Universiti Malaysia Perlis

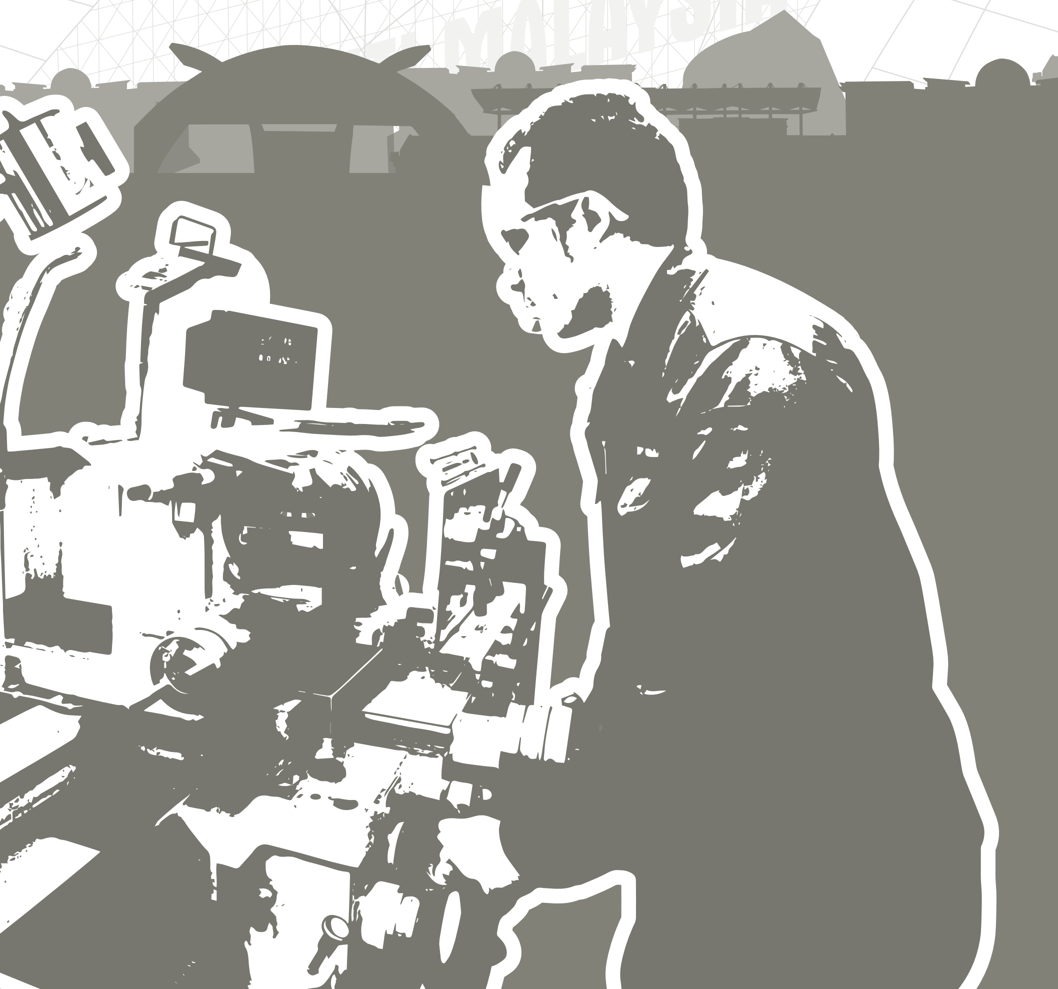
UniMAP

Ilmu • Keikhlasan • Kecemerlangan
Knowledge • Sincerity • Excellence

Program Teknologi Kejuruteraan & Perniagaan / Engineering Technology & Business Programmes

Sidang Akademik / Academic Session

2013/2014



Buku Panduan Akademik

Academic Guide Book

Program Sarjana Muda / Bachelor Degree Programmes

Buku Panduan Akademik Program Sarjana Muda

Academic Guide Book for Bachelor Degree Programmes

Program Teknologi Kejuruteraan & Perniagaan /
Engineering Technology & Business Programmes
Sidang Akademik 2013/2014 - *Academic Session 2013/2014*

Disediakan oleh / *Prepared by:*
Pejabat Timbalan Naib Canselor (Akademik & Antarabangsa)
Deputy Vice-Chancellor's Office (Academic & International)

Penasihat / *Advisors:*
YBhg. Brig. Jeneral Datuk Prof. Dr. Kamarudin Hussin
YBhg. Dato' Prof. Dr. Zul Azhar Zahid Jamal

Ketua Penulis & Penyelaras Projek / *Main Author & Project Coordinator:*
Prof. Ir. Dr. Rezuwan Kamaruddin
Dr. Hakimah Osman

Penulis Bersama / *Co-Authors*
Hajah Ruzalina Ibnu Ruslan
En. Muhammad Dhiyauddin Saharudin
Pn. Nor Innar Md Noor
En. Irma Azqrai Nin Sey Muhamad
Pn. Rahaida Abdul Rahim
Pn. Nurazrina Abd. Rahman
Dr. Shahrir Rizal Kasjoo
Dr. Nazuhusna Khalid
En. Wan Mokhzani Wan Nor Haimi
Dr. Rozmie Razif Othman
Pn. Noor Syazana Arshad
Dr. Mohd Nazri Mohd Warip
Dr. Mohd. Hafiz Fazalul Rahiman
Dr. Mohd. Afendi Rojan
Dr. Shuhaida Yahud
En. Muhammad Shakir Laili
En. Norjasmi Abdul Rahman
Cik Noor Ashikin Mohd Razali
En. Zailani Zainal Abidin
Dr. Mohammad Taufiq Mustaffa
Dr. Sharifah Shahnaz Syed Bakar
Dr. Dewi Suriani Che Halin
Dr. Firuz Zainuddin
En. Huzairy Hassan
Pn. Rashidah Ruslan
Dr. Sara Yasina Yusuf
Pn. Nur Liza Rahim
Dr. Zarina Zakaria
Pn. Rozaini Abdullah
En. Muhammad Hafiz Ab. Aziz
En. Ahmad Fariz Hasan
En. Emi Izhanizam Azmi
Pn. Norfazlin Rashid
En. Yazhar Yatim
En. Mohd Hafiezal Mohd Radzi
Pn. Noorina Hidayu Jamil
En. Ahmad Fairuz Mansor
Prof. Dr. Zakaria Wahab
En. Mohd. Zulham Affandi Mohd. Zahid
Dr. Zol Bahri Hj. Razali
Pn. Bibi Noraini Mohd Yusuf
Cik Syarifah Fairuz Syed Radzuan
YM Tengku Suriani Tengku Yaakub
En. Hassad Hassan
Pn. Adila Ismail
Pn. Siti Norayu Mohd Basir
Cik Liew Khe Li
En. Ahmad Hifzurrahman Ridzuan
En. Mahamad Akmal Saad
Dr. Mohammad Fadzli Ramli
En. Anas Abdul Rahman
En. Vithyacharan A/L Retnasamy
En. Raja Shah Erman Raja Ariffin
Pn. Zuraida Ismaail
Cik Norzaililah Zanoddin
Cik Farah Marzuliana Mat
Pn. Ku Nurmadihah Ku Yaacob
Tuan Syed Amir Fatir Syed Akhir
Pn. Rasidah Abdul Wahab
Pn. Wardah Hanim Md Nor
Cik Norren Shariza Mohamed Mokhtar
En. Zakaria Othman @ Ismail
Pn. Ruhaida Ismail
Pn. Noor Zeita Othman
Cik Afifah Azmi
Pn. Alma Azizah Abdul Rahim
Pn. Azilah Abidin
En. Kamarudin Mat Arsad
Pn. Isma Irini Shafie
Dr. Muammar Mohamad Isa
Dr. Shahrul Nizam Yaakob
Dr. Shafriza Nisha Bashah
Dr. Muzamir Isa
Dr. Muhamad Saifuldin Abdul Manan
Dr. Muhammad Asri Idris
Dr. Farizul Hafiz Kasim
Dr. Nasrul Hamidin
Dr. Abdul Hafiizh Ismail
En. Shuhaimi Zakaria @ Abdullah
Dr. Azwan Iskandar Azmi
En. Mohammad Shariff Ismail
Dr. Hanif Suhairi Abu Bakar
En. Shafiq Hizwari Md. Hashim
En. Shahrulnizam Mohd Mukhtar
En. Wan Zuki Azman Wan Muhamad
En. Muhammad Izmer Yusof
En. Mohd. Syafarudy Abu

Setiausaha / *Secretaries:*
Pn. Nur Shafissa Shabudin
En. Syarizal Ishar

Sekalung Penghargaan/*Acknowledgements:*
YBhg. Brig. Jen. Datuk Prof. Dr. Kamarudin Hussin,
YBhg. Dato' Prof. Dr. Zul Azhar Zahid Jamal,
Prof. Madya Dr. Mohd Fo'ad Sakdan,
En. Zuber Hj. Mohamad,
Pn. Mazmin Mat Akhir dan
Pn. Saodah Hassan.

dan / *and*

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

serta / and

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

Isi Kandungan / *Contents*

Muka Surat / *Page*

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

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

Pengenalan / *Introduction*

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

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

Senarai Pusat Pengajian / *List of Schools*

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

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

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

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

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

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

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

Misi / *Mission*

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

Visi / *Vision*

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

Lagu UniMAP / *UniMAP Anthem*

WAWASANKU

Universiti Malaysia Perlis
Alam Kejuruteraan
Ilmu Keikhlasan Kecemerlangan
Wawasan Jiwa Kita

Berdikari rohaniah
Berteknologi
Pemimpin Berbestari

Untuk Bangsa Insan Dan Umat dunia
Negara Yang Tercinta

Universiti Malaysia Perlis
Alam Kejuruteraan
Ilmu Keikhlasan Kecemerlangan
Wawasan Jiwa Kita

CANSELOR UniMAP / *CHANCELLOR OF UniMAP*

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

PRO CANSELOR / PRO CHANCELLOR OF UniMAP

D.Y.T.M Tuanku Hajah Lailatul Shahreen Akashah Khalil
S.P.M.P., Honoris Causa in Health Sciences, (University Nacional Pedro Henriquez Unrena, DR)
Raja Puan Muda Perlis / *Crown Princess Of Perlis*

Kata Aluan Naib Canselor

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

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

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

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

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

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

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

Wassalam.

Vice Chancellor's Message

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

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

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

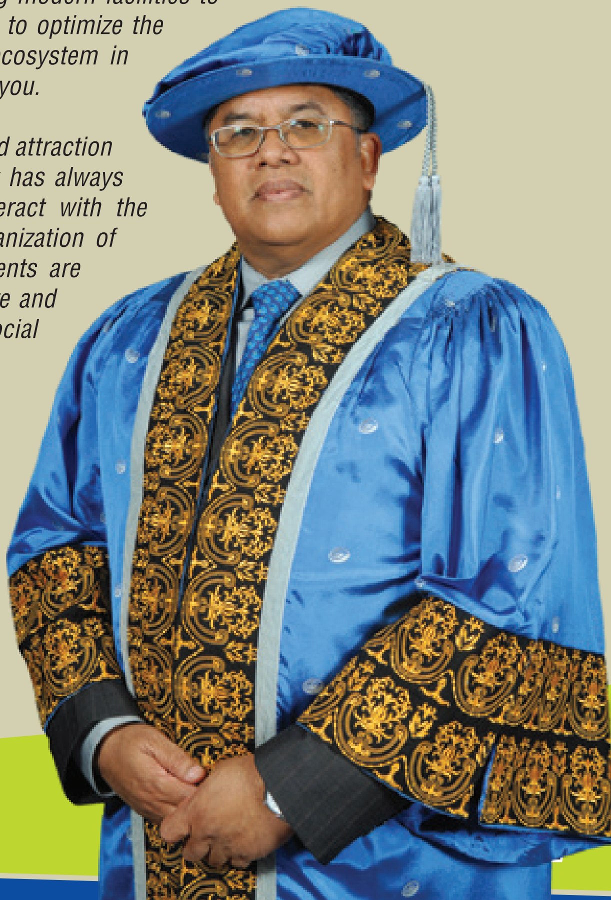
UniMAP also constantly strives to provide the best infrastructure including modern facilities to enhance learning effectiveness. I sincerely hope that all students are able to optimize the use of facilities provided by the University. I believe that a conducive ecosystem in UniMAP will contribute to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

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

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

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

Wassalam.



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

Pegawai Utama UniMAP
UniMAP Principal Officers

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

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

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

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

En. Zuber Haji Mohamad
Pemangku Pendaftar /
Acting Registrar

Pn. Saodah Hassan
Bendahari / *Bursar*

Pn. Mazmin Mat Akhir
Pustakawan Kanan /
Chief Librarian

Kalendar Akademik Semester I Sidang 2013/2014

Program Ijazah Sarjana Muda

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

Kalendar Akademik Semester II Sidang 2013/2014
Program Ijazah Sarjana Muda

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

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

Kalendar Akademik Semester II Sidang 2013/2014

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

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

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

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

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

dan

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

dan

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

Syarat Khas Program:

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

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

dan

(ii) Mathematics

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

dan

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

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

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

Syarat Khas Program:

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

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

dan

(ii) Mathematics

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

dan

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

Syarat Khas Program:

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

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

dan

(ii) Mathematics

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

dan

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

<table>
<tr><th>BIL</th><th>(i) Program Pengajian
(ii) Kod
(iii) Tempoh Pengajian</th><th>Kelayakan Minimum Matrikulasi/Asasi</th></tr>
<tr><td>22.</td><td>Ijazah Sarjana Muda Perniagaan (Kepujian) Keusahawanan Kejuruteraan
RP52 (6 Semester)</td><td>Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

Lulus Sijil Matrikulasi KPM/Asasi Sains UM/Asasi UiTM/setaraf (dalam aliran sains, aliran teknikal atau aliran perakaunan) dengan mendapat:

Sekurang-kurangnya Gred C (2.00) dalam mana-mana satu (1) daripada mata pelajaran berikut:

Aliran Sains / Aliran Teknikal:

Mathematics / Physics / Engineering Physics / Chemistry / Engineering Chemistry / Biology / Computer Science / Pengajian Kejuruteraan Awam / Pengajian Kejuruteraan Elektrik & Elektronik / Pengajian Kejuruteraan Mekanikal/Computing

Atau

Aliran Perakaunan:

Mathematics / Ekonomi / Pengurusan Perniagaan / Akaun

Dan

Mendapat sekurang-kurangnya kepujian (Gred C) di peringkat Sijil Pelajaran Malaysia (SPM)/setaraf di dalam mata pelajaran berikut:

i) Bahasa Inggeris

dan

ii) Salah satu (1) daripada mata pelajaran berikut:

Mathematics / Additional Mathematics / Physics / Chemistry / Biology / Lukisan Kejuruteraan / Teknologi Kejuruteraan / Pengajian Kejuruteraan Awam / Pengajian Kejuruteraan Mekanikal / Pengajian Kejuruteraan Elektrik & Elektronik / Prinsip Perakaunan / Ekonomi Asas / Perdagangan / Pengajian Keusahawanan / Perakaunan Perniagaan

Dan

Calon tidak cacat anggota.</td></tr>
</table>

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

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

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

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

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

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum STPM
1.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mikroelektronik **RK05** (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 T** Calon yang menggunakan kelayakan mata pelajaran Chemistry pada peringkat STPM perlu mendapat sekurang-kurangnya **kepujian (Gred C)** pada peringkat SPM dalam mata pelajaran **Physics.** **dan** Calon tidak buta warna dan tidak cacat anggota sehingga menyukarkan kerja amali.
2.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mekanikal **RK08** (8 Semester)	
3.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Pembuatan **RK13** (8 Semester)	
4.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Komputer **RK20** (8 Semester)	
5.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Sistem Elektrik **RK23** (8 Semester)	
6.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Mekatronik **RK24** (8 Semester)	
7.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Elektronik Industri **RK45** (8 Semester)	
8.	Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Perhubungan **RK53** (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>9.</td><td>Ijazah Sarjana Muda Kejuruteraan (Kepujian) Kejuruteraan Metalurgi
RK56 (8 Semester)</td><td rowspan="7">Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

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

(i) Physics / Chemistry;

dan

(ii) Mathematics T / Further Mathematics T

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

dan

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

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

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

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

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

Syarat Khas Program:

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

(i) Physics/ Chemistry / Biology;

dan

(ii) Mathematics T / Further Mathematics T

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

dan

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

Syarat Kemasukan Bagi
Program Pengajian Ijazah Sidang Akademik 2013/2014

Calon Lepasan Diploma/Setaraf

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

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

Syarat Khas Program:

<u>Kelayakan Diploma</u>

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

Mendapat sekurang-kurangnya PNGK 2.50 di peringkat Diploma.

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

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

Kelulusan pada peringkat Sijil TIDAK akan dipertimbangkan.

atau

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

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

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

Syarat Khas Program:

<u>Kelayakan Diploma</u>

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

Mendapat sekurang-kurangnya PNGK 2.50 di peringkat Diploma.

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

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

Kelulusan pada peringkat Sijil TIDAK akan dipertimbangkan.

atau

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

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

BIL	(i) Program Pengajian (ii) Kod (iii) Tempoh Pengajian	Kelayakan Minimum Diploma/Setaraf
23.	Ijazah Sarjana Muda Perniagaan (Kepujian) Perniagaan Antarabangsa **RE09** (6 Semester)	**Memenuhi Syarat Am Universiti** **serta** **Syarat Khas Program** **Syarat Khas Program:** **Kelayakan Diploma** 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** **Kelayakan STPM/Matrikulasi/Asasi (Tahun 2011 atau sebelumnya)** *Mengikut syarat kemasukan* kelayakan STPM/Matrikulasi/ Asasi tahun semasa.
24.	Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Bioteknologi Industri) **RY21** (8 Semester)	
25.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Kuasa Industri) **RY31** (8 Semester)	
26.	Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Rangkaian Elektronik) **RY43** (8 Semester)	
27.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemesinan) **RY55** (8 Semester)	
28.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Sistem Pertanian) **RY56** (8 Semester)	
29.	Ijazah Sarjana Muda Teknologi Kejuruteraan Awam (Kepujian) (Pembinaan) **RY11** (8 Semester)	
30.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pembangunan Produk) **RY57** (8 Semester)	
31.	Ijazah Sarjana Muda Teknologi Kejuruteraan Mekanikal (Kepujian) (Pemprosesan Bahan) **RY58** (8 Semester)	

<table>
<tr><th>BIL</th><th>(i) Program Pengajian
(ii) Kod
(iii) Tempoh Pengajian</th><th>Kelayakan Minimum Diploma/Setaraf</th></tr>
<tr><td>32.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Elektrik (Kepujian) (Teknologi Robotik dan Automasi)
RY32 (8 Semester)</td><td rowspan="5">Memenuhi Syarat Am Universiti
serta
Syarat Khas Program

Syarat Khas Program:

<u>Kelayakan Diploma</u>

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

Mendapat sekurang-kurangnya PNGK 2.50 di peringkat Diploma.

