW 121/3
INNOVATIVE AND CREATIVE SKILLS

Course Synopsis

This course aims to improve students understanding and knowledge of the theory and processes related to creative and innovative thinking. Foundation of the course is to processes relevant to problem solving that encourages the use of problem solving tools.

References

1. Tom Kelleys. The Ten Faces of Innovation. Doubleday (2005)
2. Tom Kelleys. The Art of Innovation. Doubleday (2001)

KUW 201/3
SMALL GROUP COMMUNICATION

Course Synopsis

The course aims to give students an understanding of the concepts and theories of small group communication. Our focus is on the core skills of communicating in small groups, build problem-solving groups, build interpersonal relationships in small groups, lead small groups, and handling conflict in small groups. Overall this course introduces students to the knowledge and skills related to the formation, operation and problem-solving in small groups to use communication skills in small groups.

References

1. John F. Cragan, Chris R. Kasch dan David W. Wright (2009). Communication in Small Groups: Theory, Process, Skills (7th. Edition). Boston, MA, USA: Wadsworth Cengage Learning.
2. J. Dan Rothwell (2013). In Mixed Company: Communicating in Small Groups and Teams (8th. Edition). Boston, MA, USA: Wadsworth Cengage Learning.
3. Scott A. Myers dan Carolyn M. Anderson (2008). The Fundamentals of Small Group Communication. Thousand Oaks, California: Sage Publication, Inc..
4. John O. Burtis dan Paul D. Turman (2006). Group Communication Pitfalls. Thousand Oaks, California: Sage Publication, Inc..
5. Stephen E. Kohn dan Vincent D. O'Connell (2007). 6 Habits of Highly Effective Teams. Franklin Lakes, NJ: Career Press.
6. Thomas E. Harris dan John C. Sherblom (2008). Small Group and Team Communication (4th. Edition). Boston, MA: Pearson Education, Inc..
7. R. Scott Tindale et. Al. (Editors) (2002). Theory and Research on Small Groups. New York: Kluwer Academic Publishers

KUW 211/3
DIGITAL PHOTOGRAPHY

Course Synopsis

The course is offered as a compulsory course with aims to take and compose photographs using Single Lens Reflects (SLR) cameras and later edit and manipulate them in digital form. It is a practical learning course (i.e. taking, and manipulating images). Photo editing software such as Adobe Photoshop are taught to the students.

References:

1. Dave Huss, (2004). How to do Everything with Digital Photography. McGraw Hill.
2. Gus Wylie, (1990). The Complete Photographer. Pyramid Books, London: Octopus Publishing Group.
3. Dennis P. Curtain, (2006). A short course in using your digital camera. http://www.shortcourses.com.

KUW 212/3
GRAPHIC DESIGN FOR NEW MEDIA

Synopsis

This course introduces students to the fundamentals of graphic design by participating in lectures and critiques, completing design projects homework and class assignment. In this course, student will exposed with design strategies and graphics software to make sure student capable to solving design problems with creative process and be able to produce highly creative project.

References:

1. Graphic Dsign Essentials: Skills, Software and Creative Strategies, Joyce Walsh Macario, 2009.
2. Color Messages and Meanings, Leatrice Eiseman, Graphix Press, 2006.
3. Graphic Design: A User's Manual, Adrain Shaughnessey, 2009

KUW 301/3
RESEARCH METHODOLOGY

Course Synopsis

This course aims to expose students to research methods in the social sciences. This course will help improve the ability of students to understand the concepts related to research methodology that can be used in scientific training.

References

1. Ranjit Kumar .(2010). Research Methodology: A Step-by-Step Guide for Beginners; Sage Publications Ltd; Third Edition.
2. John W. Creswell .(2008). Research Design: Qualitative, Quantitative, and Mixed Methods Approache; Sage Publications Ltd; Third Edition.
3. Uwe Flick (2011). Introducing Research Methodology: A Beginner's Guide to Doing a Research Project; Sage Publications Ltd.
4. William Lawrence Neuman (2006) Basics of Social Research: Qualitative and Quantitative Approaches (Allyn & Bacon; 2 Edition.

KUW 319/3
SOCIAL PSYCHOLOGY

Course Synopsis

This course focuses on social psychology and its use in helping the community. The scope of this course is more geared towards the use of social psychology in the development of society.

References

1. Aronson, E, Wilson, T.D. and Arkert, R.M. (1997) Social Psychology. Longman
2. Baron, R.A., Byrne, D and Johnson, B.T (1998) Exploring Social Psychology. Allyn and Bacon.
3. Hogg, M.A. and Vaughn, G.M. (1998) Social Psychology. Prentice Hall.
4. Penington, D. C., Gillen, K. and Hill, P. (1999) Social Psychology. Arnold.
5. Lesko, W. A. (2000) Readings in Social Psychology. Allyn and Bacon

KUW 221/3
NEW ERA MANAGEMENT

Course synopsis:
This course aims to provide interfaith understanding to students about the concepts and principles proficiency to take care of the organization. In general this course focuses on the management of environmental recognition, design, management, lead and oversees and monitors the organization.

References

1. Daft, Richard L. (2012). *New Era Management* (10th Edition). Mason, OH, USA: South-Western, Cengage Learning.
2. Chuck Williams (2011). *Management*. Mason, OH, USA: South-Western, Cengage Learning.
3. Ricky W. Griffin (2012). *Fundamentals of Management* (6th Edition). Mason, OH, USA: South-Western, Cengage Learning.
4. John R. Schermerhorn (2011). *Management* (11th Edition). Hoboken, New Jersey: John Wiley & Sons, Inc.
5. Thomas S.Bateman dan Scott A. Snell (2004). *Management: The New Competitive Landscape* (6th Edition). New York: McGraw-Hill Companies, Inc.
6. Jeffrey A Miles (2012). *Management and Organization*. San Francisco, CA: Jossey-Bass.

KUW 301/3
NEW MEDIA AND CROSS CULTURAL COMMUNICATION

Course Synopsis

This course aims to expose students to cross-cultural communication skills. This course will help improve the ability of students to understand the concepts associated with cross-cultural communication that can be used in the context of organizations, small group and dyad level. Students will be exposed to strategies to improve cross-cultural communication competence.

References

1. Judith Martin, Thomas Nakayama. (2009); Intercultural Communication in Contexts; McGraw-Hill Humanities/ Social Sciences/Languages; 5 edition
2. Fred Edmund Jandt and Fred E. Jandt .(2009). An Introduction to Intercultural Communication: Identities in a Global Community. Sage Publications, Inc; Sixth Edition edition
3. James William Neuliep. (2011). Intercultural Communication: A Contextual Approach; Sage Publications, Inc; Fifth Edition edition
4. Myron W. Lustig .(2009). Intercultural Competence: Interpersonal Communication Across Cultures; Allyn & Bacon; 6 edition
5. Judith N. Martin. (2010). Experiencing Intercultural Communication: An Introduction; McGraw-Hill Humanities/Social Sciences/Languages; 4 edition

KUW 302/3
INTEGRATED MARKETING COMMUNICATION

Course Synopsis

This course emphasizes the principles of management in planning and implementation, control strategies of corporate communications and public organizations of their marketing communications efforts. Marketing goods and services of the organization is seen in a broad context. The course focused on the integration of all elements of marketing communication view this practice as a separate and independent. The ability of a computer-based information technology, software applications and interactive media were also emphasized. At the end of the course students will be able to achieve the objectives of marketing communications organization through a systematic planning concept of brand management and integrated marketing communications strategy.

References

1. Tuckwell, K.J. (2011). Integrated Marketing Communication: Strategic Palnning Perspectives. Canada: Pearson.
2. Kenneth E. C. & Baack, D. (2011). Integrated Advertising, Promotion & Marketing Communications (5th ed.). Prentice Hall
3. Biagi, S. (2009). Media Impact: An Introduction to Mass Media. London: Wadsworth.
4. Dominick, J. R. (2010). The Dynamics of Mass Communication Media in Transition. NewYork: McGraw-Hill.
5. Rosenberry, J & Vicker, L. A. (2009). Applied Mass Communication Theory A Guide For Media Practitioners. Boston: Pearson/Allyn and Bacon.
6. Stanley, J.B. & Dennis, K.D. (2009). Mass Communication Theory: Foundations, Ferment and Future (2nd Ed.). Belmont: Wadsworth.

KUW 311/3
DIGITAL VIDEO PRODUCTION

Course Synopsis

This course focuses on the principles, processes and methods of single-camera digital video production. Lectures will focus on the terms and concepts related to the management of the production and publication process. The lecture will explain the research methodology in publishing, publishing proposal preparation methods, format and method of writing the script and every method of digital video production process including aspects of filming, editing and final mix of the various elements to be included in the publication. At the end of the course students can produce a short publication in the genre of documentaries, public service announcements and advertisements.

References

1. Linaschke, J. (2011) Introducing Final Cut Pro X: Learn by Video. Format: DVD-ROM (48 pages). http://www. Campus books .com/books/books/ specialty.
2. Rabiger, M. (2005). Directing the Documentary. (Ed.5). Focal Press: Berlington MA
3. Tomaric, J. (2007). The Power Filmmaking Kit: Make Your Professional Movie on a Next-to-Nothing Budget. The Textbooks.Com
4. Wise, M. (1989). Film and Video Financing. California: Michael Wiese Productions

KUW 312/3
WEB DESIGN AND DEVELOPMENT

Course Synopsis

This course explores alternative methods of web design, including typography, imaging, and advanced asset management. Upon completion of this course, students use the web page user interface program to effectively create pages with well-structured HTML content. Emphasis is placed on the design of multi page layout for various types of web sites. Through hands-on projects, the student learns to navigate through the program, while understanding complex issues.