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

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

Kelulusan pada peringkat Sijil TIDAK akan dipertimbangkan.

atau

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

Mengikut syarat kemasukan kelayakan STPM/Matrikulasi/ Asasi tahun semasa.</td></tr>
<tr><td>33.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Sistem Elektronik)
RY40 (8 Semester)</td></tr>
<tr><td>34.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Elektronik Bersepadu)
RY44 (8 Semester)</td></tr>
<tr><td>35.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Elektronik (Kepujian) (Rekabentuk Telekomunikasi Elektronik)
RY41 (8 Semester)</td></tr>
<tr><td>36.</td><td>Ijazah Sarjana Muda Teknologi Kejuruteraan Kimia (Kepujian) (Proses Kimia Industri)
RY20 (8 Semester)</td></tr>
</table>

Sistem Akademik

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

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

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

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

Struktur Program

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

Jadual 1(a): Struktur Program Sarjana Muda Kejuruteraan

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

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

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

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

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

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

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

Jenis-Jenis Kursus

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Sistem Unit

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

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

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

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

Pendekatan Pengajaran dan Pembelajaran di UniMAP

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

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

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

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

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

1. **Pembelajaran di dalam makmal -** sepasukan pelajar yang terdiri dari 2-3 orang, menjalankan satu eksperimen. Di dalam beberapa program makmal asas, setiap pelajar menjalankan eksperimen secara individu (1:1) dan bukannya dalam pasukan.

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

3. **E-pembelajaran –** pendekatan pembelajaran yang diperkukuhkan dengan ICT, yang melengkapkan pendekatan pembelajaran konvensional. Pelajar mempelajari kursus atau topik-topik tertentu menggunakan modul yang boleh diakses dari laman web UniMAP. Modul mengandungi nota kuliah dalam bentuk multimedia, yang merangkumi audio, video, grafik, animasi, simulasi, permainan, dan pelbagai lagi aktiviti berbentuk interaksi.

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

Latihan Industri (InTra)

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

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

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

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

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

Tujuan utama Latihan Industri ialah:-

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

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

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

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

Program Inkubator Perniagaan

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

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

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

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

Program International Business Field Trips

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

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

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

Kod Kursus

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

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

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

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

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

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

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

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

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

Kod bagi sesebuah kursus diringkaskan dalam Jadual 4 di bawah:

Jadual 4: Kod Kursus

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

Pendaftaran Kursus

Semua pelajar yang aktif adalah diwajibkan mendaftar kursus untuk setiap semester. Pendaftaran kursus ini dilakukan secara dalam talian (online) oleh semua pelajar. Pendaftaran kursus mesti dibuat mengikut tarikh yang telah ditetapkan seperti hebahan yang dikeluarkan oleh Unit Kemasukan dan Rekod Pelajar melalui emel dan portal.

Pelajar adalah diwajibkan untuk bertemu dan berbincang dengan Rakan Pendamping Siswa (RPS) berkaitan kursus – kursus yang perlu didaftar. Pelajar perlu membawa bersama slip pendaftaran kursus untuk disahkan oleh RPS dalam sistem pada sesi tersebut. Kursus – kursus yang didaftarkan tanpa mendapat pengesahan dari RPS adalah dianggap tidak sah. Sekiranya berlaku perubahan pada pendaftaran kursus sama ada pelajar menambah, menggugur atau tarik diri kursus dalam tempoh yang ditetapkan, pelajar perlu mendapatkan pengesahan semula daripada RPS.

Pelajar yang gagal mendaftar kursus dalam tempoh masa yang ditetapkan adalah tertakluk kepada penalti berjumlah RM50. Pendaftaran lewat tidak boleh melebihi minggu ketiga [3] semester. Pelajar perlu mengisi Borang HEA-09 [Borang Permohonan Kursus Lewat] dan mesti mempunyai kelulusan daripada Dekan.

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

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

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

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

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

Pendaftaran Kursus

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

Jadual 5: Ringkasan Pendaftaran Kursus Pelajar Berstatus Aktif

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

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

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

Jadual 6: Ringkasan Pendaftaran Kursus Pelajar Percubaan

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

Penambahan / Pengguguran / Tarik Diri Kursus

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

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

3. Tarik Diri Kursus (TD)

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

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

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

Kursus Pra-Syarat Syarat

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

Pertukaran Program Pengajian

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

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

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

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

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

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

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

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

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

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

Penangguhan Pengajian

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

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

Pelajar yang memohon untuk menangguhkan pengajian perlu mengisi Borang Penangguhan Pengajian (HEA/HEP-13) yang boleh didapati di Jabatan Pendaftar atau di Pusat Pengajian. Permohonan perlu mendapat perakuan dan kelulusan yang berikut:

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

Borang pemohonan penangguhan pengajian pelajar perlu dikemukakan sebelum minggu ketujuh (7) pengajian. Pemohonan selepas minggu ketujuh hanya dibenarkan atas sebab kesihatan atau kes-kes tertentu yang mendapat kelulusan Naib Canselor/Timbalan Naib Canselor (Akademik & Antarabangsa).
Pelajar tidak dibenarkan menangguhkan pengajian melebihi dua (2) semester berturut-turut kecuali dengan kelulusan Naib Canselor/Timbalan Naib Canselor (Akademik & Antarabangsa). Bagi kes selain sebab kesihatan, pelajar hanya dibenarkan pulang/keluar daripada universiti setelah permohonan penangguhan pengajian mendapat kelulusan universiti. Sekiranya pelajar telah pulang sebelum kelulusan diperoleh, ia adalah di bawah tanggungjawab pelajar sendiri.

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

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

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

Pentarafan Pelajar

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

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

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

Tempoh Minimum / Maksimum Pengajian Pelajar

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

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

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

Kursus Kuratif

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

Pengecualian Kredit

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

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

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

Sistem Peperiksaan Dan Penilaian

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

Jadual 7: Tempoh peperiksaan

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

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

Jadual 8: Gred abjad dan mata penilaian

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

Jadual 9: Pengiraan GPA dan CGPA:

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

Rayuan Penyemakan Semula Keputusan Peperiksaan

Atas sebab-sebab tertentu, pelajar mungkin ingin memohon untuk penyemakan dijalankan ke atas keputusan peperiksaan akhir semester pelajar. Pelajar hanya dibenarkan memohon menyemak semula keputusan peperiksaan akhir semester selama 15 hari selepas keputusan rasmi peperiksaan dikeluarkan oleh Jabatan Pendaftar. Permohonan selepas tempoh ini tidak akan dipertimbangkan.

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

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

Penggunaan Bahasa

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

Sistem Rakan Pendamping Siswa (RPS)

Sistem Penasihatan Akademik menjadi penghubung antara pelajar dengan pensyarah untuk berbincang dan membuat keputusan berkenaan rancangan pengajian pelajar. Walaupun pelajar mendaftar sendiri secara dalam talian (on-line), pelajar diminta berjumpa dengan Rakan Pendamping Siswa (RPS) untuk mendapatkan nasihat semasa tempoh pendaftaran.

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

Pusat-Pusat Pemantapan Akademik

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

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

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

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

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

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

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

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

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

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

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

Bahagian Pengurusan Akademik Jabatan Pendaftar

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

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

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

2. Unit Peperiksaan dan Pengijazahan

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

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

3. Unit Senat

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

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

Alamat:

Bahagian Pengurusan Akademik
Jabatan Pendaftar
Universiti Malaysia Perlis
Tingkat 3, Bangunan KWSP
Jalan Bukit Lagi
01000 Kangar
PERLIS.

Senarai Staf Bahagian Pengurusan Akademik Jabatan Pendaftar:

Cik Ruzalina Ibnu Ruslan
Ketua Penolong Pendaftar
Tel : 04-9798702
Faks : 04-9798703
e-mel : ruzalina@unimap.edu.my

Unit Kemasukan & Rekod Pelajar:

Puan Nor Innar Md Nor
Penolong Pendaftar
Tel : 04-9798701
Faks : 04-9798703
e-mel : norinnar@unimap.edu.my

Encik Muhammad Dhiyauddin Saharudin
Penolong Pendaftar
Tel : 04-9797845
Faks : 04-9798703
e-mel : dhiyauddin@unimap.edu.my

Encik Irma Azqrai Nin Sey Muhamad
Penolong Pendaftar
Tel : 04-9797878
Faks : 04-9798703
e-mel : azqrai@unimap.edu.my

Puan Rosniza Abdul Hamid
Pembantu Tadbir (P/O)
Tel : 04-9798706
Faks : 04-9798703
e-mel : rosniza@unimap.edu.my

Cik Tengku Amanina Tengku Aziz
Pembantu Tadbir (P/O)
Tel : 04-9798706
Faks : 04-9798703
e-mel : amanina@unimap.edu.my

Cik Azniyanty Abdullah
Pembantu Tadbir (P/O)
Tel : 04-9797941
Faks : 04-9798703
e-mel : azniyanty@unimap.edu.my

Encik Faizan Abdul
Pembantu Tadbir (P/O)
Tel : 04-9797941
Faks : 04-9798703
e-mel : faizan@unimap.edu.my

Encik Amirrul Amar Mazri
Pembantu Tadbir (P/O)
Tel : 04-9797940
Faks : 04-9798703
e-mel : amirrulamar@unimap.edu.my

Encik Ra'qil Afzal Raus
Pembantu Am Pejabat
Tel : 04-9798706
Faks : 04-9798703
e-mel : afzal@unimap.edu.my

Unit Peperiksaan dan Pengijazahan:

Puan Rahaida Ab. Rahim
Penolong Pendaftar
Tel : 04-9798705
Faks : 04-9798703
e-mel : rahaida@unimap.edu.my

Puan Salfarina Omar
Penolong Pendaftar
Tel : 04-9798700
Faks : 04-9798703
e-mel : salfarina@unimap.edu.my

Encik Mohamad Hairi Shaari
Penolong Pendaftar
Tel : 04-9792984
Faks : 04-9798703
e-mel : hairishaari@unimap.edu.my

Encik Hamizal Hamid
Pembantu Tadbir (P/O)
Tel : 04-9798708
Faks : 04-9798703
e-mel : hamizal@unimap.edu.my

Puan Tengku Amalina Tengku Aziz
Pembantu Tadbir (P/O)
Tel : 04-9798708
Faks : 04-9798703
e-mel : amalina@unimap.edu.my

Puan Norazwati Abdullah
Pembantu Tadbir (P/O)
Tel : 04-9798708
Faks : 04-9798703
e-mel : norazwati@unimap.edu.my

Puan Maisarah Ab. Karim
Pembantu Tadbir (P/O)
Tel : 04-9798707
Faks : 04-9798703
e-mel : maisarah@unimap.edu.my

Encik Mohd Hafizi Che Yusof
Pembantu Tadbir (P/O)
Tel : 04-9798707
Faks : 04-9798703
e-mel : hafiziyusof@unimap.edu.my

Encik Muhammad Faisal Norshidi
Pembantu Am Pejabat
Tel :04-9798708
Faks :04-9798703
e-mel : muhdfaisal@unimap.edu.my

Senarai Staf Unit Senat:

Puan Nurazrina Abd. Rahman
Penolong Pendaftar
Tel : 04-9798562
Faks : 04-9798703
e-mel : nurazrina@unimap.edu.my

Puan Tihazariah Husin
Pembantu Tadbir (P/O)
Tel : 04-9798561
Faks : 04-9798703
e-mel : tihazariah@unimap.edu.my

Academic Calendar Semester I Session 2013/2014

Bachelor Degree Programme

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

Academic Calendar Semester II Session 2013/2014

Bachelor Degree Programme

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

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

Academic Calendar Semester II Session 2013/2014

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

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

BAHASA INGGERIS (ENGLISH)

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

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

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

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

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

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

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

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

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

• Pass and obtain at least 60% in Secondary School Leaving Certificate (SSLC) or Technical Secondary School Certificate.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

• Pass Higher School Certificate / General Certificate of Education A-level examination and pass at least three (3) subjects (Advanced Level).

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

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

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

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

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

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

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

• Pass and obtain at least 60% in Al-Tawjihi @ General Secondary Education Certificate / Vocational Certificate.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

• Pass and obtain at least 60% in Higher Secondary School Certificate (HSSC).

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

Country	General Requirements	Specific Requirements		
Libya	• Completed 12 years of education in 2 levels of schools (Basic School and Secondary School) • Pass and obtain at least 60% in Secondary Education Certificate. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	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 schools (Primary School, General Secondary School and Preparatory Secondary School/ Technical/Vocational School) • Pass and obtain at least Grade C for 5 subjects in Ethiopian Higher Education Entrance Examination (EHEEE) or Technical/Vocational School Certificate. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	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 schools (Primary School, Secondary School and Pre-University) • Pass Secondary/High School Diploma and Pre-University Certificate (KONKUR) with minimum score of 13 in KONKUR. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)** • English • Mathematics • Physics / Chemistry	 60% 60% 60%
			(Bio-Based) • English • Mathematics • Physics / Chemistry / Biology	 60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%
Palestine	• Completed 12 years of education in 2 levels of schools (Basic School and Secondary School/ Technical Secondary School) • Pass and obtain at least 60% in Secondary School Certificate (Al-Tawjihi). • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)** • English • Mathematics • Physics / Chemistry	 60% 60% 60%
			(Bio-Based) • English • Mathematics • Physics / Chemistry / Biology	 60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%

Country	General Requirements	Specific Requirements		
Chad	• Completed 13 years of education in 2 levels of schools (Primary School and Secondary School) • Pass and obtain at least 60% in Baccalaureat. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	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%
Algeria	• Completed 13 years of education in 2 levels of schools (Primary School and Secondary School) • Pass Diploma of Secondary Education (Baccalaureat) with minimum score of 15. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%

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

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

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

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

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

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

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

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

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

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

<table>
<tr><th>Country</th><th>General Requirements</th><th colspan="3">Specific Requirements</th></tr>
<tr><td rowspan="5">Cameroon</td><td rowspan="5">• Completed 14 years of education in 2 levels of schools (Primary School, Secondary School and High School)

• Pass GCE A-Level with average score of 60%/ equivalent, and obtain at least C in relevant subjects.

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

60%</td></tr>
<tr><td rowspan="5">Egypt</td><td rowspan="5">• Completed 11 or 13 years of education in 3 levels of schools (Primary School, Preparatory School and General Secondary School/Technical Secondary School)

• Pass and obtain at least 60% in Secondary Education Certificate (Thanaweya Amma).

• Obtain TOEFL 525 / IELTS 5.5 / Equivalent

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

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

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

Country	General Requirements	Specific Requirements		
Cambodia	• Completed 12 years of education in 3 levels of schools (Primary School, Lower Secondary School and Upper Secondary School) • Pass Diploma of Upper Secondary with minimum score of C/60%/equivalent. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	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%
Vietnam	• Completed 12 years of education in 3 levels of schools (Primary School, Lower Secondary School and Upper Secondary School) • Pass University Entrance Examination and obtain minimum average score of 6.0/60%/equivalent. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	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		
Turkey	• Completed 12 years of education in 2 levels of schools (Basic School and High School) • Pass Lise Diplomasi and obtain minimum average score of 3.00/60%/equivalent. • Obtain TOEFL 525 / IELTS 5.5 / Equivalent *(Candidates who do not possess equivalent qualification as TOEFL 525 / IELTS 5.5 are required to undergo Intensive English Course for six (6) months in UniMAP).* • Other requirements that have been endorsed by University Senate.	Bachelor of Engineering	**(Electronic-Based)**	
			• English • Mathematics • Physics / Chemistry	60% 60% 60%
			(Bio-Based)	
			• English • Mathematics • Physics / Chemistry / Biology	60% 60% 60%
		Bachelor of Business	• English • Mathematics • Physics / Chemistry / Biology or Business / Economics / Commerce / Accounting	60% 60% 60% 60%

Academic Systems

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

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

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

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

Programme Structure

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

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

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

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

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

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

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

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

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

Types of Courses

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The Unit System

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

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

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

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

Teaching and Learning Approaches at UniMAP

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

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

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

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

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

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

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

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

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

Bachelor Of Engineering

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

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

Industrial Training

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

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

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

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

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

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

The main objectives of the Industrial Training are to:

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

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

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

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

Business Incubator Programme

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

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

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

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

International Business Field Trips

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

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

University Core Courses

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

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

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

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

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

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

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

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

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

Course Code

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

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

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

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

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

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

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

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

Table 4: Course Code

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

Course Registration

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

Students are required to discuss with their Rakan Pendamping Siswa (RPS) regarding courses that they will have to register for each semester. Students must bring the registration their slip for verification by the RPS in the system during the discussion session. Registration of courses without the RPS is considered invalid. If there are any changes in student course registration, i.e, add, drop or withdraw courses within the prescribed period, the student must also obtain verification from the RPS.

Students who fail to register within the prescribed period shall be subject to a penalty of RM50. Late registration must not exceed the third week of the semester. Students must complete HEA-09 [Late Course Application Form] and obtain the approval of the Dean.

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

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

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

Students who have been terminated and wish to place an appeal to resume their studies may do so by submitting an appeal letter to the Vice-Chancellor through the Dean (Dean verification required). Each approved re-admission will be imposed a penalty of RM100.

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

Table 5: Summary of Units

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

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

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

Table 6: Number of Units Allowed

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

Add Courses / Drop Courses / Course Withdrawal

1. Adding Courses

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

2. Dropping Courses

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

3. Course Withdrawal (TD)

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

Course Prerequisite

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

Change of Programme

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

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

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

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

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

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

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

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

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

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

Postponement of Study

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

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

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

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

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

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

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

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

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

Student Study Level

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

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

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

Minimum and Maximum Period of Study

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

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

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

Curative Courses

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

Credit Exemptions

Credit Exemption is defined as an exemption from the registration and study of a course prescribed for a program, based on the courses taken by the student before being accepted into the university program as approved by the

BAHASA INGGERIS (ENGLISH)

Dean of the School / Dean of Academic Management. Grade and Points Value for the courses given credit exemptions will not be taken into account in the calculation of Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA).

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

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

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

Examination and Evaluation System

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

Figure 6: Examination Duration

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

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

Figure 7: Letter grades and points

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

Figure 8: Calculation of GPA and CGPA:

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

Appeal to Revise Examination Results

In certain cases, a student might wish to apply for a revision of their examination results. Students are only allowed to appeal for a revision within a duration of fifteen (15) days after the examination results are officially released by the Registrar. Applications after this duration will not be considered.

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

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

Languages

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

Buddy System (Rakan Pendamping Siswa)

Buddy System (Rakan Pendamping Siswa) or RPS is a system which connects students and lecturers, to allow them to discuss and decide on students' study plan. Even though the registration is done online, students are advised to meet with their Buddy or Academic Advisor during the registration exercise.

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

Academic Support Centres

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

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

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

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

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

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

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

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

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

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

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

Academic Management Division, Registrar's Department

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

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

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

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

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

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

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

3. The Senate Unit

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

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

Address:

Academic Management Division,
Registrar's Department
Universiti Malaysia Perlis
3rd Floor, KWSP Building
Jalan Bukit Lagi
01000 Kangar
PERLIS.