References

1. Web Development and Design Foundations with HTML5, 6/E Terry Felke-Morris, Harper College, 2012.
2. Basics of Web Design: HTML5 & CSS3 Terry Felke-Morris, Harper College, 2011.
3. Writing for the Web: Creating Compelling Web Content Using Words, Pictures, and Sound, Lynda Felder, 2011.
4. Programming the World Wide Web, 7/E, Robert W. Sebesta, University of Colorado, Colorado Springs, 2012.
5. From Idea to Web Start-up in 21 Days: Creating bacn.com, Jason Glaspey and Scott Kveton. 2010.

KUW 302/3
DATA REASONING

Course Synopsis

This course aims to expose students to the method of data analysis. This course will help improve students' ability to summarize interpretation, analyze and manipulate data, particularly in the

context of the social sciences in general, and communication and new media in particular.

References

1. Arthur Aron, Elaine N. Aron and Elliot Coups .(2010). Statistics for The Behavioral and Social Sciences: A Brief Course (5th Edition) Prentice Hall
2. Perry R. Hinton (2004) Statistics Explained: A Guide for Social Science Students, 2nd
3. Edition; Routledge Alan Agresti and Barbara Finlay (2008) Statistical Methods for the Social Sciences (4th Edition) Prentice Hall
4. Frederick J. Gravetter & Larry B. Wallnau .(2012). Statistics for the Behavioral Sciences; 9 edition Wadsworth Publishing;
5. Paul D. Allison .(1998). Multiple Regression : A Primer (Undergraduate Research Methods & Statistics in the Social Sciences) Sage Publications

KUW 321/3
INVENTION SKILLS

Course Synopsis

This course focuses on the management of creativity and innovation in business today. Students will be exposed to the concepts and processes of creativity and innovation. Students will also be exposed to the opportunities and challenges in creating ideas, products and services in a creative and innovation in line with today's business challenges. The approach will be used including lectures, self-assessment, preparation and presentation projects.

References

1. Tom Kelleys. The Ten Faces of Innovation. Doubleday (2005)
2. Harvard Business Review Staff, *Managing Creativity and Innovation*. (2009). United Kingdom: Harvard Business Review Press.
3. Ceserani, J. and Greatwood, P. (1995). *Innovation and creativity*. London: Kogan Page.
4. Frederick, H.H., Kuratko, D.F, & Hodgetts, R.M. (2007). *Entrepreneurship: Theory, process & practice.* Australia: Thomson Publication.
5. Hisrich, R.D., Peters, M.P, & Shepherd, D.A. (2008). *Entrepreneurship, 7th edition*. Singapore: Mc Graw Hill Companies.

KUW401/3
PUBLIC RELATIONS AND NEW MEDIA

Course Synopsis

This course focuses on the assessment of the tactical and strategic implications of digital technology for organizations. Course content includes an examination of the potential of digital technologies for public relations campaigns, the particular challenges of online communication and the planning, management and evaluation of interactive communication campaigns. There is an analysis of the PR challenges and implications of the growing online news media industry as well as an assessment of the potential impact and possible responses to such issues as online activism, citizen journalism and the blogging explosion.

References

1. Seitel, Frasier (2011). The Practice of Public Relations (11th ed.). Upper Saddle, New Jersey: Pearson.
2. Newsom, D., Turk, J.V. and Kruckerberg, D. (2010). This is PR: The Realities of Public Relations (9th ed.). Belmont, CA: Wadsworth.
3. Cutlip, M.S., Center, H.A. and Broom, M.G. (2009). Effective Public Relations (10th ed). New Jersey: Prentice Hall.
4. Breakenridge, D., (2008). PR 2.0 - New Media, New Tools, New Audiences. Pearson Education. United States of America.
5. Kelleher, T. (2007)., Public Relations Online (1st ed.). Sage Publication, Inc.

KUW 402/3
MANAGERIAL COMMUNICATION

Course Synopsis

This course aims to expose students to the communication skills of management. This course will help improve the ability of students to understand the concepts associated with the management of communication that can be used in the context of organizations, small group and dyad level. Students are exposed to conflict management skills, problem solving and decision making in the context of the organization

References

1. Geraldine Hynes. (2010). Managerial Communication: Strategies and Applications; McGraw-Hill/Irwin; 5 edition
2. Mary M. Munter. (2011). Guide to Managerial Communication (9th Edition) Prentice Hall

3. Raman, Meenakshi and Prakash Singh, Business communication, Oxford University Press, 2006.
4. Raman Meenakshi and Sangeeta Sharma. 2004. Technical Communication. New Delhi: Oxford University Press.
5. Ober Scot. 2004. Contemporary Business Communication, Fifth Edition. New Delhi: Biztantra

KUW 411/3
DIGITAL MEDIA PRODUCTION

Course Synopsis

This course introduces students to the fundamentals of digital multimedia design and production, animated graphics, interactivity and digital imaging. In this course, learning computer applications and being creative within the field are equally important. It is significant to understand how conceptual studies and technical solutions will support each other during digital media production processes.

References

1. William G. Nickels (2008) Understanding Business. Edition 6. Irwin McGraw-Hill.
2. AB Aziz Yusof (2011). Engineering Entrepreneurship, Selangor, Malaysia: Pearson
3. 2. AB Aziz Yusof (2000). Usahawan dan Pengukuhan Jaringan Rakan Niaga, Kedah, Malaysia: Penerbit UUM.
4. Barringger, Bruce R & Ireland, R. Duane (2008). Entrepreneurship: Succesfully Launching New Ventures, 2nd edn, New Jersey: Prentice Hall.
5. Kuratko, Donald F (2009). Introduction to Entrepreneurship, 8th edn, Canada: South Western.
6. Khalidah Khalid, Business Management: A Malaysian Perspective, 1st edn, Shah Alam: Oxford Fajar Sdn. Bhd.

KUW 412/3
ANIMATION FOR INTEGRATED MEDIA

Course Synopsis

This course provides the students with the familiarization of the Macromedia Flash. It also will cover the fundamental programming concepts in addition the flash environment. The course also covers principles of interface design, measurement as it applies to embedded items, and requires the writing of an instructional design document. Students finishing this course will have at least one completed fully functional Flash project for their portfolios demonstrating a strong knowledge of the tool and a good foundation in the Action Script language as the tools and the language apply to instructional design.

References

1. Option A: Flash CS3 [Computer software]. (2007). Adobe. ($249 student/teacher version through Adobe website)
2. Option B: Creative Suite 3 Web Standard [Computer software]. (2007) Adobe. ($399 student/ teacher version through Adobe website) Has Flash, Dreamweaver, Fireworks, and Contribute. There are several flavors of the Creative Suite as well, including packages that include Photoshop and Illustrator.

KUW 322/3
ELECTRONIC ENTREPRENEURSHIP

Course Synopsis

This course aims to improve understanding and knowledge about the theories and processes associated with the business. The course is kepadaproses-relevant processes related to information technology applications expose potential students of IT in the business world, as well as master students with business skills. It also includes step-by-step formation of the business.

References

1. William G. Nickels (2008) Understanding Business. Edition 6. Irwin McGraw-Hill.
2. AB Aziz Yusof (2011). Engineering Entrepreneurship, Selangor, Malaysia: Pearson
3. ABAziz Yusof (2000). Usahawan dan Pengukuhan Jaringan Rakan Niaga, Kedah, Malaysia: Penerbit UUM.
4. Barringger, Bruce R & Ireland, R. Duane (2008). Entrepreneurship: Succesfully Launching New Ventures, 2nd edn, New Jersey: Prentice Hall.
5. Kuratko, Donald F (2009). Introduction to Entrepreneurship, 8th edn, Canada: South Western.
6. Khalidah Khalid, Business Management: A Malaysian Perspective, 1st edn, Shah Alam: Oxford Fajar Sdn. Bhd.

KUW 421/3
STRATEGIC AND PERFORMANCE MANAGEMENT

Course Synopsis

This course aims to provide interfaith understanding to students about the concepts and process management of strategies and achievement. In the strategic management of aspects, this course touches aspects environmental analysis, determination methodological findings and terraces strategy, formulation of strategic objectives, strategic method map creation, and the determination of measuring achievement of strategic objectives, and strategic initiatives. In the maintenance aspect of achievement, this course explains the docking between strategic design and achievement, method of measure achievement, method of workers and develop the achievements of workers.

References

1. Michael A. Hitt, R. Durane Ireland dan Robert E. Hoskisson (2011). *Strategic Management* (Ninth Edition). Mason, OH, USA: South-Western Cengage Learning.
2. Herman Aguinis (2009). *Performance Management* (Second Edition). Upper Saddle River, New Jersey: Pearson Education, Inc.
3. Harvard Business School (2005). *Strategy: Create and Implement the Best Strategy for Your Business*. Boston, Massachusetts: Harvard Business School Publishing Corporation.
4. Richard F. Gerson dan Robbie G. Gerson (2006). *Positive Performance Improvement: A New Paradigm for Optimizing Your Workforce*. Mountain View, CA: Davies-Black Publishing.
5. Robert S. Kaplan dan David P. Norton (1996). *The Balanced Scorecard: Translating Strategy Into Action*. Boston, Massachusetts: Harvard Business School Publishing Corporation.
6. Andy Neely, Chris Adams and Mike Kennerley (2002). *The Performance Prism: The Scorecard for Measuring and Managing Business Success*. Great Britain: Pearson Education Limited.

KUW 403/3
EVENT MANAGEMENT

Course Synopsis

This course is designed to help students improve their leadership and operation required to manage a successful event. This course provides an 'overview' for event management techniques and strategies needed to manage the event.

References

1. Van der Wagen (2007). Event Management for Tourism, Cultural, Business and Sporting Events. 3rd ed. Australia: Pearson
2. Supovitz, F. (2005). The Sports Event Management and Marketing Playbook. John Wiley & Sons, Inc.
3. Silvers, J.R. (2004). Professional Event Coordination. John Wiley & Sons, Inc.
4. Goldblatt, J. (2005). Special Events: Twenty-First Century Global Event Management. (5th ed.) Wiley Publication
5. Allen, J. et.al (2005). Festival and Special Event Management (3rd ed.) Wiley Publication

KUW 404/3
ETHICS AND LAW IN NEW MEDIA COMMUNICATION

Course Synopsis

This course aims to improve understanding and knowledge about the policy and the law and ethics related to the communications and new media. The focus of the course is to the law and ethics relevant to the field of communications and new media. It also includes an introduction to the basic laws of Malaysia.

References

1. Suhaini Muda dan Ahmad Shamsul Abd Aziz, (2007). Undang-undang Komunikasi.
2. Kuala Lumpur: Pearson Prentice Hall.
3. Cyber laws of Malaysia. Petaling Jaya: International Law Book Services.
4. Abdul Aziz Bahri. (2008). Perlembagaan Malaysia teori & praktis. Shah Alam: Arah Pendidikan.
5. Aun, W. M. (2005). The Malaysian Legal System. Petaling Jaya: Pearson.
6. Kamal Halili Hassan. (1990). Penulis dan Undang-undang. Dewan Bahasa dan Pustaka. Kuala Lumpur.
7. Mohd Safar Hasim, (2002). Mengenali Undang-undang Media dan Siber. Kuala Lumpur: Utusan Publications & Distributors Sdn. Bhd.
8. Rau. P, SampathKumar, T. J & Kayveas. M. (2006). General principle of the Malaysia legal system. Petaling Jaya: International Law Book Service.
9. Safinaz Mohd Hussein, 2002. Undang-undang Komunikasi dan Multimedia. Kuala Lumpur: Prentice Hall.

KUW 405/3
SEMINAR ON NEW MEDIA COMMUNICATION

Course Synopsis

This course aims to expose students to the issues in regards to new media communication. In addition, students are exposed to the latest research related to new media in a variety of perspectives. This course will help improve students' ability to understand the challenges of communication in traditional and new paradigms in the context of new media.

References

1. Leah A Lievrouw & Sonia Livingstone (2006) Handbook of New Media: Student Edition; Sage Publications Ltd.
2. Martin Lister, Jon Dovey, Seth Giddings , Iain Grant , Kieran Kelly; (2009); New Media: A Critical Introduction; Routledge; 2 edition.
3. Nicholas Gane and David Beer (Oct 28, 2008) New Media: The Key Concepts; Berg Publishers; English Ed edition
4. 4. Robert I. Berkman and Christopher A. Shumway (2003) Digital Dilemmas: Ethical Issues for Online Media Professionals (Media and Technology); Wiley-Blackwell
5. John V. Pavlik & Shawn McIntosh (2010) Converging Media: A New Introduction to Mass Communication; Oxford University Press, USA; 2 edition.

KUT 441/4
FINAL YEAR PROJECT

Course Synopsis

This course aims to explain issues related to the field of communications, new media and entrepreneurship. Through this course the student is able to contribute their knowledge related to the field. Scope for each selected topic will increase further the understanding and development of something that science and specific methodologies related fields studied. The investigation is controlled by students and supervised by the central lecturer this study.

References

1. Alan Agresti and Barbara Finlay (2008) Statistical Methods for the Social Sciences (4th Edition) Prentice Hall
2. Arthur Aron, Elaine N. Aron and Elliot Coups .(2010). Statistics for The Behavioral and Social Sciences: A Brief Course (5th Edition) Prentice Hall
3. Earl R. Babbie (2010).The Basics of Social Research; Wadsworth Publishing; 5 edition.
4. Frederick J. Gravetter & Larry B. Wallnau .(2012). Statistics for the Behavioral Sciences; 9 edition Wadsworth Publishing;
5. John W. Creswell .(2008). Research Design: Qualitative, Quantitative, and Mixed Methods Approache; Sage Publications Ltd; Third Edition.
6. Paul D. Allison .(1998). Multiple Regression: A Primer (Undergraduate Research Methods & Statistics in the Social Sciences) Sage Publications
7. Perry R. Hinton (2004) Statistics Explained: A Guide for Social Science Students, 2nd Edition; Routledge
8. Ranjit Kumar .(2010). Research Methodology: A Step-by-Step Guide for Beginners; Sage Publications Ltd; Third Edition.
9. Uwe Flick (2011). Introducing Research Methodology: A Beginner's Guide to Doing a Research Project; Sage Publications Ltd.
10. William Lawrence Neuman (2006) Basics of Social Research: Qualitative and Quantitative Approaches (Allyn & Bacon; 2 Edition.

EIT 302/4
INDUSTRIAL TRAINING

Course Synopsis

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 log book and report at the end of the Industrial Training. Overall, the course is a practical-based course.

References

1. UniMAP Industrial Training Guideline
2. UniMAP Industrial Training Log Book

JOB OPPURTUNITIES

1. Public Relations Executives/ MarComm
2. Corporate Communications Executives
3. Interactive Designer
4. Event Manager

UNIVERSITY COURSES

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.

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.

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

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 andself 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.

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.

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.

EUT442/2
PROFESSIONAL ENGINEERS (FOR ENGINEERING STUDENTS ONLY)

Course Sypnosis

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

References

1. Charles B. Fleddermann, "Engineering Ethics", Prentice Hall 3rd Edition.
2. Lee Mei Pheng, "General Principles of Malaysian Law", Fajar Bakti 3rd Edition, 1998.
3. Mike W. Martin and Roland Schinzinger, "Ethics in Engineering", McGraw Hill, 2005.
4. Registration of Engineers Act 1967 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.

EUT444/3
MANAGEMENT FOR ENGINEERS (FOR ENGINEERING STUDENTS ONLY)

Course Sypnosis

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

References

1. Stanley E. P., Samuel J. M., Jack R. M, Scot M. S. and Margaret M. S., "Project Management: Planning, Scheduling, and Controlling Projects", John Wiley & Sons, 2008.
2. William G. Sullivan, Elin M. Wicks and James Luxhoj, "Engineering Economy", Prentice Hall, 2005.
3. S. Kant Vajpayee, "Fundamental of Economic for Engineering Technologist and Engineers", Prentice Hall, 2001.
4. G. J. Thuesen and W. J. Fabrycky, "Engineering Economy", Prentice Hall, 2001.

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CENTRE FOR INTERNATIONAL LANGUAGES

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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UNIVERSITY REQUIRED COURSES

UVW110/2
BASIC MALAY LANGUAGE (ONLY FOR INTERNATIONAL STUDENTS)

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 civilization of countries where the language is spoken, thus encouraging positive attitudes towards language learning.

Prerequisite

This course is to be registered by all International students **EXCEPT** students from countries where the Malay Language is used as their national language or spoken language, e.g. students from Indonesia, Brunei and Singapore.

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.

UVW410/2
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.

Prerequisite

- NIL

References

1. Anwar Ridhwan & Lai Choy. (2008). *Kamus kata berimbuhan DAYA*. Selangor: Penerbitan Minda (M) Sdn.Bhd.
2. Asmah Haji Omar. (2006). *Panduan wacana akademik teori dan penerapan.* Kuala Lumpur: Dewan Bahasa dan Pustaka.
3. Dewan Bahasa dan Pustaka. (2005). *Kamus Dewan (edisi ke-4)*. Kuala Lumpur: Dewan Bahasa dan Pustaka.
4. N.A. Salleh. (2009). *Cara mudah mengenal pasti kesalahan lazim dalam bahasa Melayu*. Selangor: Perintis Books Sdn. Bhd.
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.

UVW312/2
ENGLISH FOR TECHNICAL COMMUNICATION (ONLY FOR STUDENTS IN ENGINEERING AND ENGINEERING TECHNOLOGY PROGRAMMES)

Course Synopsis

This course is designed to prepare engineering and other technical disciplinary 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.

Prerequisite

Students must have either one of these qualifications:

a) Pass Foundation English with minimum grade C
b) Obtained at least a MUET Band 4
c) Obtained TOEFL 525 / IELTS 5.5 and above
d) UniMAP Diploma graduates who have passed Diploma English 1 and 2 with minimum grade C

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.
4. Shafiq Hizwari Md. Hashim, Loo Shih Min, Liew Khe Li & Sri Kandy Putri Naru Abdul Hamid Naru. (2012). Technical Communication for University Students. Kuala Lumpur, Malaysia: Pearson Malaysia.
5. Smith-Worthington, D., & Jefferson, S. (2011). Technical writing for success (3rd Ed.). United States: South-Western Cengage Learning.