Academic Management Division:

Miss Ruzalina Ibnu Ruslan
Principal Assistant Registrar
Tel : 04-9798702
Fax : 04-9798703
e-mail : ruzalina@unimap.edu.my

Admissions and Student Records Unit:

Mrs. Nor Innar Md Nor
Assistant Registrar
Tel : 04-9798701
Fax : 04-9798703
e-mail : norinnar@unimap.edu.my

Mr. Muhammad Dhiyauddin Saharudin
Assistant Registrar
Tel : 04-9797845
Fax : 04-9798703
e-mail : dhiyauddin@unimap.edu.my

Mr. Irma Azqrai Nin Sey Muhamad
Assistant Registrar
Tel : 04-9797878
Fax : 04-9798703
e-mail : azqrai@unimap.edu.my

Mrs. Rosniza Abdul Hamid
Administrative Assistant (Clerical/Operational)
Tel : 04-9798706
Fax : 04-9798703
e-mail : rosniza@unimap.edu.my

Miss Tengku Amanina Tengku Aziz
Administrative Assistant (Clerical/Operational)
Tel : 04-9798706
Fax : 04-9798703
e-mail : amanina@unimap.edu.my

Miss Azniyanty Abdullah
Administrative Assistant (Clerical/Operational)
Tel : 04-9797941
Fax : 04-9798703
e-mail : azniyanty@unimap.edu.my

Mr. Faizan Abdul
Administrative Assistant (Clerical/Operational)
Tel : 04-9797941
Fax : 04-9798703
e-mail : faizan@unimap.edu.my

Mr. Amirrul Amar Mazri
Administrative Assistant (Clerical/Operational)
Tel : 04-9797940
Fax : 04-9798703
e-mail : amirrulamar@unimap.edu.my

Mr. Ra'qil Afzal Raus
Office Assistant
Tel : 04-9798706
Fax : 04-9798703
e-mail : afzal@unimap.edu.my

Examinations and Graduation Unit:

Mrs. Rahaida Ab. Rahim
Assistant Registrar
Tel : 04-9798705
Fax : 04-9798703
e-mail : rahaida@unimap.edu.my

Mrs. Salfarina Omar
Assistant Registrar
Tel : 04-9798700
Fax : 04-9798703
e-mail : salfarina@unimap.edu.my

Mr. Mohamad Hairi Shaari
Assistant Registrar
Tel : 04-9792984
Faks : 04-9798703
e-mail : hairishaari@unimap.edu.my

Mr. Hamizal Hamid
Administrative Assistant (Clerical/Operational)
Tel : 04-9798708
Fax : 04-9798703
e-mail : hamizal@unimap.edu.my

Mrs. Tengku Amalina Tengku Aziz
Administrative Assistant (Clerical/Operational)
Tel : 04-9798708
Fax : 04-9798703
e-mail : amalina@unimap.edu.my

Mrs. Norazwati Abdullah
Administrative Assistant (Clerical/Operational)
Tel : 04-9798708
Fax : 04-9798703
e-mail : norazwati@unimap.edu.my

Mrs. Maisarah Ab. Karim
Administrative Assistant (Clerical/Operational)
Tel : 04-9798707
Fax : 04-9798703
e-mail : maisarah@unimap.edu.my

Mr. Mohd Hafizi Che Yusof
Administrative Assistant (Clerical/Operational)
Tel : 04-9798707
Fax : 04-9798703
e-mail : hafiziyusof@unimap.edu.my

Mr. Muhammad Faisal Norshidi
Office Assistant
Tel : 04-9798708
Fax : 04-9798703
e-mail : muhdfaisal@unimap.edu.my

The Senate Unit:

Mrs. Nurazrina Abd. Rahman
Assistant Registrar
Tel : 04-9798562
Fax : 04-9798703
e-mail : nurazrina@unimap.edu.my

Mrs. Tihazariah Husin
Administrative Assistant (Clerical/Operational)
Tel : 04-9798561
Fax : 04-9798703
e-mail : tihazariah@unimap.edu.my


KELUAR

Faculty of Engineering Technology

Address

FACULTY OF ENGINEERING TECHNOLOGY
Universiti Malaysia Perlis (UniMAP)
Engineering Centre
1st Floor, Administration Building
Pauh Putra Main Campus
02600 Arau, Perlis.
Tel : +604-988 5455
Fax : +604-988 5456

FACULTY OF ENGINEERING TECHNOLOGY
Universiti Malaysia Perlis
Uniciti Campus Sg. Chucuh
Padang Besar, Perlis.

Introduction of Faculty of Engineering Technology

The Faculty of Engineering Technology (Eng-Tech)
Faculty of Engineering Technology (Eng-Tech), UniMAP will be established at Universiti Malaysia Perlis in 2013's. Its establishment is in with the objectives of the Technical University in Malaysia under the Malaysian Technical University Network, (MTUN), which is to educate and train high talent 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 when first introduced one (1) of the first engineering technology programme namely, Bachelor of Chemical Engineering Technology (Hons) (Biotechnology Industry) under the auspices of the School of Bioprocess Engineering. After that in 2012 UniMAP has added four (4) more new engineering technology programme under several other engineering colleges such as :-

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

Starting in 2013, in addition to continuing the five (5) existing engineering technology programs, the Faculty of Engineering Technology to be set up will also begin offering eight (8) another new program :-

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

Engineering Technology at UniMAP this is one area where a bridge between existing engineering much focus on the theory and design of engineering applications. Engineering technology is a field that uses knowledge about applied mathematics and science by learning theory and practical experience in the application of engineering principles through advanced technology practices for public benefit. All engineering technology program at UniMAP will use teaching and learning practical oriented. Emphasis is practical and laboratory activities will be given more focus without compromising adequate theory of content.

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

- Engineering Technology 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 theory
- 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.

The Departments of Faculty of Engineering Technology

1. 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.

1.1 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 adequate 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.

1.2 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

2. Department Of Electronic Engineering Technology

Department of Electronic Engineering Technology is offering four (4) programmes 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).

2.1 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 Opportunities

There is a high demand for highly skilled electronic engineering technologist in private and government sector especially in microelectronic fabrication and failure analysis. 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

2.2 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) design. 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 private and government sector especially in IC design, 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

2.3 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 positions 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

2.4 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 Design
- Data Systems Specialist

3. 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).

3.1 Bachelor of Engineering Technology (Hons) (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

3.2 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 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 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)

4. 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 adapt 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, 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 Technology degree programmes namely :-

4.1 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 enhance their communication and thinking skills, as well as ethical elements of professionalism in their careers.

4.2 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 agro-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 activity attaching the students to relevant industries mainly to enchance their capability and skill in accordance to the market needs.

4.3 Mechanical Engineering Technology (Product Development) – RY57

The objective of this programme is to produce highly skilled graduates 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 applying, preparing, maintaining and development products in all aspects to modern mechanical engineering technology.

4.4 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.

5. 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.

5.1 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 infrastructure. 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.

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 operations, 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

Address:

FACULTY OF ENGINEERING TECHNOLOGY,
Universiti Malaysia Perlis (UniMAP)
Engineering Centre
1st Floor, Administration Building
Pauh Putra Main Campus
02600 Arau, Perlis.
Tel : +604-988 5455
Fax : +604-988 5456

FACULTY OF ENGINEERING TECHNOLOGY
Universiti Malaysia Perlis
Uniciti Campus Sg. Chucuh
Padang Besar, Perlis.
Tel :
Fax :

Dean
Associate Professor
Che Mohd Ruzaidi Bin Ghazali
e-mail: ruzaidi@unimap.edu.my

Deputy Dean
(Academic and Research)
Mr. Muhd Shahrul Bin Mukhtar
e-mail: shahrulnizam@unimap.edu.my

Deputy Dean
(Student Development and Alumni)

e-mail: vacant

Head of Department
Department of Chemistry
Engineering Technology

e-mail: vacant

Head of Department
Engineering Technology
Dr. Abdul Hafiizh Bin Ismail
e-mail: abdulhafiizh@unimap.edu.my

Head of Department
Department of Electric
Engineering Technology
Mr. Shuhaimi Bin Zakaria @ Abdullah
e-mail: shuhaimi@unimap.edu.my

Head of Department
Department of Mechanical Engineering
Technology
Dr. Azwan Iskandar Bin Azmi
e-mail: azwaniskandar@unimap.edu.my

Head of Department
Department of Sivil Engneering
Technology

e-mail: vacant

Chairperson of Degree Programme
Chemical (Industrial Biotechnology)
Dr. Zarina Binti Zakaria
e-mail: zarinaz@unimap.edu.my

Chairperson of Degree
Programme Chemical
(Industrial Chemical Process)
Mrs Rozaini Binti Abdullah
e-mail: rozaini@unimap.edu.my

Chairperson of Degree Programme
Electronic (Electronic System)
Mr. Muhammad Hafiz Bin Ab Aziz
e-mail: muhamadhafiz@unimap.edu.my

Chairperson of Degree
Programme Electronic
(Integrated Electronic)
Mr. Ahmad Fariz Bin Hasan
e-mail: ahmadfariz@unimap.edu.my

Chairperson of Degree
Programme Electronic
(Electronic Telecommunication Design)
Mr. Emi Izhanizam Bin Azmi
e-mail: emiizhanizam@unimap.edu.my

Department of Mechanical Engineering Technology

Lecturers

Professor Dr. Zakaria Wahab
Ph.D (Plant Physiology/Plant Nutrition) (University of Bristol, UK)
M.Sc (Crop Production & Physiology) (Iowa State University, USA)
B.Sc (Agronomy) (Iowa State University, USA)
e-mail : zakariawahab@unimap.edu.my

Professor Dr. Abdul Razak Shaari
Ph.D (Plant Physiology) (University of Wales, Abersytwyth, UK)
B.Sc (Botany), UKM
e-mail : razakshaari@unimap.edu.my

Associate Professor Dr. Othman Hashim
Ph.D (Plant and Soil Science-Water Relations) (University of Canterbury, NZ)
M.Agr. Dev (Agricultural Project Development) (State University of Ghent, BELGIUM)
B.Agr. Sc (Agronomy) (Universitas Gadjah Mada, Jogjakarta, INDONESIA)
e-mail : othmanhashim@unimap.edu.my

Associate Professor Dr. Kassim Mohamad K. Hashim
Ph.D (Super Critical Fluid Technology) (University of Birmingham, UK)
M.Sc (Mechanics of Wet Steam) (University of Birmingham, UK)
B.Sc (Mechanical Engineering) (University of Baghdad, IRAQ)
e-mail : qassim@unimap.edu.my

Associate Professor Dr. Hussain Mohd Salleh
Ph.D (Agricultural Technology and Systems Management) (Michigan State University, USA)
M.Sc (Agricultural Engineering) (Louisiana State University, USA)
B.Sc (Agricultural Engineering) (Louisiana State University, USA)
e-mail : hussainsalleh@unimap.edu.my

Associate Professor Dr. Supri Abdul Ghani
Ph.D (Polymer Engineering) (Universiti Sains Malaysia, MALAYSIA)
M.Sc (Material) (Institut Teknologi Bandung, INDONESIA)
B.Eng (Material) (Institut Teknologi Bandung, INDONESIA)
e-mail : surpi@unimap.edu.my

Dr. Azwan Iskandar Azmi
Ph.D (Mechanical Engineering) (The University of Auckland, NZ)
M.Eng (Adv. Manuf. Technology) (Universiti Teknologi Malaysia, MALAYSIA)
B.Sc (Mechanical Engineering) (Purdue University, USA)
e-mail : azwaniskandar@unimap.edu.my

Mr. Ahmad Fairuz Mansor
M.Eng (Adv. Manuf. Technology) (Universiti Teknologi Malaysia, MALAYSIA)
B.Eng (Manufacturing Engineering) (Universiti Malaysia Perlis, MALAYSIA)
e-mail : fairuzmansor@unimap.edu.my

Mr. Bakri Bakar
M.A Design Visualization (Bournemouth, UK)
B. Design (Industrial Design) (Universiti Teknologi Mara, MALAYSIA)
e-mail : bakribakar@unimap.edu.my

Mr. Mohd Hafiezal Mohd Radzi
M.Sc Mechanical System Design (University of Aix-Marseille, FRANCE)
B.Eng Mechanical (University of Provence, FRANCE)
e-mail : hafiezalradzi@unimap.edu.my

Mrs. Noorina Hidayu Jamil
M.Sc (Material) (Universiti Sains Malaysia, MALAYSIA)
B.Eng (Material) (Universiti Sains Malaysia, MALAYSIA)
e-mail : noorinahidayu@unimap.edu.my

Miss Nurul Razliana Abdul Razak
M.Sc (Materials Engineering) (Universiti Malaysia Perlis, MALAYSIA)
B.Eng (Metallurgical Engineering) (Universiti Malaysia Perlis, MALAYSIA)
e-mail : razliana@unimap.edu.my

Mr. Radhwan Hussin
M.Eng (Adv. Manuf. Technology) (Universiti Teknologi Malaysia, MALAYSIA)
B.Eng (Manufacturing Engineering) (Universiti Malaysia Perlis, MALAYSIA)
e-mail : radhwan@unimap.edu.my

Teaching Engineer

Mrs. Noor Diyana Dahlan
B.Eng (Manufacturing Engineering) (Universiti Malaysia Perlis, MALAYSIA)
Dip (Manufacturing Technology) (Politeknik Seberang Perai, MALAYSIA)
e-mail : diyanadahlan@unimap.edu.my

Mr. Yusmarizal Yusop
B.Eng (Mechanical Manufacturing) (Universiti Teknologi Malaysia, MALAYSIA)
e-mail : yusmarizal@unimap.edu.my

Department of Electrical Engineering Technology

Lecturers

Mr .Shuhaimi Bin Zakaria @ Abdullah
M.Sc (Electrical System Engineering) UniMAP
B.Eng (Hons) Computer & Communication Eng. USM
e-mail : shuhaimi@unimap.edu.my

Mr. Yazhar Bin Yatim
M.Sc.(Power Eng). (BTU Cottbus, Germany)
B.Eng (Hons) Electrical Systems Eng) UniMAP
Dip (Electrical Engineering-Communication) UTM
e-mail : yazhar@unimap.edu.my

Mr. Hafiz Bin Arshad
M. Eng (Electrical System Engineering) (UniMAP)
B. Eng. (Hons) Industrial Electronic Engineering (UniMAP)
e-mail :

Ms. Mardianaliza Binti Othman
M.Eng. (Electrical-Power) UTM
B.Eng. (Hons) (Electrical) UTHM
e-mail : mardianaliza@unimap.edu.my

Mr. Mohd Annuar Bin Mohd Isa
M.Sc (Electrical & Electronics Eng) Software Testing, USM
B.Eng. (Hons) (Electrical & Electronics Engineering) USM
e-mail : annuar@unimap.edu.my

Mrs. Nor Ashbahani Binti Mohamad Kajaan
M.Eng. (Electrical Systems Engineering) UniMAP
B.Eng. (Hons) Industrial Electronic Engineering, UniMAP
e-mail : ashbahani@unimap.edu.my

Mrs. Nur Hafeizza Binti Ramly
M.Sc. (Electrical-Power) UTM
B.Eng.(Hons) Electrical & Electronics, UMP
e-mail : hafeizza@unimap.edu.my

Mr. Sharulnizam Bin Mohd Mukhtar
MSc. (Electrical System Engineering) UniMAP
B.Eng. (Hons) Electrical & electronics (Power) UPM
e-mail : sharul@unimap.edu.my

Ms. Syatirah Binti Mohd Noor
M.Sc. (Machine Design) UniMAP
B.Eng. (Hons) Industrial Electronic, UniMAP
e-mail : syatirah@unimap.edu.my

Teachning Engineer

Mr. Mohd Haris Faizal Bin Mohd Fakri
B.Eng. (Hons) Industrial Electronics Eng. UniMAP
Diploma (Electrical Engineering) UniMAP
e-mail : harizfaizal@unimap.edu.my

Mrs. Norhanisa Binti Kimpol
B.Eng. (Hons) Electrical Eng. Communication (UiTM)
Dip. (Electrical Eng.-Electronics (UiTM)
e-mail : norhanisa@unimap.edu.my

Technicians

Mr. Ahmad Fadhli Bin Zainol
e-mail : ahmadfadhli@unimap.edu.my

Mrs. Roshila Binti Hamzah @ Mohamed
e-mail : roshila@unimap.edu.my

Mr. Shuhaimi Bin Sulaiman
e-mail : shuhaimis@unimap.edu.my

Department of Chemical Engineering Technology

Lecturers

Dr. Zarina Binti Zakaria
PhD (Biotechnology Plant Tissue Culture) USM
MSc. (Tropical Forest Resource Management) UPM
B.Sc (Hons)-Botany) UM
e-mail : zarinaz@unimap.edu.my

Mrs. Noorulnajwa Diyana Binti Yaacob
M.Sc. (Bioprocess Engineering) UniMAP
B.Sc (Hons) (Biotechnology) UPM
e-mail : noorulnajwa@unimap.edu.my

Mr. Zulkarnain Bin Mohamed Idris
M.Sc (Biotechnology Engineering) UIAM
B.Eng (Hons) (Biochemical-Biotechnology) UIAM
e-mail : zulkarnainidris@unimap.edu.my

Mrs. Nurul Ain Harmiza Binti Abdullah
M.Sc. Biotechnology Engineering) UIAM
B.Eng. (Hons) (Biotechnology Engineering) UIAM
e-mail : ainharmiza@unimap.edu.my

Mrs. Nor Helya Iman Binti Kamaludin
M.Sc. (Chemical engineering), USM
B.Eng. (Hons) (Bioprocess Engineering), UniMAP
e-mail : helya@unimap.edu.my

Mrs. Khadijah Hanim Binti Abdul Rahman
M.Sc. (Biotechnology), USM
B.Sc (Biotechnology) UPM
e-mail : khadijahhanim@unimap.edu.my

Mr. Mohd Faiz Bin Mohamad Shahimin
Mr. Johan Ariff Bin Mohtar
Mrs. Siti Aminah Binti Mohd Hassan

Associate Prof. Dr. Zainab Binti Hamzah
PhD. (Soil & Plant Chemistry) University of Canterbury, NZ
M.Sc. State University of Gent
B.Sc. State University of Gent
e-mail : zainab@unimap.edu.my

Dr. A.K.M. Shafiqul Islam
PhD. (Analytical Chemistry) USM
MSc. Pharmaceutical) USM
Bsc.
e-mail : shafiqul@unimap.edu.my

Mrs. Rozaini Binti Abdullah
M.Sc. (Chemistry), UKM
B.Sc (Oleochemistry), UKM
e-mail : rozainiabdullah@unimap.edu.my

Mrs. Azduwin Binti Khasri
M.Eng. (Chemical), UTM
B.Eng. (Hons) (Chemical Engineering), UKM
e-mail : azduwin@unimap.edu.my