UVW313/2
ENGLISH FOR ACADEMIC PURPOSES (ONLY FOR STUDENTS IN BUSINESS AND NEW MEDIA COMMUNICATION PROGRAMMES)

Course Synopsis

Using a learner-centred approach, this course is aimed at preparing business students to improve their general academic writing skills by familiarising them with the fundamentals of academic writing. By the end of the semester, students are required to produce an argumentative essay individually, with topics that are related to their respective disciplines. Students are required to conduct library research; both printed and online material such as books, journals, periodicals etc. Apart from that, students are also required to apply the correct form of APA citation style in their essays. Although the primary focus of the course is on writing, this course also provides substantial activities on reading and speaking. Students are required to present their topics orally by the end of the semester.

Prerequisite

Students must have either one of these qualifications:

a) Pass Foundation English with minimum grade C
b) Obtained at least a MUET Band 4
c) Obtained TOEFL 525 / IELTS 5.5 and above
d) UniMAP Diploma graduates who have passed Diploma English 1 and 2 with minimum grade C

References

1. Bailey, S. (2011). *Academic writing: A handbook for international students*. (2nd ed.). NY, USA: Routledge.
2. Barry, M. (2011). *Steps to academic writing*. Cambridge, UK: Georgian Press.
3. Brandt, C. (2009). *Read, research and write: Academic skills for ESL students in higher education*. Wiltshire, UK: SAGE Study Skills Series
4. Chin, P., Koizumi, Y., Reid, S., Sean Wray,. & Yamazaki, Y. (2011). *Academic writing skills:*
5. *Student's book 1*. Cambridge, UK: Cambridge University Press.
6. Cox, K., & Hill, D. (2011). *EAP now! English for academic purposes students' book*. (2nd ed.). NY, USA: Pearson/ Longman.
7. Rogers, L. (2011). *DELTA academic objectives: Writing skills coursebook*. ?: Delta Publishing.
8. Soles, D. (2009). *The essential of academic writing*. (2nd ed.). Boston, USA: Wadsworth Cengage Learning.

OPTIONAL COURSES

UVW112/2
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-centered approach to help students attain good command of the English language.

Prerequisite

All **students** must register for this course **EXCEPT**:

a) Those who have obtained Band 4 and above for Malaysian University English Test (MUET)
b) Those who obtained TOEFL 525 / IELTS 5.5 and above
c) UniMAP Diploma graduates who have passed Diploma English I and II with minimum grade C.

References

1. Azar, B.S. (2003) *Fundamentals of English grammar* (3rd Edition). Englewood Cliffs, N.J.: Prentice Hall.
2. Elder, J. (2008). *Exercise your college reading skills.* New York: McGraw Hill.
3. Fuchs, M., Bonner, M., & Westheimer, M. (2000). *Focus on grammar: An intermediate course reference and practice. (*2nd Edition*).* New York: Longman.
4. Langan, J. (2008). *College writing skills* (7th Edition). Singapore: McGraw Hill.
5. *Macmillan English dictionary for advanced learners.* (2011) (2nd ed.). Oxford, United Kingdom: Macmillan Publishers Limited. (Original work published 2002).
6. Reid, J. M. (2000). *The process of composition (*3rd Edition). New York: Longman.

UVW114/2
MANDARIN I

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.

Prerequisite

Students who register **MUST NOT** have any formal qualifications in the language at PMR/SPM level; **and MUST NOT** have followed any education system which uses the language as the medium of instruction.

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.

UVW214/2
MANDARIN II

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.

Prerequisite

Pass Mandarin I with minimum grade C.

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.

UVW314/2
MANDARIN III

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.

Prerequisite

Pass Mandarin II with minimum grade C.

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.

UVW414/2
MANDARIN IV

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 practice 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.

Prerequisite

Pass Mandarin III with minimum grade C.

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.

UVW115/2
THAI I

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.

Prerequisite

Students who register **MUST NOT** have any formal qualifications in the language at PMR/SPM level; **and MUST NOT** have followed any education system which uses the language as the medium of instruction.

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.

UVW215/2
THAI II

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.

Prerequisite

Pass Thai I with minimum Grade C.

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.

UVW315/2
THAI III

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.

Prerequisite

Pass Thai II with minimum Grade C.

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. Wiworn Kasavatana-Dohrs. (2007). *Everyday Thai for beginners.* Silkworn Book.
5. Tontraseney, W, (1981). *Bahasa Thai,* Kuala Lumpur: Universiti Malaya.

UVW415/2
THAI IV

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.

Prerequisite

Pass Thai III with minimum Grade C.

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.

UVW116/2
ARABIC I

Course Synopsis

This course is designed for beginners with no prior knowledge of Arabic Language. The course covers listening, speaking, reading and writing skills. Students will be exposed to Arabic characters and correct pronunciation. Students will be able to read and understand short sentences and dialogues. They will learn basic grammar to enable them to write simple sentences in Arabic.

Prerequisite

Students who register **MUST NOT** have any formal qualifications in the language at PMR/SPM level; **and MUST NOT** have followed any education system which uses the language as the medium of instruction.

References

1. Abdullah Sulaiman Al-Jarbuk, Tammam Hassan Umar, Mahmud Kamil al-Naqah,
2. 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.
3. Muhammad Roihan Hasbullah M.A (Hj.) (2002). Perbualan bahasa Arab untuk peringkat rendah dan menengah. Kuala Lumpur: Pustaka Syuhada.
4. Sekumpulan guru-guru Bahasa Arab (1987). Al-Jadid al-Lughati al-Araabiyyah Li al-Sanah al-Ula al-Ikdadiyah. Gombak Utara Selangor: Pustaka Markiland.
5. Bahasa Arab 1 (2002). Bahagian Bahasa Arab, Universiti Sains Malaysia (Pusat Bahasa & Terjemahan).
6. Zaid Al-Hamid (2001). Pelajaran bahasa Arab untuk semua. Kuala Lumpur: Speedy Self Study System.
7. Fuad Ifram al-Bustaniy (1986). Al-Munjid Al-Tullab. Beirut, Lubnan: Darul Syarq.
8. Lingua Phone (2000). London: Lingua Phone Institut Limited.

UVW216/2
ARABIC II

Course Synopsis

At this level, students will learn basic vocabularies. Students will be exposed to more basic grammar and sentence structures. They will also learn to read and write longer sentences and conversations about daily activities. These will further develop students' listening, speaking, reading and writing skills.

Prerequisite

Pass Arabic I with minimum Grade C.

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 بغيرها 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, عربي - 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).

UVW316/2
ARABIC III

Course Synopsis

This course will expand the use of vocabulary relating to daily activities and social contexts. Students will be introduced to use vocabularies learned to produce complete sentences in communication. Students will be able to read longer dialogues and paragraphs relating to daily activities and social contexts. Students will also learn more various grammar items to write complex sentences and dialogues relating to topics learned.

Prerequisite

Pass Arabic II with minimum Grade C.

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.

UVW416/2
ARABIC IV

Course Synopsis

At this level, students will use expanded vocabulary and focus on producing longer and grammatically correct sentences. Students will be exposed to read longer paragraphs relating to different social and religious contexts. Students are also engaged in writing more complex and longer sentences relating to the topics learned.

Prerequisite

Pass Arabic III with minimum Grade C.

References

1. Ahmad Hassan Ziyat (n.d.). تاريخ الأدب العربي , Darul Kutub Misriyyah, Mesir.
2. Batras Al-Bustaniy (1989). العرب أدباء. دار النذير: بيروت , Darul Nazir, Beirut
3. Abdul Rahman Al-Barquni (1979). ديوان المتنبي. بيروت شرح دار الكتاب :, Darul Kitab, Beirut
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 اللغةDarul 'Ilmi Malayin, Beirut.

UVW117/2
JAPANESE 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.

Prerequisite

Students who register **MUST NOT** have any formal qualifications in the language at PMR/SPM level; **and MUST NOT** have followed any education system which uses the language as the medium of instruction.

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 Corporation The Association For Overseas Technical Scholarship(Aots),' Shin Nihongo-No Kiso 1', Standard Question, 3A Corpration, 1993.

UVW217/2
JAPANESE II

Course Synopsis

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.

Prerequisite

Pass Japanese I with minimum Grade C.

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 1*BunkeiRenshuuTyou, 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

UVW317/2
JAPANESE III

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.

Prerequisite

Pass Japanese II with minimum Grade C.

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 1* Bunkei Renshuu Tyou, Tokyo: 3A Corporation.
5. Miyagi, S. & Mitsui, A. (1997). *Everyday Listening in 50 days*: Tokyo: Bonjinsha Corporation

UVW417/2
JAPANESE IV

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.

Prerequisite

Pass Japanese III with minimum Grade C.

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 1*BunkeiRenshuuTyou, Tokyo: 3A Corporation.
5. Miyagi, S. & Mitsui, A.(1997). *Everyday Listening in 50 days*: Tokyo: Bonjinsha Corporation

UVW118/2
GERMAN 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.

Prerequisite

Students who register **MUST NOT** have any formal qualifications in the language at PMR/SPM level; **and MUST NOT** have followed any education system which uses the language as the medium of instruction.

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.

UVW218/2
GERMAN II

Course Synopsis

The objective of this course is to extend students' knowledge of the German language which they started in German I. Students will continue and expand the basic elements, structures and constructions of the language as well as understand the culture of the people who speak the language. Students will be able to construct longer sentences in both written and spoken for the purpose of communication, express themselves using simple phrases and also to read and comprehend short simple texts.

Prerequisite

Students who register must pass German I with minimum grade C.

References

1. Gotz, G. Schwarz, E. (2011). AussichtenA1. Deutsch als Fremdsprache für Erwachsene. Stuttgart: Ernst Klett GmbH.
2. Guess, G. (2009) Deutsch Aktiv. Berlin und München: Langenscheidt KG.
3. Maenner, D. (2006) Eurolingua Deutsch 1 & 2. Stuttgart: Ernst Klett, International GmbH.
4. Dane, A.D. (2005). Passwort Deutsch 1 & 2. Stuttgart: Ernst Klett, International GmbH.
5. Ortheil, H.J. (2010). Deutsch zum Ausprobieren, München: Sprachinstitut Treffpunkt.

UVW318/2
GERMAN III

Course Synopsis

The objective of this course is the intorduction to, and use of vocabulary related to social contexts and its use in bussiness contexts. Students will be able to read longer dialogues and paragraphs related to social and simple bussiness contexts. Students will learn to construct longer sentences to produce dialogues related to topics learned.

Prerequisite

Students who register must pass German II with minimum grade C.

References

1. Gotz, G. Schwarz, E. (2011). AussichtenA1. Deutsch als Fremdsprache für Erwachsene. Stuttgart: Ernst Klett GmbH.
2. Guess, G. (2009) Deutsch Aktiv. Berlin und München: Langenscheidt KG.
3. Maenner, D. (2006) Eurolingua Deutsch 1 & 2. Stuttgart: Ernst Klett, International GmbH.
4. Ortheil, H.J. (2010). Deutsch zum Ausprobieren, München: Sprachinstitut Treffpunkt.

UVW418/2
GERMAN IV

Course Synopsis

The objective of this course is to expose and teach the students more complex grammatical forms and sentence structure as compared to level 1, 2 and 3. Classroom tasks demand a higher level of participation and allow students to express themselves using the language. Students are exposed to different authentic situations that they would encounter in their future workplace. Students will also learn how to write essays.

Prerequisite

Students who register must pass German III with minimum grade C.

References

1. Gotz, G. Schwarz, E.(2011). AussichtenA1. Deutsch als Fremdsprache für Erwachsene. Stuttgart: Ernst Klett GmbH
2. Guess, G. (2009.) Deutsch Aktiv. Berlin und München: Langenscheidt KG.
3. Maenner,D. (2006).Eurolingua Deutsch 1,Berlin: Cornelsen Verlag,
4. Dane,A.D.(2005). Passwort Deutsch 1 & 2, Stuttgart: Ernst Klett, International GmbH.
5. Ortheil, H.J .(2010). Deutsch zum Ausprobieren, München: Sprachinstitut Treffpunkt

UVW119/2
KOREAN 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.

Prerequisite

Students who register **MUST NOT** have any formal qualifications in the language at PMR/SPM level; **and MUST NOT** have followed any education system which uses the language as the medium of instruction.

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.

UVW219/2
KOREAN II

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.

Prerequisite

Pass Korean I with minimum grade C.

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.

UVW319/2
KOREAN III

Course Synopsis

This course aims to expand students' language skills by introducing more complex sentence structures, colloquial expressions in different cultural contexts. Classroom tasks in this course naturally demand a higher level of participation and hence incorporate learning through the use of audio-visual materials and class discussion. This course will introduce students to basic business Korean use and culture behavior in dealing business with people from Korea.

Prerequisite

Pass Korean II with minimum grade C.

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.

UVW419/2
KOREAN IV

Course Synopsis

Students are introduced to more complex grammatical forms and sentence structures as compared to level I, II and III. Classroom tasks in this course would demand a higher level of participation and allow students opportunities to express themselves using the language. Students are exposed to use the language in different authentic contexts that they would encounter in their future workplace.

Prerequisite

Pass Korean III with minimum grade C.

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.

UVW120/2
RUSSIAN I

Course Synopsis

Russian Language I is a course designed for students who have no previous knowledge of the Russian language. At this level students will gain basic listening, reading, speaking and writing skills in standard spoken or written Russian. Students will learn and recognize Russian Alphabet (Cyrillic) and its sound system, as well as they will be introduced to simple grammar structures and also learn simple daily conversation in the Russian language. Throughout this course students will be introduced to Russian culture.

Prerequisite

Students who register **MUST NOT** have any formal qualifications in the language at PMR/SPM level; **and MUST NOT** have followed any education system which uses the language as the medium of instruction.

References

1. Rachel, F. (2002), Beginner's Russian, 2nd edition, Great Britain.
2. Karavanova, N.B. (2006), Survival Russian. A course in conversational Russian, 6th edition (stereotype), Moscow, Russian Language. Courses.
3. Kurlova, I.V. Nachinaem chitat po russki. (2008), Moscow. Russian Language. Courses.

UVW220/2
RUSSIAN II

Course Synopsis

A continuation from Russian I, students will gain secondary listening, speaking, reading and writing skills in Russian. Students will be able to understand spoken Russian, construct short sentences for communication, read and understand simple texts, as well as to be able to participate in discussion of the topics assigned. Moreover, based on the texts used in the course, students will also be introduced to Russian culture.

Prerequisite

Students who register must pass Russian I with minimum grade C.

References

1. Rachel, F. (2002), Beginner's Russian, 2nd Edition, Great Britain.
2. Karavanova, N.B. (2006). Survival Russian: A Course in Conversational Russian, 6th Edition (stereotype), Moscow, Russian Language Courses.
3. Kurlova, I.V. Nachinaem Chitat Po Russki. (2008), Moscow. Russian Language Courses.

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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)
- Engineering Skills (ECT112)
- Engineering Skills (PCT111)

And also a core course for diploma level:

- Basic Engineering Skill (DCT100)

ENGINEERING SKILLS (ECT111/ECT112)

- 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.

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.
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3. William J. Palm III. (2001). *MATLAB for Engineering Students*. McGraw Hill.
4. Mohd Ramzan Mainal, Badri Abdul Ghani, Yahya Samian. (2000). *Lukisan Kejuruteraan Asas*. UTM

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INTRODUCTION

The Institute of Engineering Mathematics is a centre for planning and monitoring the curriculum of Mathematics and Statistics to all engineering, engineering technology and business programmes in UniMAP. It undertakes exemplary teaching and research across a number of disciplines. Each discipline explores opportunities to support and enhance our subjects, providing exciting interdisciplinary research and innovative approaches to teaching. Our areas of expertise cover Mathematics, Statistics, Mathematical Physics, Simulation and Operational Research. Our scientists are active in internationally recognised research across the disciplines, advancing knowledge in the established fields, alongside novel developments in emerging areas such as fuzzy modeling, computational intelligence applications, computational fluid dynamics and multi-characteristics quality control.

MISSION

To provide excellent services in teaching and research related to Engineering Mathematics that consistent with the university's aspiration.

VISION

To become a competitive institution in teaching and research related to Engineering Mathematics.

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PROGRAMME OFFERED

Doctor of Philosophy by Research Mode
Master of Science by Research Mode
Master of Science (Engineering Mathematics) by Mixed Mode

COURSES OFFERED

DIPLOMA COURSES

DQT101/3	Mathematics I
DQT102/3	Mathematics II
DQT203/3	Mathematics III

DEGREE COURSES

i) Business Programme

BQT133/3	Business Mathematics
BQT173/3	Business Statistics

ii) Engineering Programme

EQT101/3	Engineeering Mathematics I
EQT102/3	Engineering Mathematics II
EQT203/3	Engineering Mathematics III
EQT221/3	Discrete Mathematics & Linear Algebra
EQT241/3	Intermediate Mathematics
EQT271/3	Engineering Statistics
EQT272/3	Probability and Statistics

iii) Engineering Technology Programme

PQT111/3	Mathematics for Engineering Technology I
PQT112/3	Mathematics for Engineering Technology II
PQT213/3	Mathematics for Engineering Technology III
PQT274/3	Statistics for Engineering Technology

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 equatio.
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

EQT101
ENGINEERING MATHEMATICS I

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.

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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
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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.

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1. Erwin Kreyszig (2006): *Advanced Engineering Mathematics*, 9th edition, John Wiley & Sons, Inc.
2. Undergraduate Mathematics for Engineering Student. McGraw Hill.
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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.
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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 differentialequations 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

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.

PQT 274/3
STATISTICS FOR ENGINEERING TECHNOLOGY

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 nonparametric statistics (The χ^2 test, Sign test, Mann-Whitney 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. Students should be able to identify the coefficients and apply the methods to construct simple linear regression model.
4. Students should be able to construct the ANOVA table and analyze the result.
5. Students should be able to understand, select and apply the basic methodology of nonparametric statistics.

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.*


UniMAP
ICoMEIA2014
INTERNATIONAL CONFERENCE ON MATHEMATICS, ENGINEERING AND INDUSTRIAL APPLICATIONS
2014

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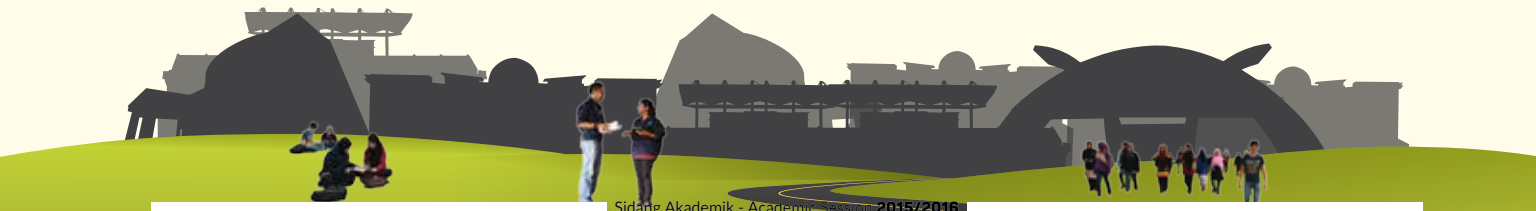

INTRODUCTION

The Centre for Industrial & Governmental Collaboration (CIGC) 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. CIGC consists of several main units, namely Graduate Employability, Industrial Training, Industrial Networking, ICT & Publicity and Administration (Finance & Projects). 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, 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
2. UniMAP Industrial Training Log Book

PIT 304/12
INDUSTRIAL TRAINING
[DEGREE IN ENGINEERING TECHNOLOGY PROGRAMME]

Syllabus

This practical-based course exposes students to a company technical functions and organizational structure and operation such as departmental function, work procedure, safety procedure, communication, technical skills and project management.