Mrs. Nor Fauziah Binti Zainudin
M.Sc. (Chemical Engineering), USM
B.Eng. (Chemical Engineering), USM
e-mail : norfauziah@unimap.edu.my

Mrs. Alina Rahayu Binti Mohamed
(Study Leave)
M.Sc. (Chemistry), UTM
B.Sc. (Chemistry), Sheffield, UK
e-mail : alina@unimap.edu.my

Mrs. Siti Kartini Binti Enche Ab Rahim
Mr. Muhammad Faiq Bin Abdullah

Teaching Engineer

Mohd Qailani Bin Che Kassim
B.Eng. (Chemical Engineering), UTM
e-mail : qalani@unimap.edu.my

Mrs. Noor Hasyierah Binti Mohd Salleh
MSc. (Bioprocess Engineering), UniMAP
B.Eng. (Biochemical Engineering), UKM
e-mail : hasyierah@unimap.edu.my

Mr. Ahmad Anas Bin Nagoor Gunny
M.Sc. (Bioprocess Engineering), UniMAP
B.Eng. (Hons) (Biochemical Biotechnology), UIAM
e-mail : admadanas@unimap.edu.my

Mr. Ahmad Radi Bin Wan Yaakub
B.Eng. (Chemical Engineering), UTM
e-mail : ahmadradi@unimap.edu.my

Ms Hafizah Binti Mohd Johar
B.Eng (Chemical Engineering), University of Minnesota, Twin Cities, USA
e-mail : hafizahjohar@unimap.edu.my

Mr. Mahfuz Affif Bin Mohd Ruslan
B.Eng. (Chemical Engineering), USM
e-mail : mahfuz@unimap.edu.my

Department of Electronic Engineering Technology

Lecturers

Dr. Abdul Hafiizh Bin Ismail
Ph.D (Wireless Communication Engineering), Ibaraki University, Japan
M.Eng Electrical and Electronic (Telecommunication) Engineering, UTM
B.Eng (Media and Telecommunication Engineering) Ibaraki University, Japan
e-mail : abdulhafiizh@unimap.edu.my

Mr. Muhamad Hafiz Bin Ab Aziz
M.Sc (Microelectronic), UniMAP
B.Eng (Hons.) (Electric Eng.), UniMAP
e-mail : muhamadhafiz@unimap.edu.my

Mr. Emi Izhanizam bin Azmi
M. Sc. (Electronic System Design), USM
B. Eng. (Computer Engineering), KUKUM
e-mail : emi@unimap.edu.my

Mrs. Norfazlin Rashid
M.Sc. (Information Technology), UUM
B.Sc. (Hons) Computer Science, UTM
e-mail : norfazlin@unimap.edu.my

Ahmad Fariz Bin Hassan
M.Eng (Electrical-Electronic and Telecommunications), UTM
B.Eng (Electrical-Telecommunications), UTM
e-mail : farizhasan@unimap.edu.my

Associate Professor
Abdul Rahman Bin Mohd. Saad
M.Sc. Engineering (Electric & Electronic), USM
B.Eng. Electrical & Electronic Engineering, USM
e-mail : abd.rahman@unimap.edu.my

Mr. Azman Bin Muhamad Yusof @ Kamarudin
(Senior Lecturer)
M.Sc (Electric & Electronic Engineering), USM
B.Eng Electric & Electronic, USM
e-mail : azman@unimap.edu.my

Mr. Fairul Afzal Bin Ahmad Fuad
M.Sc Electronics System Design Engineering, USM, Malaysia
B.Eng Communication Engineering, University of Toukai, Japan
e-mail : fairul@unimap.edu.my

Mr. Abdul Hallis Bin Abdul Aziz
M.Sc (Computer Engineering), UniMAP
B.Eng Electronic, Communication and Computer Engineering, University of Bradford, UK
e-mail : abdulhallis@unimap.edu.my

Mr. Mohamad Rizal Bin Abdul Rejab
M.Sc (Information and Communication Technology), UUM
B.Eng. (Hons) Electronic Engineering, USM (2004)
e-mail : m.rizal@unimap.edu.my

Mrs. Hazila Binti Othman
M.Sc, UniMAP
B.Eng. Electrical Engineering (Communication), UiTM (2002)
e-mail : hazila@unimap.edu.my

Mr. Mohd Fairuz Bin Muhamad Fadzil
M.Sc (Information and Communication Technology), UUM
B.Eng. Electrical Engineering (Telecommunication), UTM (2005)
e-mail : mohdfairuz@unimap.edu.my

Mrs. Dayang Khadijah Binti Hamzah
M.Sc (Communication), UniMAP
B.Eng. Electrical Engineering (Communication), UiTM (2002)
e-mail : h_dayang@unimap.edu.my

Teaching Engineer

Mrs. Siti Nor Diana binti Ismail
B.Eng. (Computer Engineering), UniMAP (2006)
e-mail : sitinordiana@unimap.edu.my

Mr. Khairil Syahmi bin Musa
B.Eng. Electrical Engineering (Communication),KUiTTHO (2006)
e-mail: syahmi@unimap.edu.my

Mr. Mohd. Fisol bin Osman
B.Eng. Electrical and Electronic Engineering, Liverpool (1995)
e-mail: mohd.fisol@unimap.edu.my

Department of Engineering Technology Civil (Construction)

Lecturers

Associate Professor
Dr. Khairul Nizar Bin Ismail
PhD (Construction Material), (USM)
MSc (Building Technology), (USM)
BSc (HBP), (USM)
Tel : +604-979 8630
Faks : +604-979 8636
e-mail : nizar@unimap.edu.my

Associate Professor Ir. Shuib Bin Sahudin
M.Sc.(Mechanical Eng) (Univ. College of Swansea)
B.Sc.(Mechanical Eng) (Sunderland Univ.)
Dip in Mechanical Eng (UTM)
MIEM, P.Eng., APEC Eng., IntPE (MY)
e-mail : shuibmie@unimap.edu.my

Ir. Muhammad Arkam Bin Che Munaaim
MSc. Building Technology (USM)
B. Eng. (Electrical)(UTM)
Dip. Elec. Engineering (Power) (UTM)
Tel : +604-979 8988
e-mail : arkam@unimap.edu.my

Mr. Md. Hadli Bin Abu Hasan
M.Sc.(Civil Eng.), (UTM)
B.Eng.(Civil), (UTM)
Dip. In Civil Eng.(UiTM)
Tel : +604-979 8973
e-mail : mdhadli@unimap.edu.my

Mrs. Norlia Binti Mohd Ibrahim
M.Sc.(Env.Eng.) (USM)
B.Eng.(Civil),(USM)
Tel : +604-979 8980
e-mail : norlia@unimap.edu.my

Mrs. Nur Liza Binti Rahim
M.Eng.(Civil Eng.) (UKM)
B.Eng.(Civil&Structural)(UKM)
Tel : +604-979 8586
e-mail : nurliza@unimap.edu.my

Mrs. Roshazita Binti Che Amat
M.Sc.(Mineral Resources)(USM)
B.Eng.(Mineral Resources) (USM)
Tel : +604-979 8976
e-mail : roshazita@unimap.edu.my

Mrs. Syakirah Afiza Binti Mohammed
M.Eng. (Civil) (UKM)
B.Eng.(Civil & Structural) (UKM)
Tel : +604-979 8514
e-mail : syakirahafiza@unimap.edu.my

Mrs. Shamshinar Binti Salehuddin
M.Eng.(Civil & Structural)(UTM)
B.Eng.(Civil) (UTM)
e-mail : shamshinar@unimap.edu.my

Mr.Mohd Zulham Affandi Bin Mohd Zahid
M.Sc.(Civil)(USM)
B.Eng.(Civil) (USM)
Tel : +604-979 8587
e-mail : mohdzulham@unimap.edu.my

Mr. Zuhayr Bin Md. Ghazaly
M.Eng.(Civil)(UKM)
B.Eng.(Civil and Structural) (UKM)
Tel : +604-979 8972
e-mail : zuhayr@unimap.edu.my

Mr.Mohd Faiz Bin Mohammad Zaki
M.Eng.(Geotechnics)(UTM)
B.Eng.(Civil)(UTM)
e-mail : faizzaki@unimap.edu.my

Mr. Mustaqqim Bin Abdul Rahim
MSc (Structural Eng and Constructions) (UPM)
BEng (Civil Eng)(UNIMAS)
e-mail : mustaqqim@unimap.edu.my

Dr. Afizah Binti Ayob
PhD (Env) (USM)
M.Sc.(Env) (USM)
B.Eng. (Civil) (USM)
e-mail : afizah@unimap.edu.my

Mrs. Liyana Binti Ahmad Sofri
MSc (Highway and Transport Engineering)(UPM)
B. Eng. (Civil)(UTM)
e-mail : liyanasofri@unimap.edu.my

Mrs. Nur Fitriah Binti Isa
MSc. Civil Eng. (UTHM)
B.Eng. Civil (UMP)
e-mail : n.fitriahisa@gmail.com

Teaching Engineer

Mr. Roshasmawi Bin Abdul Wahab
B.Eng (Civil) (UTM)
Tel : +604-979 8805
e-mail : roshasmawi@unimap.edu.my

Mr. Mokhzani Khair Bin Ishak
B.Eng(Material Eng)(UniMAP)
Tel : +604-979 7751
e-mail : mokhzani@unimap.edu.my

Mr. Ahmad Faizal Bin Mansor
B.Eng (Civil)(UiTM)
Tel : +604-979 4572
e-mail : faizalmansor@unimap.edu.my

Mrs.Nurul Huda Binti Hashim
B.Eng.(Material Eng.),UniMAP
Tel : +604-979 7702
e-mail : nurulhuda@unimap.edu.my

Technicians

Mr. Andi Julaini Bin Jasni
Tel : +604-979 8812
e-mail : andijulaini@unimap.edu.my

Mr. Mohd Shukri Bin Mohd Soid
Tel : +604-979 7721
e-mail : mohdshukri@unimap.edu.my

Mr. Mohamad Zahir Bin Hanafi
e-mail : zahirhanafi@unimap.edu.my

Mr. Syed Ahmad Rizman Bin Syed Kamel
Tel : +604-979 7721
e-mail : rizman@unimap.edu.my

Administration Staffs

Mr. Zakaria Bin Othman @ Ismaill
B.A. (Hons) (Social Administration), Universiti of Malaya, 2001
1st Assistant Registrar
Tel : 04-988 5716
e-mail : zakariaothman@unimap.edu.my

Mrs. Siti Masliana Binti Bohari.
Bachelor of (Hons) (Public Management) Universiti Utara Malaysia, 2008
2nd Assisstant Registrar
Tel : 04-988 5718
e-mail : maslianabohari@gmail.com

Ms. Azfa Ruhaya Binti Abdullah
Bachelor of (Hons) Technology Management (Production & Operation), UTHM 2011
M.Education - UPM
3rd Assisstant Registrar
Tel : 04-988 5718
e-mail : azfaruhayu@gmail.com

Mrs. Haidasafinas Binti Abas
Office Secretary
Tel : 04-988 5712
e-mail : haida@unimap.edu.my

Mrs. Sharifah Hanita Binti Syed Ahmad
Administrative Assistant
Tel : 04-988 5719
e-mail : s.hanita@unimap.edu.my

Mr. Hafizi Bin Hasan Al-Kamal
General Office Assisstant
Tel : 04-988 5720
e-mail : hafizi@unimap.edu.my

Engineering Technology Programme

Bachelor of Chemical Engineering Technology (Honours) (Industrial Biotechnology)

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 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.

Curriculum Structure

Bachelor of Chemical Engineering Technology (Honours) (Industrial Biotechnology)

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
DISCIPLINE CORE (105)	ERT 105/3 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
	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 271/3 Statistics for Engineering Technology					
	PTT 110/3 Engineering Material					EUT 4XX/3 Technologist in Engineering Management	EUT 4XX/3 Technologist in Society	
UNIVERSITY REQUIRED (17)	UUW 212/2 University English Language	UUW 410/2 University Malay Language	UUT122/2 Skills & Technology in Communication	UUW 224/2 Engineering Entrepreneurship				
		UZW 1XX/1 Co-Curriculum	UUW 233/2 Islamic Civilization and Asia Civilization	UUW 235/2 Ethnic Relation				
			UUW 322/2 Thinking Skill	UUW XXX/2 Option subjects				
140	**19**	**19**	**19**	**19**	**17**	**18**	**17**	**12**

Total Units for Graduation 140

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

ERT 105/3
Electrical Technology

Course Synopsis

This course is intended to provide students with clear understanding of the DC and AC circuits, basic principles of 3-phase AC circuits, electro-magnetism and magnetic circuits. They will also gain an understanding of the basic operating principles and performance analysis of three most commonly used electric machines, namely, transformers, dc machines, and induction motors.

Course Outcomes

1. Ability to explain the principle elements of DC and AC circuits such as current, voltage, power, energy, nodes, branches etc.
2. Ability to analyze the DC and AC circuits by using Ohm's Law, Kirchhoff's Current Law, Kirchhoff's Voltage Law, Source Transformation and Thevenin's theorem.
3. Ability to calculate and analyze parameters of three phase AC system for Wye and Delta connection.
4. Ability to explain the basic concept of magnetism and electromagnetism and its application in DC and AC machines.

References

1. Boylestad, Robert L., Introductory Circuit Analysis, 11th Edition, Prentice Hall, 2007.
2. Hughes, Electrical and Electronic Technology, 9th Edition, Prentice Hall, 2005.
3. Richard J. Fowler, Electricity Principles and Applications, 7th Edition, Mc Graw Hill, 2008.
4. Charles K. Alexander & Matthew N.O.Sadiku, Fundamentals of Electric Circuits, International Third Editions, McGraw-Hill.
5. Nilsson, J.W. & Riedel, S.A., Electric Circuits, 7th Edition, Pearson Prentice Hall, 2005.

PTT101/3
Engineering Materials

Course Synopsis

The course is tailored to give students a broad introduction to material properties and limitations which covers the fundamental material structure, class of material properties, measurement of the properties, the common micro-structural features of different material classes in order to relate material with its characteristics as well as some features of biomaterials.

Course Outcomes

1. Ability to solvetypes of material families (metal, polymer, ceramic, and composite), material structures, and material characteristic.
2. Ability to analyze the behavior of structural materials suchmetals, ceramics, polymers, composites, biological materials and biomaterials.
3. Ability to analyze the phases in material and material reliability in terms of material life cycle, corrosion mechanismas well as application of biomaterials.

References

1. Smith, W.F. and Hashemi, J. (2011). Foundations of Materials Science and Engineering, 5th Edition, McGrawhill.
2. Askeland, D.R., Fulay, P.P., Wright, W.J. (2010). The Science and Engineering of Materials, 6th Edition, Cengage Learning.
3. Ashby, M., Shercliff, H. and Cebon, D., A., (2007). Materials: engineering, science, processing, and design, Elsevier.
4. Ashby, M. and Jones, D.R.H. (2006). Engineering Materials II: An Introduction to Microstructure, processing, and design, 3rd Edition, Elsevier, Butterworth Heinemann.
5. Sharma, C.P. (2004). Engineering material properties and applications of metal and alloys, Prentice Hall, New Delhi.

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. Ability 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 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.

Career Opportunities

Graduate from this school has a wide range of employment prospects either in private companies, industry, government departments and statutory bodies. Sectors that offer employment opportunities are as follows;

- Industrial Bioprocess
- Pharmaceutical Industry
- Food Industry
- Consultation and Research Institution such as MARDI, FRIM
- Chemical Industry
- Biotechnology Companies
- Environment Sector
- Public Sector Farming Body (FELDA, Felcra, MADA etc)
- Forestry Sector (Manufacturing & Management)
- Irrigation and Drainage
- Education Sector

Engineering Technology Programme

Bachelor of Engineering Technology (Electrical) (Hons) (Industrial Power)

Program Objective (PEO)

Programme Objective 1
Graduates are leaders in the field of electrical engineering as demonstrated through career advancement.

Programme Objective 2
Graduates who are members and contribute to professional society.

Programme Objective 3
Graduates pursue continuing education opportunities.

Programme Objective 4
Graduates make contributions through research and development.

Programme Objective 5
Graduates who are entrepreneurs.

Programme Outcomes (PO)

PO1
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialisation principles.

PO2
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs.

PO3
Plan and conduct experimental investigations of broadly-defined problems.

PO4
Select and apply appropriate techniques, resources and modern engineering tools.

PO5
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to electrical engineering technology.

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 understanding of professional and ethical responsibilities and commitment to the community for sustainable development.

PO9
Recognize the need for professional development and to be engage in independent and lifelong learning.

PO10
Demonstrate an awareness of management, business practices and entrepreneurship.

Curriculum Structure

Bachelor of Engineering Technology (Electrical) (Hons)
(Industrial Power)

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	I	II	III	IV	SEMESTER	I	II	III
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	PLT400/12 Industrial Training
	PLT102//2 Computer Aided Drafting (CAD)	PLT106/3 Digital Electronics	PLT202/3 Measurement & Instrumentation	PLT206/3 Microprocessor System & Microcontroller	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					EUT4XX/3 Technologist in Engineering Management	EUT4XX/2 Technologist in Society	
UNIVERSITY REQUIRED (17)	UUW212/2 University English Language	UUW410/2 University Malay Language	UUW233/2 Islamic Civilization and Asia Civilization	UUW235/2 Ethnic Relation	UUW322/2 Thinking Skills	UUWXXX/2 Option subjects		
	UUT122/2 Skills & Technology in Communication	UZWXXX/1 Co-curriculum	UUW224/2 Engineering Entrepreneurship					
140	**18**	**18**	**19**	**18**	**19**	**18**	**18**	**12**
Total Units for Graduation 140								

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: PLT403/4 High Voltage Technology C2: PLT 405/3 Energy Efficiency & Management

Faculty of Engineering Technology

Course Syllabus

PLT101/3
Computer Programming

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. 8th Edition. John Wiley.
4. Robert L. Boylestad. (2010). Introductory Circuit Analysis, 12th Edition. 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 McDonald. (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.

Engineering Technology Programme

Bachelor of Electronic Engineering Technology (Honours) (Electronic Network Design)

Programme Objectives (PEO)

PEO 01
Electronic Network Design Technology graduates who are competent in both technology theory and practice.

PEO 02
Electronic Network Design Technology graduates who are able to demonstrate leadership and contribute to team success and manage projects in a multi-disciplinary environment.

PEO 03
Electronic Network Design Technology graduates who are able to make contributions to knowledge.

PEO 04
Electronic Network Design 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.