Course Outcomes

CO1: Ability to analyze and adapt the working environment during training period.
CO2: Ability to demonstrate good work performance, good communication skills, leadership and work ethics during training period
CO3: Ability to operate assigned task given by host company.

References

1. 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

*STRUCTURED INTERNSHIP PROGRAMME (SIP)

A collaborative effort between TalentCorp Malaysia and Ministry of Education (MOE). The programme encourages a meaningful internship experience relevant to industries.

OBJECTIVES

- Introduce students to the working world as early as possible
- Provide practical experience and emphasise the development of specific knowledge or skills for student of higher educational institutions.
- Prepare graduates to become relevant to industries thus, generating more employable graduates to fill the current talent shortage in Malaysia
- Encourages companies/industries to make internship programmes more structured in terms of their competency development through the double tax deduction incentive.

BENEFIT FOR STUDENTS

- Chance to experience working life and put theories learnt from university into practice
- Familiarise themselves with working culture of preferred industry or company before embarking on their careers.
- A platform to demonstrate knowledge, skill and abilities to be considered as a future employee
- Develop skill sets required by the industry through a structured internship.

Co-Curriculum Centre

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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 required to enroll at least 3 units of Co-Curriculum courses and student are compulsory to take uniformed body courses in their first year of study. Kindly refer to the table below:

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1	Uniformed Bodies Co-curriculum	2 Unit 1 Unit
2	Uniformed Bodies	package

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CO-CURRICULUM COURSES OFFERED BY CO-CURRICULUM CENTRE

During their study, all the degree students must take 3 units 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)***	**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	Bola Tampar [Volleyball]	UZW109	1		
10	Lawan Pedang *[Fencing]*	UZW174	1		
11	Futsal [Futsal]	UZW175	1		
12	Boling Padang *[Lawn Bowl]*	UZW181	1		
13	Petanque *[Petanque]*	UZW182	1		
14	Kayak *[Canoe]*	UZW183	1		
15	Badminton *[Badminton]*	UZW184	1		
16	Hoki *[Hockey]*	UZW185	1		
17	Sepak Takraw [*Sepak Takraw]*	UZW186	1		
18	Ragbi *[Rugby]*	UZW187	1		
19	Memanah *[Archery]*	UZW188	1	**Sukan *(Sport)***	**Ditawarkan Secara Tunggal *(Offered in Single)***
20	Ping Pong *[Table Tennis]*	UZW189	1		
21	Seni Silat Cekak I *[Seni Silat Cekak I]*	UZW171	1	**Sukan *(Sport)***	**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		

BIL.	SENARAI KURSUS	KOD KURSUS	UNIT	TERAS	PRA- SYARAT
22	Taekwon-Do GTF I *[Taekwon-Do GTF I]*	UZW172	1	**Sukan *(Sport)***	**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)***
	Taekwon-Do GTF II *[Taekwon-Do GTF II]*	UZW272	1		
	Taekwon-Do GTF III *[Taekwon-Do GTF III]*	UZW372	1		
23	Karate-Do *[Karate-Do]*	UZW173	1		
	Karate-Do II *[Karate-Do II]*	UZW273	1		
	Karate-Do III *[Karate-Do III]*	UZW373	1		
24	Taekwon-Do WTF I *[Taekwon-Do WTF I]*	UZW176	1		
	Taekwon-Do WTF II *[Taekwon-Do WTF II]*	UZW276	1		
	Taekwon-Do WTF III *[Taekwon-Do WTF III]*	UZW376	1		
25	Silat Olahraga I *[Sport Silat I]*	UZW177	1		
	Silat Olahraga II *[Sport Silat II]*	UZW178	1		
	Silat Olahraga III *[Sport Silat III]*	UZW277	1		
26	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		
27	*Penerbitan Video [Video Publishing]*	UZW132	1	**Kebudayaan *(Culture)***	**Ditawarkan Secara Tunggal** ***(Offered in Single)***
28	Seni Pergerakan Kreatif *[Arts of Creative Movement]*	UZW155	1		
29	Drama, Pementasan & Seni Lakon *[Drama, Playwright & Acting]*	UZW156	1		
30	Pancaragam I *[Brass Band I]*	UZW153	1	**Kebudayaan *(Culture)***	**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)***
	Pancaragam II *[Brass Band II]*	UZW253	1		
	Pancaragam III *[Brass Band III]*	UZW353	1		
31	Asas Gamelan *[Foundations of Gamelan]*	UZW151	1	**Kebudayaan *(Culture)***	**Ditawarkan Secara Berperingkat** ***(Gradual Offered)***
	Gamelan II *[Gamelan II]*	UZW251	1		
	Gamelan III *[Gamelan III]*	UZW351	1		
31	Kumpulan Jazz I *[Jazz Band I]*	UZW152	1		
	Kumpulan Jazz II *[Jazz Band II]*	UZW25	1		
	Kumpulan Jazz III *[Jazz Band III]*	UZW352	1		
32	Angklung I *[Angklung I]*	UZW154	1	**Kebudayaan *(Culture)***	**Ditawarkan Secara Berperingkat** ***(Gradual Offered)***
	Angklung II *[Angklung II]*	UZW254	1		
	Angklung III *[Angklung III]*	UZW354	1		

BIL.	SENARAI KURSUS	KOD KURSUS	UNIT	TERAS	PRA- SYARAT
32	Khidmat Masyarakat *[Community Services]*	UZW191	1	**Kidmat Komuniti *(Community Services)***	**Ditawarkan Secara Tunggal** ***(Offered in Single)***
33	Tajwid *[Tajwid]*	UZW193	1	**Kepemimpinan *(Leadership)***	
34	Pidato *[Elocution]*	UZW194	1	**Pengucapan Awam *(Public Speaking)***	
35	Radio Kampus *[Campus Radio]*	UZW195	1		
36	Daya Usaha & Inovasi *[Initiative & Innovation]*	UZW192	1	**Daya Usaha & Inovasi *(Initiative & Innovation)***	
37	Student In-Free Enterprise (SIFE) *[Student In-Free Enterprise (SIFE)]*	UZW196	1	**Keusahawanan *(Entrepreneurship)***	
38	Kumpulan Latihan Kelanasiswa Malaysia I (Udara) / *[Malaysian University Rover Training Group I (Air)]*	UZW112	1	**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)***
	Kumpulan Latihan Kelanasiswa Malaysia II (Udara) / *[Malaysian University Rover Training Group II (Air)]*	UZW113	1		
39	Briged Bomba I *[Fire And Rescue Briged I]*	UZW120	1		
	Briged Bomba II *[Fire And Rescue Briged II]*	UZW121	1		
40	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		
41	St. John Ambulans Malaysia I *[Malaysian St. John Ambulance I]*	UZW124	1		
	St. John Ambulans Malaysia II *[Malaysian St. John Ambulance II]*	UZW125	1		
42	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		
43	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		

BIL.	SENARAI KURSUS	KOD KURSUS	UNIT	TERAS	PRA- SYARAT
44	Kursus Persijilan Bulan Sabit Merah Malaysia I (BSMM I) *[The Malaysian Red Crescent 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 Bulan Sabit Merah Malaysia II (BSMM II) *[The Malaysian Red Crescent Certification Course II]*	UZW165	1		
	Kursus Persijilan Bulan Sabit Merah Malaysia III (BSMM III) *[The Malaysian Red Crescent Certification Course III]*	UZW264	1		
45	Sukarelawan Siswa/Siswi Koreksional Jabatan Penjara Malaysia I (Kor SISKOR I) *[Students Voluntary Correctional Malaysian Prison Department I (Kor SISKOR I)]*	UZW110	1	**Kesukarelawanan *(Volunteerism)***	**Kursus Berpakej – (Pelajar Harus Mengikuti Dari Peringkat 1 – 4 Untuk Memperolehi 4 Unit)** *** Tahun 1 - 2 (4 Semester)** ***Packaged Courses – (Students should Following From Stage 1 -4 To Acquire 4 Units)*** **** Years 1 - 2 (4 Semesters)***
	Sukarelawan Siswa/Siswi Koreksional Jabatan Penjara Malaysia II (Kor SISKOR II) *[Students Voluntary Correctional Malaysian Prison Department II (Kor SISKOR II)]*	UZW111	1		
	Sukarelawan Siswa/Siswi Koreksional Jabatan Penjara Malaysia III (Kor SISKOR III) *[Students Voluntary Correctional Malaysian Prison Department III (Kor SISKOR III)]*	UZW210	1		
	Sukarelawan Siswa/Siswi Koreksional Jabatan Penjara Malaysia IV (Kor SISKOR IV)] *[Students Voluntary Correctional Malaysian Prison Department IV (Kor SISKOR III)]*	UZW211	1		
46	Kor Siswa Siswi Pertahanan Awam I (Kor SISPA I) *[Malaysia Civil Defense Department I]*	UZW162	1	**Kesukarelawanan *(Volunteerism)***	**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		

BIL.	SENARAI KURSUS	KOD KURSUS	UNIT	TERAS	PRA- SYARAT
47	Palapes Darat I *[ROTU Army I]*	UZW160	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)***
	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		
48	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		
49	Briged RELA Siswa Siswi (RELASIS) I *[Malaysian People's Volunteer corps I]*	UZW168	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)***
	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) VI *[Malaysian People's Volunteer corps VI]*	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.