Curriculum Structure

Bachelor of Electronic Engineering Technology (Honours)
(Electronic Network Design)

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	**INDUSTRIAL EXPOSURE (IndEX) – 1 WEEK**	PGT 200/3 Operating Systems	PGT 204/3 Internetworking Technology I	**INDUSTRIAL ENTREPRENEURSHIP (2 DAYS)**	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 302/3 Embedded Software Technology	PGT XXX/3 Elective I	PGT 402/3 Network Security Technology	
	PGT 101/3 Electric Circuit Principles	PGT 106/3 C Programming			PGT 206/3 Computer Architecture		PGT 303/3 Data Structures	PGT 305/3 Network Management	PGT XXX/3 Elective II	
		PGT 107/2 Writing in Engineering Technology		PGT 202/3 Analog Electronics I	PGT 207/3 Object Oriented Programming		PGT 304/3 Internetworking Technology II	PGT 306/3 Network Modeling	PGT XXX/3 Elective III	
	PGT 100/3 Networking Fundamentals			PGT 203/3 Database Management Systems				PGT 307/3 Programming for Networking		
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 XXX/3 Mathematics for Engineering Technology IV		EUT 4XX/3 Technologist in Engineering Management	EUT 4XX/3 Technologist in Society		
	PCT 111/3 Engineering Skills									
UNIVERSITY REQUIRED (17)	UZW 1XX/1 Co-Curriculum	UUW 410/2 University Malay Language		UUW 224/2 Engineering Entrepreneurship	UUW 235/2 Ethnic Relation		UUW 322/2 Thinking Skills			
		UUW 122/2 Skills & Technology in Communication		UUW 212/2 University English Language	UUW233/2 Islamic & Asian Civilizations		UUW XXX/2 Option Subjects			
122	19	18		19	19		19	19	15	12
18	University English, Engineering Entrepreneurship, TITAS, Ethnic Relation, Thinking Skill, University Malay Language, Co-Curriculum, Option Subject									
Total Units for Graduation 140										
Elective : CCNA I, CCNA II, CCNA III, CCNA IV, Mobile Computing, Web Programming, Artificial Intelligent										

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.

Engineering Technology Programme

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;

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 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.

Curriculum Structure

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	PPT413/6 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	Elective I /3	Elective III /3	
	PDT110/3 Metrology	PDT120/3 Basic Electrical and Electronic	PDT202/3 Heat Transfer	PDT222/3 Metallurgy	PDT310/3 Quality Control	PDT315/3 Maintenance		
		PDT112/3 Theory in Machining		PDT212/3 Geometric, Dimensioning & Tolerencing		PDT316/3 Sustainable Machining		
COMMON CORE (15)	PQT 111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II	PQT 213/3 Statistics for Engineering Technology		EUT 4XX/3 Technologist in Engineering Management		EUT 4XX/3 Technologist in Society	
UNIVERSITY REQUIRED (19)	UUW 233/2 Islam & Asia Civilisation (TITAS)	UUT122 /2 Skill and Technology in Communication	UUW 224/2 Engineering Entrepreneurship	UUW 212/2 University English Language	UUW 322/2 Thinking Skills	UUW XXX/2 Options Subjects		
	UUW 410/2 University Malay Language	Co-Curriculum (1 unit)	Co-Curriculum (1 unit)				UUW 235/2 Ethnic Relation	
	Co-Curriculum (1 unit)							
Total Credit	**19**	**20**	**19**	**18**	**18**	**19**	**17**	**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. McGraw 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 Objectives (PEO)

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)

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

Bachelor of Mechanical Engineering Technology (Honours)
(Agricultural Systems)

YEAR	FIRST		SECOND		THIRD		FOURTH	
SEMESTER	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**INDUSTRIAL TRAINING (12)**
DISCIPLINE CORE (96)	PDT 176/2 Computer Aided Drafting	PDT 181/3 Engineering Mechanics	PDT 276/3 Mechanics of Material	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 177/2 Applied Chemistry	PDT 182/3 Electronic Application in Agriculture	PDT 277/3 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	
	PDT 178/2 Applied Biology	PDT 183/2 Agricultural Mechanics and Workshop Technology	PDT 278/2 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.	
	PDT 179/3 Agricultural Economics	PDT 184/4 Agricultural Production Systems	PDT 279/4 Principles of Agronomy	PDT 284/2 Agro-ecosystems and Sustainability	PDT 379/3 Water Resources Management	PDT 384/3 Food Technology	PDT479/3 **or** PDT480/3 Elective 2/3 Option A2 **or** Option B2	
	PDT 180/3 Engineering Science		PDT 280/2 Fundamentals of Agribusiness Accounting and Finance		PDT 380/3 Automations in Agricultural Systems	PDT 385/3 **or** PDT386/3 Elective 1/3 Option A1 **or** Option B1	PDT481/3 **or** PDT482/3 Elective 3/3 Option A3 **or** Option B3	
COMMON CORE (15)	PQT 111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II		PQT 271/3 Statistics for Engineering Technology				
					EUT 4XX/3 Technologist in Engineering Management	EUT 4XX/3 Technologist in Society		
UNIVERSITY REQUIRED (17)	UZW 1XX/1 Co-Curriculum	UUT 122/2 Skills & Technology in Communication	UUW 233/2 Islamic & Asian Civilizations	UUW 322/2 Thinking Skills				
	UUW 410/2 University Malay Language	UUW XXX/2 Option Subject	UUW 224/2 Engineering Entrepreneurship	UUW 212/2 University English Language	UUW 235/2 Ethnic Relation			
140	**18**	**19**	**18**	**17**	**19**	**19**	**18**	

Electives Option 1 (Green Technology):
A1: PDT 385/3 Bio-Material Engineering
A2: PDT 479/3 Bio-renewable System
A3: PDT 481/3 Advances in Agrotechnology

Electives Option 2 (Agricultural Production Technology):
B1: PDT 386/3 Integrated Agrosystems
B2: PDT 480/3 Food Processing Engineering
B3: PDT 482/3 Food and Herbal Crops Production Technology

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 biological phenomena at a various levels, from cellular to ecological systems.

2. Ability to differentiate various groups of organisms according to morphological, anatomical, reproductive and physiological parameters.
3. Ability to illustrate organism responses to internal and external stimuli.

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. Ability to 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. (2008). 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). PostharvestTechnologyforSoutheast AsianPerishableCrop,SecondEdition, 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.

Engineering Technology Programme

Bachelor of Civil Engineering Technology (Honours) (Construction)

Programme Objectives (PEO)

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.

Programme Outcomes (PO)

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.

Faculty of Engineering Technology

Curriculum Structure

Bachelor of Civil Engineering Technology (Honours) (Construction)

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 Mechanic	GEOMATIC CAMP	PAT 201/2 Structural Theory	EAT 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 Mechanic		EAT 202/3 Hydraulic and Hydrology	EAT 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		EAT 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		EAT 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 Elektive 3	
					PAT 253/2 Geotechnic				
COMMON CORE (18)	PQT 111/3 Mathematic for Engineering Technology I	PQT 112/3 Mathematic for Engineering Technology II		PQT 213/3 Statistic for Engineering Technology					
	EMT 110/3 Engneering Material						EUT 4XX/3 Technologist in Engineering Management	EUT 4XX/3 Technologist in Society	
UNIVERSITY REQUIRED (17)	UUW 223/2 University English Language	UUW 114/2 University Malay Language		UUT 112/2 Skills and Technology in Communication	UUW 224/2 Engineering Entrepreneurship				
		UZW 1XX/1 Co-Curriculum		UUW 233/2 Islamic Civilization and Asia Civilization	UUW 235/2 Ethnic Relation				
				UUW 322/2 Thinking Skill	UUW XXX/2 Option Subjects				
140	17	17		22	21	15	18	18	12

Total Units for Graduation = 140

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 analyze area moment of inertia and mass moment of inertia for various type cross section and composite bodies.
CO4: Ability to solve problems which relate to kinematics of a particle.

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: Fundamental of electricity – Ohm's Law
Lab 2: Heat Transfer -Thermal Conductivity
Lab 3: Solar
Lab 4: Measuring light intensity
Lab 5: Acoustics - Sound and Wave

Course Outcome

CO1: Ability to explain Ohm's Law and Kirchhoff's Law and analyze resistor in series or parallel.
CO2: Ability to explain concept of magnetic field and analyze e/m ratio.
CO3: Ability to explain basic mechanism of heat transfer and evaluate heat transfer conduction.
CO4: Ability to explain characteristic of sound and evaluate interference of sound waves.

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

Introduce basic skills and knowledge required for a career in civil engineering technology. This course is a cross section of topics in contemporary civil engineering with their routine works by providing neat sketches and illustrations with practical problems. The syllabus also introduces the requirement of authority liaison, construction business and value engineering for future challenge in construction industries.

Course Outcome

CO1: The ability to explain the role of civil engineering technology and its branches.
CO2: Ability to discuss the rules and procedures of approval authority liaison and/or construction business.
CO3: Ability to discuss and sketch the construction of substructures, superstructure and infrastructure.
CO4: Ability to discuss the concept of construction management.

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
Basic 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
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 154/3 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.

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
Structure 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 Mechanics

Course Synopsis

The course introduces the students with the basic and background of the properties and behavior of soil deposits and the applications of soil mechanics theory. It includes brief introduction on geological and physical characteristics of soils. Also includes identification, classification and description of 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 Materials

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 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.

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 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.

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",PearsonPrentice-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.
CO2: Ability to evaluate the Principle of Score calculation and its submissions.
CO3: Ability to decide Concept of Modular Coordination in IBS, Joints and Tolerances.
CO4: Ability to discusss precast concrete building 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 structures.

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

Engineering Technology Programme

Bachelor of Mechanical Engineering (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;

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 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.

Curriculum Structure

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 Statistics for Engineering Technology				EUT 4XX/3 Technologist in Engineering Management	
							EUT 4XX/3 Technologist in Society	
UNIVERSITY REQUIRED (19)	UUW 233/2 Islam & Asia Civilisation (TITAS)		UUW 212/2 University English Language	UUW 224/2 Engineering Entrepreneurship		UUT 122/2 Skill Technology in Communication		
	UZW XXX/1 Co-Curriculum	UZW XXX/1 Co-Curriculum	UZW XXX/1 Co-Curriculum	UUW 235/2 Ethnic Relation	UUW 410/2 University Malay Language	UUW XXX/2 Options Subjects		
				UUW 322/2 Thinking Skills				
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 . McGraw 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 AC 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 1st, 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 30th, 2002).
5. The New Economy and Public Policy: Schumpeterian Perspectives by Uwe Cantner, Elias Dinopoulos, and Robert F. Lanzillotti (Nov 9th, 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.

Engineering Technology Programme

Bachelor of Mechanical Engineering Technology [Honours] [Materials Processing]

Programme Objectives (PEO)

PEO 01
Applying knowledge of materials processing technology in different areas of materials engineering and possess sufficient technical skills to work in the industry.

PEO 02
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 03
Upholding the importance of professionalism and ethics of materials processing profession to form a cultured and more developed society.

PEO 04
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

Curriculum Structure

Bachelor of Mechanical Engineering Technology (Honours)
(Materials Processing)

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	
	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		
	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 Statistics for Engineering Technology				EUT 4XX/3 Technologist in Engineering Management	
							EUT 4XX/3 Technologist in Society	
UNIVERSITY REQUIRED (19)	UUW 233/2 Islam & Asia Civilisation (TITAS)		UUW 212/2 University English Language	UUW 224/2 Engineering Entrepreneurship		UUW XXX/2 Communication Skills		
	UZW XXX/1 Co-Curriculum	UZW XXX/1 Co-Curriculum	UZW XXX/1 Co-Curriculum	UUW 235/2 Ethnic Relation	UUW 410/2 University Malay Language	UUW XXX/2 Options Subjects		
				UUW 322/2 Thinking Skills				
Total Credit	**19**	**21**	**20**	**18**	**17**	**17**	**18**	**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)								

Faculty of Engineering Technology

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 . McGraw 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, 5th 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. Serope 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.

Engineering Technology Programme

Bachelor of Electrical Engineering Technology (Hons) (Robotics & Automation)

Programme Educational Objective (PEO)

PEO1
Graduates who effectively demonstrate engineering knowledge and entrepreneurial skills by providing practical solutions.

PEO 2
Graduates who effectively demonstrate professionalism in multi-disciplinary engineering technology environment, leadership quality and teamwork.

PEO 3
Graduates who engage in life-long learning and demonstrate an ethical commitment to the community and the profession through involvement with professional organizations and society.

Programme Outcomes (PO)

PO1
Apply knowledge of mathematics, science, engineering fundamentals and engineering specialisation principles.

PO2
Design solutions for broadly-defined engineering technology problems, and to design systems, components or processes to meet specified needs.

PO3
Plan and conduct experimental investigations of broadly-defined problems.

PO4
Select and apply appropriate techniques, resources and modern engineering tools.

PO5
Solve broadly-defined engineering problems systematically to reach substantiated conclusions, using tools and techniques appropriate to electrical engineering technology

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 understanding of professional and ethical responsibilities and commitment to the community for sustainable development.

PO9
Recognize the need for professional development and to be engage in independent and lifelong learning.

PO10
Demonstrate an awareness of management, business practices and entrepreneurship.

Curriculum Structure

Bachelor of Electrical Engineering Technology (Hons)
(Robotics & Automation)

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 (sem1)	PLT 202/3 Measurement & Instrumentation	PLT 206/3 Microprocessor Systems & Microcontroller	PLT303/3 Electrical Drives	PLT 340/4 Final Year Project I	PLT 440/6 Final Year Project II	PLT 400/12 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 42x/3 Elective II	
				PLT224/3 Pneumatics & Hydraulic Systems	PLT325/3 Manufacturing Support System	PLT327/3 Industrial Robotics		
						PLT 32x/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				EUT 4XX/3 Technologist in Society		EUT 4XX/3 Technologist in Engineering Management	
UNIVERSITY REQUIRED (17)	UUW 212/2 University English Language	UZW 1XX/1 Co-Curricular Activity	UUW 233/2 Islamic Civilization and Asia Civilization	UUW 235/2 Ethnic Relation	UUW XXX/2 Option subjects			
	UUT122/2 Skills & Technology in Communication	UUW 410/2 University Malay Language	UUW 322/2 Thinking Skills	UUW 224/2 Engineering Entrepreneurship				
143	18	18	19	19	20	19	18	12

Total Units for Graduation 143

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

Faculty of Engineering Technology

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*. 2nd Edition, 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
Applied 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*. 5th Ed., McGraw Hill.
2. David H. Myszka (2005). *Machine & Mechanisms: Applied Kinematic Analysis*. Prentice Hall.
3. Richard G. Budynas and J. Keith Nisbet (2008). *Shigley's Mechanical Engineering Design*. 8th Ed., McGraw Hall.
4. Robert L. Mott (2006). *Machine Elements in Mechanical Design.* 4th Ed. in SI Units, Prentice-Hall.
5. Charles E. Wilson and J. Peter Sandler (2006). *Kinematics and Dynamics of Machinery.*3rd Ed., Pearson Prentice-Hall.

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

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 theautomatedidentificationanddata 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 Technology 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)

Engineering Technology Programme

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.

Curriculum Structure

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

YEAR	FIRST			SECOND			THIRD		FOURTH	
SEMESTER	I	II	INDUSTRIAL EXPOSURE (IndEX) - 1 WEEK	III	IV	INDUSTRIAL ENTREPRENEURSHIP - 2 DAYS	V	VI	VII	VIII
DISCIPLINE CORE (102)	PGT 101/3 Electric Circuit Principles	PGT 105/3 Electrical Engineering Technology		PGT 211/3 Electromagnetic Theory	PGT 213/3 Analogue Electronics II		PGT 301/3 Communication System	PGT 300/4 Final Year Project I	PGT 400/6 Final Year Project II	XXX 4XX/12 Industrial Training
	PGT 102/3 Engineering Science	PGT 104/3 Digital Electronics		PGT 201/3 Microprocessor	PGT 206/3 Computer Architecture		PGT 320/3 Power Electronics	PGT 312/3 Modern Control Systems		
	PGT 103/3 Computer Technology	PGT 106/3 C Programming		PGT 202/3 Analogue Electronics I	PGT 220/3 VLSI Design		PGT 330/3 Microelectronic Fabrication Technology	PGT 332/3 Semiconductor Packaging	PGT 420/3 Instrumentation	
	PGT 120/3 Engineering Material	PGT 107/2 Writing in Engineering Technology		PGT 207/3 Object Oriented Programming	PGT 205/3 Signal and Systems		PGT 331/3 Nanoelectronic Fundamental	PGT 333/3 Reliability & Failure Analysis	PGT 4XX/3 Elective II	
								PGT 3XX/3 Elective I	PGT 4XX/3 Elective III	
COMMON CORE (21)	PGT 111/3 Engineering Mathematics I	PGT 112/3 Engineering Mathematics II		PGT 213/3 Engineering Mathematics III	PQT XXX/3 Statistic		EUT 4XX/3 Technologist in Engineering Management	EUT 4XX/3 Technologist in Society		
	PCT111/3 Engineering Skills									
UNIVERSITY REQUIRED (17)	UZWXXX/1 Co-Curriculum	UUW 410/2 University Malay Language		UUW 224/2 Engineering Entrepreneurship	UUW 235/2 Ethnic Relation		UUW 322/2 Thinking Skills			
		UUW 122/2 IT and Communication Skills		UUW 212/2 University English Language	UUW 233/2 Islamic & Asian Civilisation		UUW XXX/2 Option Subjects			
Unit	19	18		19	19		19	19	15	12
Total Units For Graduation = 140										

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

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 8th 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
Engineering Material

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/MEMS devices. 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. Michael Negnevitsky, Artificial Intelligence: A Guide to Intelligent Systems (2nd Edition), Addison-Wesley, 2005.
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. 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.

Engineering Technology Programme

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.

Curriculum Structure

Bachelor of Electronic Engineering Technology (Honours)
(Integrated Electronics)

YEAR	FIRST			SECOND			THIRD		FOURTH	
SEMESTER	I	II	INDUSTRIAL EXPOSURE (IndEX) – 1 WEEK	III	IV	INDUSTRIAL ENTREPRENEURSHIP (2 DAYS)	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 PCT 111/3 Engineering Skills	PQT 112/3 Mathematics for Engineering Technology II		PQT 213/3 Mathematics for Engineering Technology III	PQT XXX/3 Mathematics for Engineering Technology IV		EUT 4XX/3 Technologist in Engineering Management	EUT 4XX/3 Technologist in Society		
UNIVERSITY REQUIRED (17)	UZW 1XX/1 Co-Curriculum	UUW 410/2 University Malay Language		UUW 224/2 Technology Entrepreneurship	UUW 235/2 Ethnic Relation		UUW 322/2 Thinking Skills			
		UUW 122/2 Skills & Technology in Communication		UUW 212/2 University English Language	UUW233/2 Islamic & Asian Civilizations		UUW XXX/2 Option Subjects			
122	19	18		19	19		19	19	15	12
18	University English, Engineering Entrepreneurship, TITAS, Ethnic Relation, Thinking Skill, University Malay Language, Co-Curriculum, Option Subject									
Total Units for Graduation 140										
Elective : Reliability and Failure Analysis, Nanosystem Design, Analog Integrated Circuit Design, Artificial Intelligent System, MEMS Design and Fabrication, Optoelectronic Systems										

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 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
Engineering Material

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. Michael Negnevitsky, Artificial Intelligence: A Guide to Intelligent Systems (2nd Edition), Addison-Wesley, 2005.
2. Li, Hongxing, Chen, C. L. P. and Huang, H. P., “Fuzzy Neural Intelligent Systems”, CRC Press, U.S.A., 2001.
3. Adam Greenfield, Everyware : The dawning age of ubiquitous computing, New Riders, 2006.

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.

Program Engineering Technology

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.

Curriculum Structure

Bachelor of Electronic Engineering Technology (Honours)
(Electronic Telecommunication Design)

YEAR	FIRST			SECOND			THIRD		FOURTH	
SEMESTER	**I**	**II**	**INDUSTRIAL EXPOSURE (IndEX) – 1 WEEK**	**III**	**IV**	**INDUSTRIAL ENTREPRENEURSHIP (2 DAYS)**	**V**	**VI**	**VII**	**VIII**
DISCIPLINE 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 II		PQT 213/3 Mathematics III	PQT xxx/3 Mathematics IV		EUT xxx/3 Technology Management	XXX XXX/2 Technology in Society		
	PCT 100/3 Engineering Skill									
UNIVERSITY REQUIRED (17)	UZW 1xx/1 Co-Curriculum	EUW 410/2 University Malay language		UUW xxx/2 Technology Entrepreneurship	UUW 235/2 Ethnic Relation		UUW 322/2 Thinking Skill			
		UUW 122/2 IT and Communication Skills		UUW 212/2 University English	UUW 233/2 Islam & Asia Civilisation		UUW XXX/2 Option Subjects			
122	19	18		19	19		19	19	15	12
18	University English, Engineering Entrepreneurship, TITAS, Ethnic Relation, Thinking Skill, University Malay Language, Co-Curriculum, Option Subject									
Total Units for Graduation 140										
Elective: CCNA I, CCNA II, CCNA III, CCNA IV, Mobile Computing, Web Programming, Artificial Intelligent										

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.

Engineering Technology Programme

Bachelor of Chemical Engineering Technology (Honours) (Industrial Chemical Process)

Programme 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)	PRT 136/3 Electrical Technology	ECT 112/3 Engineering Skills	PRT 242/3 Introduction to Process Instrumentations	PRT 247/3 Heat Transfer	PRT 326/4 Process Control & Dynamics	PRT 328/4 Final Year Project 1	PRT 426/6 Final Year Project 2	Industrial Training (LI) PRT 431
	PRT137/3 Engineering Graphic	EKT 120/3 Computer Programming	PRT 243/4 Material and Energy Balance	PRT248/4 Reactor Engineering	PRT349/4 Utility Design	PRT 329/3 Safety & Loss Prevention	PRT 427/4 Process Plant Design II	
	PRT 140/3 Physical Chemistry	PRT 139/3 Organic Chemistry	PRT 244/4 Thermodynamics	PRT 249/3 Mass Transfer	PRT 350/4 Separation Engineering	PRT 330/4 Process Plant Design I	Elective III/3	
		PRT141/3 Analytical Chemistry	PRT245/3 Fluid Mechanics		Elective I/3	Elective II/3	PRT 429/3 Industrial Waste Treatment	
						PRT 332/3 Process Equipment Mechanical Design		
COMMON CORE (18)	PQT111/3 Mathematics for Engineering Technology I	PQT 112/3 Mathematics for Engineering Technology II		EQT 271/3 Engineering Statistics		EUT 4XX/3 Technologist in Engineering Management	EUT 4XX/3 Technologist in Society	
	PDT 180/3 Engineering Science Principle							
UNIVERSITY REQUIRED (17)	UUW 410/2 University Malay Language	UUT 122/2 Skills & Technology in Communication	UUW 224/2 Technology Entrepreneurship	UUW 212/2 University English Language	UUW 322/2 Thinking Skills			
	UZW 1XX/1 Co-Curriculum		UUW 233/2 Islamic & Asian Civilizations	UUW XXX/2 Option Subjects	UUW 235/2 Ethnic Relation			
140 (12 LI)	18	17	18	17	19	20	19	12
UNIVERSITY REQUIRED	University English, Technology Entrepreneurship, TITAS, Ethnic Relation, Thinking Skill, University Malay Language, Co-Curiculum, Option Subject							
Total Units for Graduation 140								
Elective I, Elective II, Elective III PRT 327/3 Oleochemical Process & Products; PRT331/3 Petroleum & Gas Processing Technology; PRT 428/3 Green Technology & Sustainable Waste Management; PRT430/3 Food Processing Technology								

Faculty of Engineering Technology

Course Syllabus

PRT 136/3
Electrical Technology

Course Synopsis

This course introduces 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.

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

PRT 137/3
Engineering Graphic

Course Synopsis

The subject covers principles and methods useful to modern engineering and technology which are used in determining space relations of points, lines, planes, and their combination. The student will be exposed to development of drafting skills and introduction to sketching, drafting instruments, computer software for graphic representations and problem solving. Emphasis placed on graphical analysis, orthographic projection, auxiliary views, pictorial drawings, dimensioning methods, and sectioning with adherence to drafting standards. AutoCAD or similar computer-aided drafting & design software will be used.

Course Outcomes

1. Ability to describe and demonstrate the use of various manual drafting tools and equipment.
2. Ability to demonstrate techniques and standard practices of technical graphic.
3. Ability to demonstrate the most 2D and 3D AutoCAD commands and proper use of AutoCAD software

References

1. James Bethune. 2010. Engineering Graphics with AutoCAD 2011. Prentice Hall Publishing.
2. Terence M. Shumaker, David A. Madsen, David P. Madson. 2009. AutoCAD and Its Applications Comprehensive 2010. Goodheart-Wilcox Publisher.
3. Gary R. Bertoline. 2009. Technical Graphic Communications, McGraw Hill Higher Education.
4. Dennis K. Lieu, Sheryl Sorby, Visualisation. 2009. Modelling and Graphics for Engineering Design.
5. Wai-Kai Chen. 2009.Computer Aided Design and Design Automation (The Circuits and Filters Handbook). CRC.

PRT 139/3
Organic Chemistry

Course Synopsis

This course introduces the fundamental the fundamental theories (atomic orbital and hybridization theories) and its application in reactions involving alkenes and alkynes. Then, focusing on conformational analysis of alkanes and emphasizing on the nucleophilic substitution reaction of alkyl halides. 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 the organic chemical process is discussed in terms of biofuel and pharmaceutical production.

Course Outcomes

1. Ability to understand the basic concepts (such as the atomic orbital theory and molecular orbital theory) and identify the functional groups like alkanes, alkenes and aromatic compound.
2. Ability to differentiate the chemical and physical properties of each functional group and carry out theoretical reaction mechanism at the molecular level.
3. Ability to explain the chemical, physical properties and reactions of alcohol, ether, aldehyde, ketone and carboxylic acids.
4. Ability to apply the knowledge of organic chemical process in industry such as production of aromatic and pharmaceutical.

References

1. Bruice, P.Y. 2007. Organic Chemistry 6th Edition. Pearson Prentice Hall.
2. John, E. Mcmurray. 2012.Organic Chemistry. 8th Edition. Brooks/Cole.
3. Solomon, T.W.G. & C.B. Fryhe. 2008. Organic Chemistry. 9th Edition. John Wiley and Son. Inc.
4. Francis, A.Carey. 2000. 4th Edition. McGraw Hill.
5. Wade, L.G. 2006. Organic Chemistry. Pearson Prentice Hall.

PRT 140/3
Physical Chemistry

Course Synopsis

Physical chemistry is an extensive use of mathematical models to describe fundamental knowledge in physics, chemistry and combination of both such as laws of thermodynamic, chemical equilibrium, reaction equilibrium and chemical kinetics. In this course, students will learn to calculate thermodynamic and equilibrium properties of matter, reaction equilibrium of ideal gas and mixture gas, phase diagram and etc. Laboratory experiment will illustrate concepts being discussed in lecture and familiarize students with many tools used by physical chemist.

Course Outcomes

1. Ability to explain the phenomena, basic concepts, laws and principles in physical chemistry.
2. Ability to solve problems concerning physical chemistry
3. Ability to illustrate various fundamental laws in physical chemistry.

References

1. Atkins, P. & de Paula, Julia. 2006. Physical Chemistry. 8th Edition. Oxford University Press,
2. Levine, I. N. 2002. Physical Chemistry. 5th Edition. McGraw Hill.
3. Bahl, B.S., Bahl, Arun & Tuli, G.D. 2006. Essentials of Physical Chemistry. S. Chand, New Delhi.
4. Monk, P. 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.

PRT 141/3
Analytical Chemistry

Course Synopsis

This course introduces and discusses the basic principle of analytical chemistry that covers data analysis and interpretation. Basic statistics and the utilization of statistics are applied in most of the analytical methods. To introduce, discuss and apply classical analytical methods such as gravimetriy and titrimetry. This course also meant to introduce, discuss and apply modern methods in analytical chemistry such as chromatographic and spectroscopic technique

Course Outcomes

1. Ability to calculate and perform the correct statistical method for data analysis and to remember the steps in quantitative analysis.

2. Ability to classify and use separation techniques and gravimetric methods for mass determination.
3. Ability to differentiate and to calculate the concentration of analyses of various titrimetic methods (acid-base, complexation, redox and precipitation).
4. Ability to apply the chromatography principles and to interpret and calculate the peak height for concentration determination.
5. Ability to understand the spectroscopic principles and to calculate the concentration.

References

1. Gary D. Christian. 2004. Analytical chemistry. 6th Edition. Publisher: John Wiley & Sons, Inc.
2. David Harvey. 2000. Modern Analytical Chemistry. Publisher: McGraw-Hill.
3. D. Keeley & P.J. Haines. 2002). Analytical Chemistry. Publisher: Oxford: Bios Scientific.
4. D.A. Skoog, D.M. West & F.J. Holler. 1996. Fundamentals of Analytical Chemistry. Publisher: Saunders College Publication.
5. R. Kellner et al. 2004. Analytical Chemistry: A Modern Approach to Analytical Science. 2nd Edition. John Wiley and Son.

PRT 242/3
Introduction to Process Instrumentations

Course Synopsis

The course objective is to prepare the students with the necessary skills in the process industry. The course begins with introduction to process measurements involved in the process industries, followed by introduction to fundamental of industrial valves. Students then will be taught about ISA symbology, where students will be taught with the universal symbols used in process industry. Students then will be taught how to write the identification letter as well as the tag numbers for unit operation and piping. To complete the course, students will learn how to read and develop a process flow diagram (PFD) and also piping and instrumentation diagram (P & ID).

Course Outcomes

1. Ability to define the function of different types of valves, describe and discuss the operational aspects of the valves.
2. Ability to identify and analyze the ISA Symbology for the Process Flow Diagram; apply appropriate symbols and sketch the Process Flow Diagram.
3. Ability to identify and analyze the ISA Symbology for the Piping & Instrumentation Diagram; apply appropriate symbols and sketch the Piping & Instrumentation Diagram.

References

1. McAvinew T. & Mulley R. 2005. Control System Documentation: Applying Symbols and Identification. 2nd Edition. ISA.
2. McCabe W.L., Smith J.C. & Harriott P. 2005. Unit Operations of Chemical Engineering. 7th Edition. McGraw-Hill.
3. Skousen P.L. 2004. Valve Handbook. 2nd Edition. McGraw-Hill.
4. Smith C.A. & Corripio A. 2006. Principles and Practice of Automatic Process Control. 3rd Edition. John Wiley.
5. Meier F.A. & Meier C.A. 2004. Instrumentation and Control Systems Documentation. ISA.

PRT 243/4
Material & Energy Balance

Course Synopsis

The aims of this course to teach students how they should formulate and solve material 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 apply knowledge of engineering fundamental to define and applied engineering processes and methodologies.
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.
4. Ability to plan and conduct an experimental investigation on material and energy balance.

References

1. Colin Oloman. 2005. Material And Energy Balance.
2. Colin Oloman. 2009. Chemical And Energy Balance For Engineers and Environmentalist.
3. Sigurd Skogestud. 2008. Chemical and Energy Process Engineering.
4. Bailey and Ollis . 2005. Biochemical Engineering Fundamentals. 2nd Edition. McGraw Hill.
5. Felder, Rousseau. 2005. Elementary Principles of Chemical Processes. 3rd Update Edition,. John-Wiley,

PRT 244/4
Thermodynamic

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 will determine the direction of heat flow, and the availability of energy to do the work. In this course, students will be studying the terminology, principles, theory, and practical application of the First and Second Law of engineering thermodynamics. They will also be introduced to solution thermodynamics.

Course Outcomes

1. Able to recognize and manipulate the fundamental basic properties, as well as the law of thermodynamics.
2. Able to calculate heat, work and other thermodynamics properties ideal fluid in given processes. Able to solve problems for real fluids using volumetric equations of state.
3. Able to estimate thermodynamics properties from available data by using appropriate tools.
4. Able to select specific equations of state or correlations that are appropriate for treating given problems.

References

1. Cengel, Y.A. & M.A.Boles. 2007. Thermodynamics-An engineering Approach, 6th edition. McGraw-Hill.
2. Smith, J.M., Van Ness, H.C. & Abbott, M. M. 2005. Introduction to Chemical Engineering Thermodynamics. 7th Edition, McGraw – Hill.
3. Sandler, S. 2006. Chemical, Biochemical and Engineering Thermodynamics. Wiley.
4. Moran, M.J. & Shapiro, H.N. 2008. Fundamentals of Engineering Thermodynamics. 6th Edition. John Wiley & Sons, USA.
5. Eastop, T.D. & Mc Conkey. 1995. Applied Thermodynamics for Engineering Technologies. 5th Edition. Prentice Hall, Pearson.

PRT 245/3
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 the flow system, dimensional analysis, internal flows (pipe flows), differential analysis and external flows (lift and drag).

Course Outcomes

1. Ability to analyze the essential parameters describing a fluid system and recognize the common devices used in measuring pressure and flow rates and turbo machineries.
2. Ability to calculate pressures, forces and stability in static fluid systems and identify whether a flow is steady or unsteady, uniform or non-uniform, laminar or turbulent and flow rate in the dynamic fluid system and distinguish the link between conserved quantities and the equations of fluid mechanics.
3. Ability to analyze appropriate control volumes and surfaces for developing the equations of fluid mechanics.

References

1. Cengel, Y. A. & Cimbala, J. M. 2006. Fluid Mechanics: Fundamental and Applications. Second 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. 8th Edition. John Wiley.
4. Richardson, J.F. & Peacock, D.G. (Eds). 1994. Coulson and Richardson's Chemical Engineering Volume 3 - Chemical and Biochemical Reactors and Process Control. 3rd Edition. Elsevier,
5. Denevers, N. 2004. Fluid Mechanics For Chemical Engineering. 3rd Edition. McGraw-hill Book Co.

PRT 247/3
Heat Transfer

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 analyzes heat transfer knowledge and designing heat transfer equipment such as evaporator, dryer and agitated vessel.

Course Outcomes

1. Ability to compare the heat transfer mechanism.
2. Ability to calculate mode of heat transferred.
3. Ability to analyze heat transfer knowledge as well as designing heat transfer equipment.

References

1. Holman J.P. 2001. Heat transfer Eighth SI. McGraw-Hill.
2. Christie J. Geankoplis. 2003. Transport Processes and Separation Process Principles: Includes Unit Operations. 4th Edition. McGraw-Hill.
3. McCabe et. al. 2005. Unit Operations of Chemical Engineering. McGraw Hill, New York.
4. Pauline M. Doran. 2006. Bioprocess Engineering Principles. Academic Press, London.
5. Incropera, F.P. & De Witt, D.P. 2006. Fundamentals of Heat and Mass Transfer. 6th Ed. Wiley, New York.

PRT 248/4
Reactor Engineering

Course Synopsis

This course introduces the students to various types of reactors. Topics covered include a comparison of reactors, special instrumentation and control. Here, the students will also be introduced to simple designs of bioreactors and also the scale up procedure.

Course Outcomes

1. Ability to recognize, compare and draw the schematic diagram for specific types of reactors.
2. Ability to analyze relevant data to design a stirred tank reactor according to the specific application.
3. Ability to design process scale up based on geometric similarities or constant power number.

References

1. Mark E. Davis & Robert J. Davis. 2003. Fundamental of Chemical Reaction Engineering. McGraw Hill.

2. Vivek V. Ranade. 2002. Computational Flow Modeling for Chemical Reactor Engineering. Academic Press.
3. Tapio O. Salmi, Jyri-Pekka Mikkola & Johan P. Warna, 2009. Chemical Reaction Engineering and Reactor Technology. CRC Press.
4. Norman E. B. 2008. Chemical Reactor design, optimization and Scale up.
5. Najafpour, G.A. 2007. Biochemical Engineering and Biotechnology. Amsterdam: Elsevier B.V.

PRT 249/3
Mass Transfer

Course Synopsis

This course emphasizes fundamental concepts and problem-solving techniques. Topics to be covered include mass transfer mechanisms which is diffusion, Ficks Law, Maxwell Law and designing mass transfer equipment and gas adsorption.

Course Outcomes

1. Ability to demonstrate general knowledge of mass transfer (molecular diffusion, convection).
2. Ability to derive simple models that capture the significant features of mass transfer problem.
3. Ability to analyze data to design mass transfer process and equipment.

References

1. Thirumaleshwar, M. 2006. Fundamental of Heat & Mass Transfer. Pearson Education.
2. Diran Basmadjian. 2004. Mass transfer: Principle and Appication. CRC Press.
3. Louis Theodore, Francesco Ricci. 2011. Mass Transfer Operations For Practising Engineer. Wiley.
4. Alapati Suryanarayana. 2002. Mass transfer Operation. New Age International Publisher.
5. Jaime Benitez. 2011. Principles and Modern Applications of Mass Transfer Operation. 2nd Edition. Wiley.

PRT 326/4
Process Control & Dynamic

Course Synopsis

This course includes an introduction to process control and dynamics, theoretical models, dynamic behavior of processes, feedback controllers, control system instrumentation, overview of control system design, PID controller design and troubleshooting. The theories are supported by performing laboratory experiments.

Course Outcomes

1. Ability to derive and develop a theoretical model of chemical processes, analyze Laplace transform techniques to simplify first order and second order processes and create transfer functions and state space models.
2. Ability to derive and develop dynamic behavior of first and second order processes, analyze dynamic response characteristics of more complicated processes and development of empirical models from process data.
3. Ability to analyze control system instrumentation and propose feedback control system for bioprocess and chemical processes.
4. Ability to calculate and analyze dynamic behavior of closed-loop control system.

References

1. Seborg, D.E., Edgar, T.F. & Mellicamp D.A. 2003. Process Dynamic and Control. 2nd Ed. John-Wiley.
2. Bequette,. B.W. 2003. Process Control: Modelling, Design, and Simulation. Prentice Hall.
3. Marlin, T. 2002. Process Control: Designing Processes and Control System for Dynamic Performance. McGraw-Hill.
4. Coughonowr. 1991. Process system, Analysis and Control McGraw-Hill.
5. Luyben, W. L. 1990. Process Modelling, Simulation, and Control for Chemical Engineers. New York: Mc Graw Hill.