UZW109
VOLLEYBALL

Make curricular sports activities of Volleyball as an activity participated by all students through the activities planned in order to master the basic skills of volleyball, the organization of the game, and the rules of the game. In addition to member interaction opportunities, fun and occupy their free time with useful things as well as fostering a sense of sportsmanship and cooperation, responsible and contribute to the university.

References

1. Lee E. Brown, Vance A. Ferrigno, 2005, Training for speed, agility and Quickness, Second Edition, human kinetic.

2. Kinda S.Lenberg, 2004 Coaching Volleyball Defensive Fundamentals and Tecnhniques, Second Edition, Coaches Choice.

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

UZW273
KARATE-DO II

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. Karate A Step By Step Guide to Shotokan Karate (KevinHealy) New Delhi Health Harmony, 2002.

UZW373
KARATE-DO III

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. Karate A Step By Step Guide to Shotokan Karate (KevinHealy) New Delhi Health Harmony, 2002.

UZW176
TAEKWON-DO WTF 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.

UZW276
TAEKWON-DO WTF II

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.

UZW376
TAEKWON-DO WTF III

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.

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

UZW175
FUTSAL

Make curricular sports activities of Futsal as an activity participated by all students through the activities planned in order to master the basic skills of futsal, organization of games and game laws. In

addition to the opportunity of interaction, fun and occupy their free time with useful things as well as fostering a sense of difficulty and collaborative, responsible and contribute to the the university.

References

1. V.Hermans & R. Engler, 2011, Futsal: Technique, Tactics, Training, Midenhead Mayer & Mayer Sport (UK) Ltd.
2. T. Burn, 2004, Holistic Futsal, Lulu Enterprises Incorporated.

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) **Claire Mitchell-Taverner** (Author)
6. **›** Visit Amazon's Claire Mitchell-Taverner Page
7. Find all the books, read about the author, and more.
8. See search results for this author
9. Are you an author? Learn about Author Central
10. .

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. Richards http://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/new zealand/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.

UZW132
VIDEO PUBLISHING

Course Synopsis

Kursus ini berkisar tentang proses Penerbitan Video. Kursus akan bermula Fasa Pra-Produksi yang mana menyentuh tentang kerja-kerja pengurusan sebelum menjalani proses pengambaran atau Fasa Produksi. Proses pembelajaran akan berjalan hingga ke Fasa akhir iaitu Post-Produksi bagi menyiapkan kerja-kerja penyuntingan .Selain itu kursus ini juga mengetengahkan kemahiran pengendalian kamera dan pencahayaan bagi menyokong penerbitan video pendek di akhir kursus ini.

References

1. Deborah S.Patz. (2010). Film Production Management 101 second edition. Michael Wiese Productions (ISBN:978—932907-77-3)
2. Brordwell & Thomsan. (2008). Film Art An Introduction Eight Edition. N.York: The McGraw-Hill Companieslc. (ISBN:-13:978-0071101592)
3. Legal Reseach Board. (2008). Film Cencorship Act 2002 (ACT 620) & Perbadanan KEmajuan Filem Nasional Malaysia ACT 1981 (ACT 244).Intrnasional Law Book Services. Selangor, Malaysia. (ISBN 967-891468-9)
4. Tom Ang. (2006). Digital Video An Introduction. Star Standard, Singapore. (ISBN-13: 978-1-40531-254-7)
5. Gloman, Chuck B.(2003).303 Digital lFilmmaking Solution: Solve Ang Video Shoot or edit problem in 10 minutes or less. McGraw-Hill (ISBN: 0-07-141651-X)
6. Beacham, Frank (1994). American Cinematographer video manual second Edition. Sinclair Printing Company, United States. (ISBN: 0-935578-1-9)

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.

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.

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.

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 course 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 edn, 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 edn, 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

1. Modul Latihan dari Kolej Tentera Darat ATM
2. Buku Panduan Senjata-senjata Kompeni, Kementerian Pertahanan Malaysia, 2004
3. 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

1. Modul Latihan dari Kolej Tentera Darat ATM
2. Buku Panduan Senjata-senjata Kompeni, Kementerian Pertahanan Malaysia, 2004
3. 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

1. Modul Latihan dari Kolej Tentera Darat ATM
2. Buku Panduan Senjata-senjata Kompeni, Kementerian Pertahanan Malaysia, 2004
3. 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

1. Modul Latihan dari Kolej Tentera Darat ATM
2. Buku Panduan Senjata-senjata Kompeni, Kementerian Pertahanan Malaysia, 2004
3. 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

1. Modul Latihan dari Kolej Tentera Darat ATM
2. Buku Panduan Senjata-senjata Kompeni, Kementerian Pertahanan Malaysia, 2004
3. 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

1. Modul Latihan dari Kolej Tentera Darat ATM
2. Buku Panduan Senjata-senjata Kompeni, Kementerian Pertahanan Malaysia, 2004
3. 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 theoretical 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 (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

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)
2. Kanun Keseksaan (Akta 574) atau Penal Code (Act 574)
3. Modul Latihan dari PDRM
4. Akta Dadah Merbahaya 1952 (Akta 234)
5. Modul Undang-undang PDRM
6. Akta Penagih Dadah (Rawatan dan Pemulihan) (Akta 283)
7. Buku Panduan Senjata
8. Akta Pencegahan Jenayah 1959
9. Manual Pertolongan Cemas PBSMM
10. 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)
2. Kanun Keseksaan (Akta 574) atau Penal Code (Act 574)
3. Modul Latihan dari PDRM
4. Akta Dadah Merbahaya 1952 (Akta 234)
5. Modul Undang-undang PDRM
6. Akta Penagih Dadah (Rawatan dan Pemulihan) (Akta 283)
7. Buku Panduan Senjata
8. Akta Pencegahan Jenayah 1959
9. Manual Pertolongan Cemas PBSMM
10. 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)
2. Kanun Keseksaan (Akta 574) atau Penal Code (Act 574)
3. Modul Latihan dari PDRM
4. Akta Dadah Merbahaya 1952 (Akta 234)
5. Modul Undang-undang PDRM
6. Akta Penagih Dadah (Rawatan dan Pemulihan) (Akta 283)
7. Buku Panduan Senjata
8. Akta Pencegahan Jenayah 1959
9. Manual Pertolongan Cemas PBSMM
10. 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)
2. Kanun Keseksaan (Akta 574) atau Penal Code (Act 574)
3. Modul Latihan dari PDRM
4. Akta Dadah Merbahaya 1952 (Akta 234)
5. Modul Undang-undang PDRM
6. Akta Penagih Dadah (Rawatan dan Pemulihan) (Akta 283)
7. Buku Panduan Senjata
8. Akta Pencegahan Jenayah 1959
9. Manual Pertolongan Cemas PBSMM
10. 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)
2. Kanun Keseksaan (Akta 574) atau Penal Code (Act 574)
3. Modul Latihan dari PDRM
4. Akta Dadah Merbahaya 1952 (Akta 234)
5. Modul Undang-undang PDRM
6. Akta Penagih Dadah (Rawatan dan Pemulihan) (Akta 283)
7. Buku Panduan Senjata
8. Akta Pencegahan Jenayah 1959
9. Manual Pertolongan Cemas PBSMM
10. 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)
2. Kanun Keseksaan (Akta 574) atau Penal Code (Act 574)
3. Modul Latihan dari PDRM
4. Akta Dadah Merbahaya 1952 (Akta 234)
5. Modul Undang-undang PDRM
6. Akta Penagih Dadah (Rawatan dan Pemulihan) (Akta 283)
7. Buku Panduan Senjata
8. Akta Pencegahan Jenayah 1959
9. Manual Pertolongan Cemas PBSMM
10. 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 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.

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

1. First Aid Manual, 8th edition (2002). Authorised manual of the UK's leading First Aid providers. Great Britain: Dorling Kindersley.
2. Harvey D. Grant, Robert H. Murray, Jr., J. David Bergeron. Emergency Care, 5th Edition. U.S.A.: Prentice-Hall International.
3. 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

1. First Aid Manual, 8th edition (2002). Authorised manual of the UK's leading First Aid providers. Great Britain: Dorling Kindersley.
2. Harvey D. Grant, Robert H. Murray, Jr., J. David Bergeron. Emergency Care, 5th Edition. U.S.A.: Prentice-Hall International.
3. Basic Life Support, Guidelines 2005, Handbook for Healthcare Providers, 4th Edition

UZW126
MALAYSIA UNIVERSITY ROVER TRAINING GROUP I

Course Synopsis

KLKM is an international characteristic uniformed body that teaches 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 UNIVERSITY ROVER TRAINING GROUP II

Course Synopsis

KLKM is an international characteristic uniformed body that teaches 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 UNIVERSITY 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 UNIVERSITY 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

UZW177
SPORT SILAT I

Course Synopsis

Sports Silat course introduces and exposes the students with the martial art in terms of theory and practice. Students will learn the background, concepts, equipment and regulations in martial arts

and martial arts sports. Students will also be emphasized in terms of self-discipline. In addition, students will learn the basics of martial arts movement, combination of technical and fundamental movements in martial arts.