PRT 327/3
Oleochemical Process & Products

Course Synopsis

The purpose of this course is to expose the students about oleochemical products. The first part of the course discusses the introduction of fats and oils, sources of commercial and alternative oleochemical raw materials. The second part of the course, reveals with the oleochemical processing. The last part of the course discuses the major olechemical products in the industry and application of the products and formulation in daily life.

Course Outcomes

1. Ability to define and describe the oleochemical basic concepts.
2. Ability to describe and explain the important processes in oleochemical industry.
3. Ability to describe and apply the oleochemical products and formulations.

References

1. O' Brien, R.D. 2009. Fats and Oils Formulating and Processing for Application. CRC Press.
2. O' Brien, R.D. Farr, W.E. and Wan, P.J. 2008 Intoduction to Fats and Oils Technology. Third Revised Edition. AOCS Press.
3. Gunstone, F.D. 2004. The Lipid Handbook. Blackwell Pub.
4. Erhan, S.Z. 2005. Industrial Uses of Vegetable Oils. AOCS Press.
5. Gunstone, F.D. and Hamilton, R.J. 2001. Oleochemical Manufacture and Applications. Sheffield Academic Press.

PRT 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. 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. Academic Journals.

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

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

PRT 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. 2003. Petroleum & Gas Processing, Marcel Dekker.
2. Robert E. Maples. 2000. Petroleum Refinery Process Economics. 2nd Edition. Pennwell Corp.
3. Robert A. Meyers. 2004. Handbook of Petroleum Refining Processes. 3rd Edition. McGraw Hill.
4. Ozren Osic. 2005. Oil Refineries in the 21st Century. John Wiley.
5. William C. Lyons, Joseph Zaba. 1996. Standard Handbook of Petroleum and Natural Gas Engineering.

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

PRT 349/4
Utility Design

Course Synopsis

The aim of the subject is to introduce the student to the design of applied utilities in the chemical industry. Topics covered include the design of shell and tube heat exchanger, evaporator, condenser, reboiler and cooling tower. Apart from that, exposure on integration process which involves energy integration will be emphasized as well.

Course Outcomes

1. Ability to explain the mechanism of heat transfer and its relation to different type of utilities.
2. Ability to identify and analyze data to design different types of heat exchanger.
3. Ability to identify evaporator, reboiler, condenser and other utilities and demonstrate their optimum operating procedures.

References

1. Coulson, J. M. Richardson. 2005. Chemical Engineering Design. 6th Edition. Oxford: Pergamon Press.
2. Geankoplis, C.J. 2003. Transport Process and Separation Proces., 4th Edition Mc Graw Hill.
3. Gavin P. Towler & R.K. Sinnott 2008. Chemical Engineering Design: Principle, Practice and Economics of Plant and Process Design. New York: McGraw-Hill.

4. R. K. Shah & Dusan P. Sekulic 2003. Fundamental of Heat Exchanger Design. John-Wiley & Sons.
5. Process Utility Systems: Introduction to Design, Operation and Maintenance. 1997. Institute of Chemical Engineer.

PRT 350/4
Separation Engineering

Course Synopsis

This subject aims to provide students an understanding of the principles of separation processes based on both equilibrium stage concepts and mass transfer rate control are addressed in a range of chemical process operations, including distillation, gas absorption, extraction, adsorption, and membrane-based processes.

Course Outcomes

1. Ability to apply principles; develop a basic design for gas-liquid separation equipment (gas absorber) and vapor-liquid separation equipment (distillation column).
2. Ability to apply principles; develop a basic design for liquid-liquid separation equipment (extractor) and fluid-solid separation equipments (adsorber and leaching equipment).
3. Ability to apply and calculate based on principles of membrane separation process and mechanical- physical separation process (filtration and centrifugation).

References

1. Seader J. D. & E. J. Henley. 1998. Separation Process Principles. New York: John Wiley.
2. Wankat, P. C. 2003. Separation Process Engineering. 2nd Ed. Prentice Hall.
3. McCabe, W. L., Smith, J. C. & Harriot, P. 2005. Unit Operations of Chemical Engineering. 5th Ed. New York: McGraw-Hill.
4. Wankat, P. C. 2011. Separation Process Engineering. Prentice Hall.
5. Geankoplis, C. J. 2003. Transport Processes and Unit Operations. 4th Ed. Prentice Hall.
6. Perry, R. H. & Green, D.W. Perry's. 1997. Chemical Engineers's Handbook. 7th Ed.. New York: McGraw Hill.

PRT 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. 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. Academic Journals.

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

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

PRT 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 to interpret compares, justify and choose the correct method for particular industrial waste treatment.

References

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

PRT 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. 2009. Introduction to Food Engineering, Fourth Edition (Food Science and Technology). Academic Press. Elsevier.
2. Side, Catherine. 2008. *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.
4. Williams, C. 2006. Improving the Fat Content of Foods. Woodhead Publishing, Limited.
5. Sharma, S.K., Mulvaney, S.J. and Rizvi, S.S.H. 2000. Food Process Engineering Theory and Laboratory Experiments. Wiley Interscience.

School of Business Innovation and Technopreneurship (PPIPT)

Program

- Bachelor of Business (Honours) (Engineering Entrepreneurship)
- Bachelor of Business (Honours) (International Business)

Address

PUSAT PENGAJIAN INOVASI PERNIAGAAN DAN TEKNOUSAHAWAN (PPIPT)
Universiti Malaysia Perlis (UniMAP)
Jalan Kangar - Alor Setar
01000 Kangar
Perlis
Tel : +604 - 979 7707
Faks : +604 - 979 7708

Introduction

School of Business Innovation and Technopreneurship (PPIPT) was approved for inception on June 4, 2010. PPIPT was established to serve as a catalyst in disseminating knowledge in management and business not only to all departments at UniMAP, in particular, the engineering schools but also the society at large.

Program

Currently PPIPT offers two business program:

1. Bachelor of Business (Honours) (Engineering Entrepreneurship)
2. Bachelor of Business (Honours) (International Business).

The main aim of the Bachelor of Business (Hons) (Engineering Entrepreneurship) program is to prepare business students majoring in entrepreneurship as well as basic skills in engineering to become entrepreneurs. This is designed for students interested in entrepreneurship who wish to develop knowledge and basic skills of engineering associated with the production and marketing of technology-based products. This program will be able to produce graduates with balanced knowledge and skills in entrepreneurial and technical aspects. Student will be moulded and guided in learning the basic subjects of engineering and entrepreneurship, nurtured to be self-reliant and have high competitiveness to face the challenges in the current globalized environment.

The main aim of the Bachelor of Business (Honours) (International Business) program is to produce graduates who are knowledgeable and capable of business transactions in the international perspective, as Malaysia is now increasingly active in international trade. Graduates from this program are trained to have the ability to incorporate and apply the knowledge and skills in business. Student will also be groomed to be self-reliant and able to find solutions to a variety of problems through innovative and creative thinking. Student will also be instilled with noble and ethical values.

Academic Staff

Professor Dato Wira Dr. Mohd Salleh Hj. Din
Post Graduate Advance Management, University of Pennsylvania, USA
Ph.D (Technopreneurship and Small Business) University of Durham, UK
MBA (Finance and Marketing), Miami University, USA
BSc. (Accounting), Miami University, USA
Dip. in Accountancy, UiTM, Malaysia
Tel : 04-979 7726
e-mail : sallehdin@unimap.edu.my

Professor Dr. Rosni Bakar
Ph.D (Economics), University of Exeter, England, UK
MA (Economics), Eastern Illinois University, USA
BA (Economics), Eastern Illinois University, USA
Dip. Ed., UTM, Malaysia.
Tel : 04-979 7728
e-mail : rosni@unimap.edu.my

Associate Professor Dr. Hazry Desa
Ph.D (Engineering), Oita University, Japan
Bac. of Mechanical Engineering, Tokushima University, Japan
Tel : 04-979 7707
e-mail : hazry@unimap.edu.my

Associate Professor Dato' Dr. Haji Abdul Razak Haji Omar
Ph.D (Business Studies), University of Stirling, Scotland, UK
MBA, University of New Haven, Connecticut, USA
B.Soc.Sc. (Hons), USM, Malaysia
Professional Certificate in Public Administration, University of New Heaven, Connecticut, USA
e-mail : razakomar@unimap.edu.my

Associate Professor Ku Halim Ku Ariffin
Master of Public Administration, USM / Syracuse, Malaysia
B.Soc.Sc. (Hons), USM, Malaysia
Tel : 04-979 77886
e-mail : ku.halim@unimap.edu.my

Associate Professor Dr. Yoshifumi Harada
DBA, Kanagawa University, Japan
MSc. (Economics), Murray State University, USA.
MBA, Hampton University, USA
B.Sc (Law), Kobegakuin University, Japan
Tel : 04-979 7884
e-mail : yoshifumi@unimap.edu.my

Associate Professor Dr. Idris Md Noor
Ph.D (Curriculum Studies), University of Manchester, UK
M.Ed, University of Birmingham, UK
BA. Ed (Hons) Geography/Linguistics, USM, Malaysia
e-mail : idris@unimap.edu.my

Associate Professor Dr. Md Aminul Islam
Ph.D (Finance), USM, Malaysia
MBA, USM, Malaysia
BBA, IIUM, Malaysia
Adv. Dip. in Teaching In Higher Education, Nottingham Trent University, UK
Tel : 04-979 8593
e-mail : amin@unimap.edu.my

Associate Professor Mohamed Murray Hunter
Master of Organisation Behaviour , Swinburne University of Technology, Australia
Dip. of Perfumery, Plymouth University, UK
e-mail : murray@unimap.edu.my

Associate Professor Lt. Kol. Azuddin Hj. Bahari (B)
MBA, Leicester, UK
Dip. Military Studies, Armed Forces Staff College, Malaysia
Dip. Personnel Management, UKM, Malaysia
Tel : 04-979 7734
e-mail : azuddin@unimap.edu.my

Dr. Muhammad Shahar Jusoh
Ph.D (Quality Management), UUM, Malaysia
MSc. (Information Management), UiTM, Malaysia
B. BA (Hons), UUM, Malaysia
Tel : 04-979 7714
e-mail : shahar@unimap.edu.my

Dr. Mohd. Suberi Bin Ab. Halim
Ph.D (Financial Management in Construction), USM, Malaysia
MSc. (Project Management), USM, Malaysia
BA. Economics, UM, Malaysia
Tel : 04-979 7735
e-mail : suberi@unimap.edu.my

Dr. Arman Hadi Bin Abdul Manaf
Ph. D (Business Administration). Asia e- University, Malaysia
MBA, UUM, Malaysia
BBA, Western Michigan University, USA
Tel : 04-979 7742
e-mail : arman@unimap.edu.my

Dr. Syed Faiz Ahmed
Ph.D (Electronic Engineering), FEST, Hamdard University, Pakistan
MSc. Electrical & Electronic Engineering (Computer Control & Automation), Nanyang Technological University, Singapore
Bac. of Electrical Engineering (Electronic Engineering), Usman Institute of Technology, Hamdard University,Pakistan
e-mail : syedfaiz@unimap.edu.my

Dr. Abul Bashar Bhuiyan
Ph.D (Environment & Development), UKM, Malaysia
MBA (Accounting), Islamic University, Lushtia, Bangladesh
BBA (Accounting), Islamic University, Kushtia, Bangladesh
Tel : 04-979 7869
e-mail : bashar@unimap.edu.my

Mr. Lokman Salim
MBA, Central Michigan University, USA
BSc. of Business Admin, Northern Illinois University, USA
Dip. in Accountancy, UiTM, Malaysia
e-mail : lokmansalim@unimap.edu.my

Lt. Kol. Dr. Abdullah Osman
Doctor Business Administration, UUM, Malaysia
Master In Management, UM, Malaysia
Dip. Strategic And Defense Studies, UM, Malaysia
Dip. in Business Studies, ICMK-UK
e-mail : abdullahosman@unimap.edu.my

Tuan Haji Rusli Abd Hamid
MBA, UKM, Malaysia
BSc. (Hons) (Biology), USM, Malaysia
Dip. in Public Management, INTAN, Malaysia
Certificate in Mechanical Engineering (Production), Politeknik Ungku Omar (PUO), Malaysia
Tel : 04-979 7731
e-mail : rusli@unimap.edu.my

Mr. Hussen Nasir
Executive Master of Business Administration, UiTM, Malaysia
B.BA (Hons) Finance, UiTM, Malaysia
Dip. BS, UiTM, Malaysia
Certificate in General Mechanical, Politeknik Ungku Omar (PUO), Malaysia
Tel : 04-979 7725
e-mail : hussen@unimap.edu.my

Mr. Wan Mashumi Wan Mustafa
MBA, UUM, Malaysia
BBA (Honours)(Marketing), UUM, Malaysia
Dip. in Business Studies (Marketing), UiTM, Malaysia
Tel : 04-979 7883
e-mail : wanmashumi@unimap.edu.my

Ms. Atikah Nor Johari
MBA, UUM, Malaysia
B.BA (Hons) Finance, UUM, Malaysia
Tel : 04-979 7733
e-mail : atikahnor@unimap.edu.my

Ms. Azlini Che Hassan @ Hassan
MBA, UUM, Malaysia
BBA (Hons) Human Resource Management, UUM, Malaysia
Tel : 04-9797717
e-mail : azlini@unimap.edu.my

Ms. Bibi Noraini Mohd Yusuf
MSc. (International Business), UUM, Malaysia
Bac. of International Business Management, UUM, Malaysia
Tel : 04-979 7741
e-mail : bibinoraini@unimap.edu.my

Ms. Hafizah Abdul Rahim
M.Ec, IIUM, Malaysia
Bachelor of Syariah & Economics (Honours), UM, Malaysia
Tel : 04-979 7715
e-mail : hafizahrahim@unimap.edu.my

Ms. Husna Afifi Mohd Yusoff @ Mat Jusoh
MSc. (Information Management), UiTM, Malaysia
Bac. of Public Management (Honours), UUM, Malaysia
Tel : 04-979 8715
e-mail : husnaafifi@unimap.edu.my

Mr. Ku Amir Ku Daud
MBA, UUM, Malaysia
BBA (Marketing) UiTM, Malaysia
Tel : 04-977 1062
e-mail : kuamir@unimap.edu.my

Ms. Mashitah Binti Abdul Mutalib
Master Of Laws (LLM) General
University Of Edinburgh, UK
Bachelor Of Laws (Hons.) (LLB) UIA
e-mail : mashitahmutalib@unimap.edu.my

Mr. Mohd Juraij Abd Rani
MBA (Marketing), UPM, Malaysia
BBA (Honours) Marketing, UiTM, Malaysia
Diploma in Accountancy, KUIS, Malaysia
e-mail : juraij@unimap.edu.my

Mr. Mohammad Shariff Ismail
MBA, UUM, Malaysia
BA (Hons) (Accounting & Finance), Southbank University London
Dip. in Education, Kuala Lumpur Technical Teaching College, Malaysia
Dip. in International Baccalaureate, MARA College Banting, Malaysia
Tel : 04-979 7702
e-mail : shariff@unimap.edu.my

Mr. Mohd Fitri Mansor
MSc. (Management), UUM, Malaysia
BBA (Hons) (Human Resource Management), Coventry University, UK
Tel : 04-979 7743
e-mail : fitrimansor@unimap.edu.my

Mr. Mohd Shahidan Shaari
M.Ec., UUM, Malaysia
Bac. of Economics, UUM, Malaysia
Tel : 04-979 7716
e-mail : shahidanshaari@unimap.edu.my

Mr. Mohd. Rosli Abd. Ghani
MBA., UUM, Malaysia
BBA, UIA, Malaysia
e-mail : mohdrosli@unimap.edu.my

Mr. Muhamad Azan Yaakob
MBA, UUM, Malaysia
BBA (Marketing)., UiTM, Malaysia
DIB, UiTM, Malaysia
e-mail : azan@unimap.edu.my

Mr. Abul Bashar Bhuiyan
PhD Environment & Development, UKM, Malaysia
MBA Acctng, Islamic University, Lushtia, Bangladesh
BBA Acctng, Islamic University, Kushtia, Bangladesh
Tel : 04-979 7869
e-mail : bashar@unimap.edu.my

Mr. Md. Tareq Bin Hossain
MBA (Islamic Banking and Finance, IIUM, Malaysia
BBA, Islamic University, Bangladesh.
Tel : 04-979 7877
e-mail : tareq@unimap.edu.my

Ms. Norshahrizan Nordin
MSc. (Information & Communication Technology), UUM, Malaysia
Bac. of Technology Management, UUM, Malaysia
Dip. In Manufacturing Technology, KUSZA, Malaysia
e-mail : norshahrizannordin@unimap.edu.my

Mr. Raziff Jamaluddin
MBA, UiTM, Malaysia
BBA (Hons) International Business, UiTM, Malaysia
e-mail : raziff@unimap.edu.my

Ms. Siti Norwahida Shukeri
MSc. (Accounting), IIUM, Malaysia
BAcc. (Hons), IIUM, Malaysia
e-mail : sitinorwahida@unimap.edu.my

Ms. Siti Nor Junita Mohd Radzi
MSc. (International Accounting), UUM, Malaysia
BAcc. (Hons), UiTM, Malaysia
Dip. in Accounting, UiTM, Malaysia
Tel : 04-979 7737
e-mail : sitijunita@unimap.edu.my

Ms. Suraiya Ibrahim
MBA (Accounting), UUM, Malaysia
BAcc. (Hons), UiTM, Malaysia
Dip. in Accounting, UiTM, Malaysia
e-mail : suraiya@unimap.edu.my

Ms. Suriani Sukri
MBA, UUM, Malaysia
BBA (Hons), UUM, Malaysia
Tel : 04-979 7723
e-mail : surianisukri@unimap.edu.my

Ms. Syahira Sa'aban
MBA (Human Resource Management), UUM, Malaysia
BBA (Hons) Human Resource Management, UiTM, Malaysia
e-mail : syahirasaaban@unimap.edu.my

Ms. Nurul Ilahi Zainal Abidin
MSc. (International Business), UUM, Malaysia
BBA (International Business), UiTM, Malaysia
e-mail : nurulilahi@unimap.edu.my

Ms. Tengku Suriani Tengku Yaakub
MBA, University of Central Missouri, USA
BSc. (Busines Administration & Computer Science), Indiana State University, USA
Tel : 04 – 9797885
e-mail : tengkusuriani@unimap.edu.my

Ms. Syarifah Fairuz Syed Radzuan
MSc. (International Accounting), UUM, Malaysia
BAcc. (Hons), UiTM, Malaysia
Dip. of Accounting, UiTM, Malaysia
Tel : 04-979 7705
e-mail : syarifahfairuz@unimap.edu.my

Ms. Syahida Kamil
MSc. (Finance), UUM, Malaysia
BBA. (Hons) Finance, UiTM, Malaysia
Dip. in Business Studies, UiTM, Malaysia
Tel : 04-979 7873
e-mail : syahida@unimap.edu.my

Mr. Mohd Akhir Bin Ahmad
MBA, UUM, Malaysia
Bachelor of Electrical, UTM, Malaysia
Diploma of Electronic Communication, Takuma College Of Technology, Japan
Diploma of Natural Science, Shinjuku, Japan
Tel : 04-979 7736
e-mail : mohdakhir@unimap.edu.my

Ms. Intan Maizura Abdul Rashid
MBA (Finance), UKM, Malaysia
BBA (Hons) (Finance), UiTM, Malaysia
Dip. Hotel Mgt, UiTM, Malaysia
e-mail : intanmaizura@unimap.edu.my

Ms. Nurul Ilahi Zainal Abidin
MSc. (International Business), UUM, Malaysia
BBA (International Business), UiTM, Malaysia
e-mail : nurulilahi@unimap.edu.my

Ms. Nur Afifah Shuib
Master in Accountancy, UiTM, Malaysia
BAcc. (Hons), IIUM, Malaysia
Tel : 04-979 7872
e-mail : afifahshuib@unimap.edu.my

Eng. Mohammad Harith Amlus
MSc. (Technology Management), UUM, Malaysia
Bac. of Manufacturing Engineering (Process & System), UTEM, Malaysia
Tel : 04-979 7719
e-mail : harithamlus@unimap.edu.my

Mr. Muhammad Fazlee Sham Abdullah
MSc. (International Business), UUM, Malaysia
BBA (Marketing), UiTM, Malaysia
Tel : 04-979 7730
e-mail : fazleesham@unimap.edu.my

Mr. Muhammad Safizal Abdullah
MSc. (Management), UUM, Malaysia
BBA, UUM, Malaysia
e-mail : safizal@unimap.edu.my

Mr. Mohd Zukime Mat Junoh
MSc. (Information Technology), UUM, Malaysia
Bac. of Economics (Hons), UUM, Malaysia
e-mail : zukime@unimap.edu.my

Ms. Evawaynie Valquis Md. Isa
MBA, UiTM, Malaysia
BBA (Hons) (Finance), UiTM, Malaysia
Dip. In Investment Analysis, UiTM, Malaysia
e-mail : evawaynie@unimap.edu.my

Ms. Nursakinah Abdul Karim
Master in Management (IT), UPM, Malaysia
BBA (Hons) (Entrepreneurship Development), UNITEN, Malaysia
e-mail : sakinahkarim@unimap.edu.my

Study Leave

Mr. Hirwan Jasbir Bin Jaafar
Master of Human Resource Development, UPM, Malaysia
Bachelor of Law (Honours), UKM, Malaysia
e-mail : hirwan@unimap.edu.my

Ms. Julinawati Suanda
MBA, UUM, Malaysia
Bac. of Public Management, UUM, Malaysia
e-mail : julina@unimap.edu.my

Ms. Tunku Salha Tunku Ahmad
M.Ec, UUM, Malaysia
Bac. of Economics, UUM, Malaysia
Dip. in Education, Maktab Perguruan Persekutuan P. Pinang, Malaysia
e-mail : salha@unimap.edu.my

Mr. Adi Anuar Azmin @ Che Wan
M.Ed (Human Resource), UTM, Malaysia
BBA (Hons), UiTM, Malaysia
Dip. in Banking, UiTM, Malaysia
e-mail : adianuar@unimap.edu.my

Mr. Ahmad Zulhusny Rozali
MSc. (Information Technology Entrepreneurship), UTM, Malaysia
BSc. (Computer Science), UTM, Malaysia
e-mail : zulhusny@unimap.edu.my

Ms. Dayang Hasliza Muhd Yusuf
MSc. (Finance), IIUM, Malaysia
BBA (Hons), IIUM, Malaysia
e-mail : dayanghasliza@unimap.edu.my

Mr. Muhammad Faisal Hamidi @ Abd Rani
MSc. (Management), UUM, Malaysia
Bac.in International Business (Hons), UUM,Malaysia
Dip. in International Trade,KUSZA, Malaysia
e-mail : faisalhamidi@unimap.edu.my

Ms. Nur Syuhadah Kamaruddin
MBA, UUM, Malaysia
BBA (Minor - Operation Management), UUM, Malaysia
Dip. in Business Studies, ITM, Malaysia
e-mail : syuhadah@unimap.edu.my

Ms. Wan Sallha Yusoff
MBA (Accounting), UUM, Malaysia
BAcc. (Hons), UUM, Malaysia
e-mail : wansallha@unimap.edu.my

Administrative Staff

Ms. Ruhaida Ismail
Assistant Registrar
Tel : 04-979 7704
e-mail : ruhaida@unimap.edu.my

Ms. Fatin Syazwani Syamimi Abd. Majid
Secretary
Tel : 04-979 7707
e-mail : fatinsyazwani@unimap.edu.my

Mr. Mordani Morni
Administration Assistant
Tel : 04-979 7710
e-mail : mordani@unimap.edu.my

Mr. Mohd Alif Zakaria
Administration Assistant
Tel : 04-979 7709
e-mail : alifzakaria@unimap.edu.my

Ms. Siti Azura Abdullah
Administration Assistant
Tel : 04-979 7711
e-mail : sitiazura@unimap.edu.my

Mr. Mohd Hafis Md. Nor
Technician
Tel : 04-979 7710
e-mail : mohdhafis@unimap.edu.my

Mr. Shubri Salleh
Office Assistant
Tel : 04-979 7711
e-mail : shubri@unimap.edu.my

Mr. Muhamad Akmal Md. Zin
General Worker
Tel : 04-979 7711
e-mail : akmalzain@unimap.edu.my

Program Educational Objective (PEO) and Program Outcomes (PO)

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) – 2013/2014 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 PROGRAMME (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		UUW212/2 University English				
	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

* Students must register themselves one (1) week earlier than the University's Academic Calendar in order to prepare for incubator program during the following semester break.

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
17	BFT225/3	Engineering System Design	3
18	BFT3xx/3	Specialization in Engineering	3

Curriculum Structure for Bachelor of Business (Honours)

(International Business) – 2013/2014 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	UUW235/2 Ethnic Relations	UUW1x1/2 Foreign Language (Part 1)		EUW1x2/2 Foreign Language (Part 2)	EUW2x3/2 Foreign Language (Part 3)		EUW2x4/2 Foreign Language (Part 4)	UUW322/2 Thinking Skills
	UUW4102 Malay Language	UUW212/2 University English		BUW123/3 Business Communication	UUW 224/2 Engineering Entrepreneurship			
	UZW1xx/1 Co-Curriculum (Uniformed Body)	UZW2xx/1 Co-Curriculum (Uniformed Body)		UZWxxx/1 Co-Curriculum				
		BUW122/2 Skills and Technology in Communication						
		UUW233/2 Islamic & Asian Civilizations						
124 units	20	21	3	21	19	3	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) (International Business)
Elective Course

RE09 - Bachelor of Business (Honours) (International Business)			
No	**Course Code**	**Course Name**	**Credit Hour**
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
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

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. Vengedasalam D. & Karunagaran (2010). Principles of Business Economics, (2nd edition.), Oxford University Press.
2. Mastrianna, F.V. (2010). Principles of Economics, (15th ed.), South-Western, Cengage Learning.
3. Nellis, J.G. and Parker, D. (2008). Principles of Business Economics, (2nd ed.), Prentice Hall, Pearson

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. Vohrah B. & Wu M.A,'The Commercial Law of Malaysia, (2nd Edition), Kuala Lumpur Pearson Education Malaysia Sdn. Bhd.
2. Ivamy E.R.H (1986), 'Underhill's Principles of the Law of Partnership, (12th ed), London: Butterworth.
3. Lee M.P (1997), 'General Principles of Malaysian Law', Kuala Lumpur MLJ.

BFT105/3
Introduction to Business

Course Synopsis

This course presents business theory 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. Ebert R.J., Griffin, Ricky W. (2011). Business Essentials, (8th edition), New Jersey: Pearson Education Inc.
2. Dlabay, L., Burron, J.L. and Eggland, S.A. (2010). 'Intro to Business', Asia Edition. Singapore: Cengage Learning Asia Pte. Ltd.
3. Pride,William M., Hughes R.J, and Kapoor J.R. (2009). Introduction to Business, 10th Edition, South-Western-Cengage Learning Pub

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.

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. Smart and Graham, (2012), Introduction to Financial Management, Third Edition, Cengage Learning.
2. Titman, Keown and Martin, (2011), Financial Management; Principles and Application (Eleventh Edition), Pearson Prentice Hall Publication.
3. Keown, Martin, Perry (2011). Foundations of Finance: The Logics and Practice of Financial Management, Pearson International Edition, Sixth Edition, Pearson Prentice Hall Publications, USA.

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, (2012), Principles of Marketing An Asian Perspective, Pearson Education South Asia Pte. Ltd.
2. P. Kotler, G. Armstrong, (2011), Marketing An Introduction, Pearson Education Inc.
3. P. Kotler, G. Armstrong, (2011), Principles of Marketin A Global Perspective, Pearson Education South Asia Pte. Ltd.

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.

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. George. J. M. & Jones, G. R. (2012). Understanding and Managing Organizational Behavior (6th Edition). Boston: Pearson.
2. Quick, J. C. & Nelson, D. L. (2011). Principles of Organizational Behavior: Realities and Challenges (7th Edition). Australia: South-Western Cengage Learning.
3. Greenberg, J. (2010). Managing Behavior in Organizations (5th Edition). New Jersey: Pearson.

BFT221/3
Operation Management

Course Synopsis

This course will be of interest to business programmes 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. Krajewski and Ritzman, (2010) Operations Management, Ninth Edition, Prentice Hall.
3. William J. Stevenson (2007), Operations Management (9th Edition), McGraw-Hill

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. Horngren, Sundem, Stratton, Burgstahler and Schatzberg (2011), Introduction to Management Accounting (15th Edition), Prentice Hall
3. Brewer, Garrison and Noreen (2010), Introduction to Managerial Accounting (5th Edition), McGraw-Hill

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. Mondy, R. W. & Mondy, J. B. (2012). Human Resource Management (12th Edition). Boston: Pearson.
2. Maimunah Aminuddin (2011). Human Resource Management: Principles and Practices (2nd Edition). Shah Alam: Oxford Fajar.
3. Siti Zubaidah Othman et al. (2010). BBPB2103 Human Resource Management (Open University Malaysia Module). Selangor: Pearson Prentice Hall.

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. Ghauri, P. & Gronhaug, K. (2010) Research methods in Business Studies (4th Edition), Prentice Hall Publications.
2. Sekaran U. (2010) Research Methods for Business: A Skill-Building Approach (5th Ed). John Wiley & Sons.
3. Saunders, M., Lewis, P. & Thornhill, A. (2009) Research Methods for Business Students (5th edition), Prentice Hall.

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.

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. David, F. R. (2011). Strategic Management: Concepts and Cases (13th edition). New Jersey: Prentice Hall.
3. Haim, H. A. (2010). Pengurusan Strategik: Konsep dan Kes (3rd. edition). Kuala Lumpur: Pearson-Prentice Hall.

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.

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. Kathleen, R.A. (2012), New Venture Creation, (5th Edition), South Western Cengage Learning, Singapore.
3. 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. (2010), Manufacturing Engineering and Technology, (6th Ed.), Prentice Hall.
2. Grover M. P, (2002) Fundamentals of Modern Manufacturing, (2nd Ed.), John Willey & Sons, Inc.
3. Schey J. A, (2000) Introduction to Manufacturing Processes, (3rd Ed.), Mc Graw Hill.

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. Ulrich, K.T. and Eppinger, S.D. (2010). Product Design and Development (5th Edition), McGraw-Hill.
2. 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.

3. Baxter, M. (1995). Product Design: Practical Methods for Systematic Development of New Products, CRC Press.

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.

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. Clements & Gido (2012). Effective Project Management, (2th Edition). South-Western Cengage Learning.
2. Pinto, J.K., (2010). Project Management – Achieving Competitive Advantage, (2th Edition). Pearson.
3. Meredith & Mantel, Jr. (2006). Project Management - A Managerial Approach. (6th edition). John Wiley & Sons, Inc.

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.

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. Daniels J. D., Radebaugh L. H., & Sullivan D. P. (2011), International Business: Environments and Operations, (13th Edition), Pearson.
2. Inkpen A., & Ramaswamy, K. (2005), Global Strategy: Creating and Sustaining Advantage across Borders, Oxford University Press, USA.
3. Griffin R. W., & Pustay M. W. (2010), International Business, (6th Edition), Pearson.

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.

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. Inkpen A., & Ramaswamy, K. (2005), Global Strategy: Creating and Sustaining Advantage across Borders, Oxford University Press, USA.

2. Ghemawat P. (2007), Redefining Global Strategy: Crossing Borders in a World Where Differences Still Matter, Harvard Business School Press.
3. Wetherly P. & Otter D. (2011), The Business Environment Themes and Issues (2nd Edition), Oxford.

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. Keegan, W., Green, M. (2011). Global Marketing, (6th edition), Pearson Prentice-Hall.

References

1. Chernev A.(2007). Strategic Marketing Analysis, (2nd Edition). Brightstar Media, Inc.
2. C. Samuel Craig and Susan P. Douglas (2005). International Marketing Research. Wiley.

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.

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.

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)

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.

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. Wright, Paul H. (2002). Introduction to Engineering. (3rd ed). John Wiley & Sons. New York

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.

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

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.

References

1. Adelman, J.P. and Marks, M.A. (2010). Entrepreneurial Finance (5th Edition), Pearson International Edition.
2. Mohd Noor Mohd Shariff, Rosli Mohd Saad, Siti Hajar Mohd Ali (2006). Financial Analysis for Entrepreneur, Pearson Prentice Hill.
3. Smith, R.L. and Smith Kiholm, J. (2004). Entrepreneurial Finance (2nd Edition), Wiley Publishing.

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.

References

1. Schindehutte, M., Morris, M. and Pitt, L., (2009),'Rethinking Marketing: The Entrepreneurial Imperative', Prentice Hall.
2. Bjerke, B. and Hultman, C., (2004), 'Entrepreneurial Marketing: The Growth of Small Firms in the New Economic Era ', Edward Elgar Pub.
3. Buskirk, B. and Lavik, M. ,(2003), 'Entrepreneurial Marketing: Real Stories and Survival Strategies', South-Western College Pub; 1st Edition.

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. Gibson C.H. (2011). Financial Statement Analysis (12th Edition). Cengage Learning.
2. Carlberg C. (2010). Business Analysis: Microsoft Excell 2010. Que.
3. Palepu K.G. , Healy P.M.and Peek E. (2010) Business Analysis and Valuation IFRS edition (2nd Edition). Cencage Learning.

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. Daft, R. L. (2011). Leadership, (5th Edition), South-Western, Cengage Learning.
2. Achua, L. (2010). Effective Leadership, (4th Edition), South-Western, Cengage Learning.
3. Yulk, G. D. (2009). Leadership in Organizations, (7th Edition), Pearson 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. Rejda G. E. (2011). Principles of Risk Management and Insurance (11th Edition). Pearson Publications.
2. Chance, D.M. and Brooks R. (2010), An introduction to Derivatives and Risk Management, South Western, Cengage Learning.
3. Hull, J. C. (2009), Options, Futures, and Other Derivatives, (7th Edition), 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. Schultz, M. and Doerr, J. (2009). Professional Services Marketing, Wiley
3. Zeithaml, V., Bitner, M.J. and Gremler, D.D. (2008), Services Marketing (5th Edition), McGraw-Hill/Irwin

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

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.

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. Murphy and Wood (2011), Contemporary Logistics, (Tenth Edition), Prentice Hall
2. Ronald H. Ballou (2004), Business Logistics/Supply Chain Management, (Fifth Edition), 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.

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. Hatten T.S (2012). Principles of Small Business Management. 5th Edition. South Western: Cengage Learning Publication
2. 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
3. Frederick, F.H., Kuratko, D.F., & Hodgetts, R.M., (2010) Entrepreneurship: Theory, Process, Practice, Asia-Pacific Edition, 2nd edition, Melbourne, Cengage

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.

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.

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.

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.

References

1. Carbaugh, R. J.(2008). Global Economics, (13th Edition), South-Western Cengage Learning
2. Sawyer,W. C., Sprinkle, R. L.,(2008). International Economics. (3rd Edition), Prentice Hall
3. Balaam, D. N and Veseth, M (2007). Introduction to International Political Economy (4th Edition.). New Jersey: Pearson Prentice Hall.

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

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. Dennis Briscoe (2008). International Human Resource Management (Global HRM). Routledge.
2. Dowling, Peter J., Denice E. Welch, and Randall S. Schuler, (1999). Introduction and Overview, International Human Resource Management, Cincinnati: ITP, Southwest 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.

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. Zeithaml, V., Bitner, M.J. and Gremler, D.D. (2008), Services Marketing (5th Edition), McGraw-Hill/Irwin
3. Schultz, M. and Doerr, J. (2009). Professional Services Marketing, Wiley

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

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. Murphy and Wood (2011), Contemporary Logistics, (Tenth Edition), Prentice Hall.
2. Ronald H. Ballou (2004), Business Logistics/Supply Chain Management, (Fifth Edition), 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. Boatright J. R. (2009), Ethics and the Conduct of Business, International Edition, 6/E, Pearson Higher Education.
2. Ferrell O.C., Fraedrich J., & Ferrell L. (2010), Business Ethics and Policy: Ethical Decision Making and Cases, Asia Edition, (1st Edition), Cengage Learning.
3. Beauchamp T. L., Bowie N., Arnold D. (2009), Ethical Theory and Business, 8/E, Pearson Higher Education.

Job Opportunities

Bachelor of Business (Honours) (Engineering Entrepreneurship)

Engineering Entrepreneurship graduates have good business potential because they are trained and well-equipped to be entrepreneurs. Off-campus incubator experience shall strenghtened confidence required by the graduates. For those who are looking for business opportunities in the engineering field, this program provides technical and entrepreneurial skills areas. In term of career opportunities, could involved in finance, hospitality, investment, public service, marketing and production.

Bachelor of Business (Honours) (International Business)

International Business graduates have reasonably enough knowledge and skills as they have been dealing with International Business, experiencing industrial training at well-known companies. These knowledge and skills are in-line with Malaysia socio-economy. Tramsformation program especially at international level. In term of career opportunities, could involved in Global Management Officer, International Sales Manager, International Sales Representative, International Finance Manager, Human Resource Manager, Operations Manager, Financial Analyst, Audit Staff, Sales Manager, Project Management Specialist, Investment & Banking Executive, Human Resource Specialist and IT Analyst.

2013/2014

UniMAP

Tel: +6(04) 979 8008 / 8044
Fax: +6(04) 979 8099

Knowledge • Integrity • Excellence
www.unimap.edu.my

NIOSH CERTIFICATION