References

1. Persatuan Silat Kebangsaan Malaysia (PESAKA) (Syarat dan Peraturan Pertandingan Silat Olahraga)
2. Persatuan Silat Kebangsaan Negeri Perlis (PESAKA Perlis)

UZW178
SPORT SILAT II

Course Synopsis

Silat course of this exercise is continued from the course exercise Silat I. This course will explore Silat sport again in theory, ternikal and practical. Students will learn about the art of tying headdress, art sampin bond and basic movement and sports games silat martial art. Students will also be emphasized in terms of self-discipline. In addition, students will learn the basics of coaching workshops sports and martial arts martial arts.

References

1. Persatuan Silat Kebangsaan Malaysia (PESAKA) (Syarat dan Peraturan Pertandingan Silat Olahraga)
2. Persatuan Silat Kebangsaan Negeri Perlis (PESAKA Perlis)

UZW112
MALAYSIAN UNIVERSITY ROVER TRAINING GROUP I (AIR)

Course Synopsis

Co-curricular courses uniformed bodies Kelana Student Training Group I with another name Air Scout Unit, which is a newly established unit within the Group Kelana Students in Malaysia. This university is a pioneer in the establishment of the Air Scout. Malaysia is the only university that has the Air Scout. Air Scout Training Scheme will be exposed to the new Air Scout and Leadership courses scouter. Air Scout is comprised of adolescents aged from 17 years up to 25 years old offering a range of activities and skills training in developing human capital of individuals directly or indirectly. Concentration is also given to the development of self-awareness that emphasizes self-responsibility, obedience to the leader, organization, community and volunteerism State and providing services to the public, in line with the Scout motto of “Serving”

UZW277
SPORT SILAT III

Course Synopsis

Silat course of this exercise is a continuation of the course Silat sport II. This course will explore Silat sport again in theory, ternikal and practical. Students will learn about the art of tying headdress, art sampin bond and basic movement and sports games silat martial art. Students will also be emphasized in terms of self-discipline. In addition, students will learn the basics of coaching workshops sports and martial arts martial arts.

References

1. Persatuan Silat Kebangsaan Malaysia (PESAKA) (Syarat dan Peraturan Pertandingan Silat Olahraga)
2. Persatuan Silat Kebangsaan Negeri Perlis (PESAKA Perlis

UZW113
MALAYSIAN UNIVERSITY ROVER TRAINING GROUP II (AIR)

Course Synopsis

Co-curricular courses uniformed bodies Kelana Student Training Group II with another name Air Scout Unit, which is a newly established unit within the Group Kelana Students in Malaysia. This university is a pioneer in the establishment of the Air Scout. Malaysia is the only university that has the Air Scout. Air Scout Training Scheme will be exposed to the new Air Scout and Leadership courses scouter. Air Scout is comprised of adolescents aged from 17 years up to 25 years old offering a range of activities and skills training in developing human capital of individuals directly or indirectly. Concentration is also given to the development of self-awareness that emphasizes self-responsibility, obedience to the leader, organization, community and volunteerism State and providing services to the public, in line with the Scout motto of “Serving”

References

1. Panduan Pergurusan Pengakap Kumpulan Latihan Kelana Siswa Malaysia
2. Skim Latihan Pengakap Kelana Udara

References

1. Panduan Pergurusan Pengakap Kumpulan Latihan Kelana Siswa Malaysia
2. Skim Latihan Pengakap Kelana Udara

UZW110
STUDENTS VOLUNTARY CORRECTIONAL MALAYSIAN PRISON DEPARTMENT I
(KOR SISKOR I)

Course Synopsis

This course is a preliminary course in the series Prison Teachers Training courses. Through this course, students will be introduced to the prison organization, its history and its importance in the development of the State. At the initial stage, the students will be exposed to activities, training and education syllabus assignment of the role of the Prison Department of Malaysia, as well as providing the relevant disclosure as volunteer basis, the Prison Act 1995 as amended in 2008, REGULATIONS Prison In 2000, United Nations Standard Minimum Rules (UNSMR) and marching exercises.

References

1. Akta Penjara Malaysia. (1995; Pindaan 2008). Undang – undangMalaysia. Kuala Lumpur: Jabatan Penjara Malaysia.
2. Jabatan Penjara Malaysia. (1985). Buku bimbingan penjara. Kuala Lumpur. Unit Perancangan dan Penyelidikan
3. Laporan Tahunan Jabatan Penjara 2010
4. Laporan Tahunan Jabatan Penjara 2011
5. Laporan Tahunan Jabatan Penjara 2012
6. Jamaludin Badusah *et al*. (2009). Pembangunan Pelajar: Memperkasakan Kokurikulum Institut Pengajian Tinggi. Jabatan Pengajian Tinggi & Penerbit Universiti Putra Malaysia
7. Price, D. (1998). Security categorization in prisons. Institute Criminology: Cambridge University
8. United Nations (1957). Standard minimum rules of the treatment of prisoners. New York. United States.

UZW111
STUDENTS VOLUNTARY CORRECTIONAL MALAYSIAN PRISON DEPARTMENT II
(KOR SISKOR II)

Course Synopsis

Undergraduate students Correctional II (SISKOR II) is an extension of SISKOR II where he emphasized the safety of the placement, the placement of detention, the placement service and the placement of recovery (PPI) at the Prisons Department. This Course also emphasizes interpersonal skills and character building of students. Students will be exposed to skills training drills, snap and handling of firearms. In addition, students are given an overview of the compulsory attendance (FGM), involving the community program.

References

1. Akta Penjara Malaysia. (1995; Pindaan 2008). Undang – undangMalaysia. Kuala Lumpur: Jabatan Penjara Malaysia.
2. Jabatan Penjara Malaysia. (1985). Buku bimbingan penjara. Kuala Lumpur. Unit Perancangan dan Penyelidikan
3. Laporan Tahunan Jabatan Penjara 2010
4. Laporan Tahunan Jabatan Penjara 2011
5. Laporan Tahunan Jabatan Penjara 2012
6. Jamaludin Badusah *et al*. (2009). Pembangunan Pelajar: Memperkasakan Kokurikulum Institut Pengajian Tinggi. Jabatan Pengajian Tinggi & Penerbit Universiti Putra Malaysia
7. Price, D. (1998). Security categorization in prisons. Institute Criminology: Cambridge University
8. United Nations (1957). Standard minimum rules of the treatment of prisoners. New York. United States.

UZW210
STUDENTS VOLUNTARY CORRECTIONAL MALAYSIAN PRISON DEPARTMENT III
(KOR SISKOR III)

Course Synopsis

Undergraduate students Correctional III (SISKOR III) is an advanced course SISKOR III which emphasizes the understanding of the Prison Policy, Promoting Prisons Rehabilitation and Housing Intermediate (RP). School Students are also given skills training and marching outside.

References

1. Akta Penjara Malaysia. (1995; Pindaan 2008). Undang – undangMalaysia. Kuala Lumpur: Jabatan Penjara Malaysia.
2. Jabatan Penjara Malaysia. (1985). Buku bimbingan penjara. Kuala Lumpur. Unit Perancangan dan Penyelidikan
3. Laporan Tahunan Jabatan Penjara 2010
4. Laporan Tahunan Jabatan Penjara 2011

5. Laporan Tahunan Jabatan Penjara 2012
6. Jamaludin Badusah *et al*. (2009). Pembangunan Pelajar: Memperkasakan Kokurikulum Institut Pengajian Tinggi. Jabatan Pengajian Tinggi & Penerbit Universiti Putra Malaysia
7. Price, D. (1998). Security categorization in prisons. Institute Criminology: Cambridge University
8. United Nations (1957). Standard minimum rules of the treatment of prisoners. New York. United States..

UZW211
STUDENTS VOLUNTARY CORRECTIONAL MALAYSIAN PRISON DEPARTMENT IV
(KOR SISKOR IV)

Course Synopsis

Undergraduate students Correctional IV (SISKOR IV) is an advanced course SISKOR III which emphasizes the Teachers Training Program Occupational Safety and Parole and Community Services in Prison Institutions that become core bussines in correctional services. Students will be exposed to the knowledge base prison rehabilitation program, theoretical training and practical firearms, Rehabilitation Program, and Internal Security Unit. In addition, students are required to undertake university and community ties.

References

1. Akta Penjara Malaysia. (1995; Pindaan 2008). Undang – undangMalaysia. Kuala Lumpur: Jabatan Penjara Malaysia.
2. Jabatan Penjara Malaysia. (1985). Buku bimbingan penjara. Kuala Lumpur. Unit Perancangan dan Penyelidikan
3. Laporan Tahunan Jabatan Penjara 2010
4. Laporan Tahunan Jabatan Penjara 2011
5. Laporan Tahunan Jabatan Penjara 2012
6. Jamaludin Badusah *et al*. (2009). Pembangunan Pelajar: Memperkasakan Kokurikulum Institut Pengajian Tinggi. Jabatan Pengajian Tinggi & Penerbit Universiti Putra Malaysia
7. Price, D. (1998). Security categorization in prisons. Institute Criminology: Cambridge University
8. United Nations (1957). Standard minimum rules of the treatment of prisoners. New York. United States.

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