



**UNIVERSITI  
KUALA LUMPUR**

**Malaysian Institute of Chemical &  
Bioengineering Technology**

**Programme Handbook  
January 2022 Intake  
(DCET)**

***Disclaimer:***

*The Programme Handbook Diploma January 2022 Intake (DCET)  
is meant for the students for Diploma January 2022 Intake (DCET).*

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Malaysian Institute of Chemical & Bioengineering  
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## Vision & Mission of University

# CORPORATE STRATEGY



## VISION

TO BE THE LEADING ENTREPRENEURIAL TECHNICAL UNIVERSITY







## MISSION

TO PRODUCE ENTERPRISING GLOBAL TECHNOPRENEURS

# Academic Activities Calendar 2022

DESCRIPTION	JANUARY SEMESTER
Semester Registration for Returning Students	<b>Week 0 - 1</b>
Online Semester Registration is <b>CLOSED</b>	<b>Week 2</b>
Late Semester Registration	<b>Week 1</b>
Appeal to Reactivate Student Status	<b>Week 4</b>
Deferment from Study After Week 5 – Pay full Tuition Fees & subjects will recorded as 'W'	<b>Week 1 – 9</b>
Add Subject <b>(ONLINE - ECITIE)</b>	<b>Week 0 – 1</b>
Drop Subject <b>(ONLINE- ECITIE)</b>	<b>Week 1 – 4</b>
Verifying Subject Registration <b>(ONLINE - ECITIE)</b>	<b>Week 3 – 4</b>
Correction of records only on: a) Wrong Subject Code b) Change Subject Group  After Week 4 – Penalized at minimum RM50 for each request.  After Week 9 - Penalized at minimum RM100 for each request.	<b>Week 2 – 4</b>
	<b>Week 5 – 9</b>
	<b>Week 10 onwards</b>
Subject Withdrawal <b>(MANUAL - FORM)</b>	<b>Week 5 – 9</b>
Subject Pre-Registration <b>ONLINE – ECITIE</b>	<b>Week 11 – 12</b>
Draft of Final Examination Timetable released	<b>Week 10</b>
Final Examination Timetable released	<b>Week 12</b>
BAR List released	<b>Week 15</b>
<b>FINAL EXAMINATION</b>	<b>Week 16 - 17</b>

## Academic Top Management Team UniKL MICET

	<p>Associate Professor Ts. Dr Ruzainah binti Ali@Jaafar            Dean of UniKL MICET            Email: <a href="mailto:ruzainah@unikl.edu.my">ruzainah@unikl.edu.my</a>            Phone: 06-551 2146</p>
	<p>Dr Raja Nazrul Hakim bin Raja Nazri            Deputy Dean Academic and Technology            Email: <a href="mailto:rajanazrul@unikl.edu.my">rajanazrul@unikl.edu.my</a>            Phone: 06-551 2077</p>
	<p>Azu Farhana binti Anuar            Deputy Dean Student Development &amp; Campus Lifestyle            Email: <a href="mailto:azufarhana@unikl.edu.my">azufarhana@unikl.edu.my</a>            Phone: 06-551 2136</p>
	<p>Ts Dr Muhamad Yusuf bin Hasan            Deputy Dean IIIP            Email: <a href="mailto:muhamadyusuf@unikl.edu.my">muhamadyusuf@unikl.edu.my</a>            Phone: 06-551 2077</p>

# Academic Staff Member of UniKL MICET

## Academic Staff Member of UniKL MICET

### TECHNICAL FOUNDATION SECTION

SL: STUDY LEAVE  
SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	MS. ZAIDA RAHAYU BINTI YET (Head of Section)	MASTER OF SCIENCE	SENIOR LECTURER
2.	MR. ABDUL HAKIM BIN HJ ABU BAKAR	MASTER ELECTRICAL ENGINEERING	SENIOR LECTURER
3.	MS. ASIMI ANA BINTI AHMAD	MASTER OF ENGINEERING (CHEMICAL)	LECTURER
4.	MS. AZLINA DIN	MASTER OF COMPUTER SCIENCE	LECTURER
5.	HANIZA BINTI KAHAR (Ts.)	MASTER OF SCIENCE (ANALYTICAL CHEMISTRY & INSTRUMENT)	LECTURER
6.	MS. IZUME AYUNA BINTI MOHAMED KHAMIL	MASTER OF INFORMATION TECHNOLOGY	LECTURER
7.	MR. MOHD NASIR MAHMUD	MASTER OF MATHEMATICS	LECTURER
9.	MR. MOHD NIZAM BIN ZAHARI	MASTER OF ENGINEERING TECHNOLOGY (GREEN & ENERGY EFFICIENT BUILDINGS)	LECTURER
10.	NAZATULSHIMA BINTI HASSAN (Dr)	PhD (BIOSTATISTIC)	SENIOR LECTURER
11.	MS. NURUL NABIHAH BINTI RAHMAN	MASTER OF ENGINEERING MATHEMATICS	LECTURER
12.	SITI HARTINI BINTI HAMDAN (Ts. Dr)	PhD (MECHANICAL ENGINEERING) TRIBOLOGY	SENIOR LECTURER
13.	MS. SITI NUR ELMI BINTI ABDUL AZIZ	MASTER OF SCIENCE	LECTURER
14.	MS. TEO SIEW HWAY	MASTER OF INFORMATION TECHNOLOGY	LECTURER
15.	MS. YUSHAZAZIAH BINTI MOHD YUNOS	MASTER OF SCIENCE (MECHANICAL ENGINEERING)	LECTURER
16.	MS. NORHAYATI BINTI MOHD IDRUS	MASTER OF SCIENCE	LECTURER

## PROCESS ENGINEERING TECHNOLOGY SECTION

**SL: STUDY LEAVE**

<b>NO.</b>	<b>NAME</b>	<b>HIGHEST QUALIFICATION</b>	<b>DESIGNATION</b>
1.	MOHD. RAZEALY BIN ANUAR (Dr.) (Head of Section)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
2.	AHMAD AZAHARI BIN HAMZAH (Dr)	PhD (ELECTRICAL ENGINEERING)	SENIOR LECTURER
3.	MS. AIZA SYUHANIZ BINTI SALLEH	MASTER OF ENGINEERING	LECTURER
4.	ALIFF RADZUAN BIN MOHAMAD RADZI (Ts. Dr)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
5.	AMIN SAFWAN BIN ALIKASTURI (Dr)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
6.	MR. AZRIN BIN ABDUL RAHMAN	MASTER OF SCIENCE (PROCESS PLANT MANAGEMENT)	SENIOR LECTURER
7.	MS. FARIDAH BINTI GHAFAR	MASTER OF SCIENCE	SENIOR LECTURER
8.	INDOK NURUL HASYIMAH BINTI MOHD AMIN (Assoc. Prof. Dr.)	PhD (CHEMICAL ENGINEERING & PROCESS)	ASSOCIATE PROFESSOR
9.	KELLY YONG TAU LEN (Assoc. Prof. Dr.)	PhD (MECHANICAL SCIENCE & ENGINEERING)	ASSOCIATE PROFESSOR
10.	LAW JENG YIH (Dr)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
11.	MS. MARMY ROSHAIDAH BINTI MOHD SALLEH	MASTER OF ENGINEERING	LECTURER
12.	MS. NADIA BINTI ISA (SL)	MASTER OF SCIENCE	SENIOR LECTURER
13.	MS. NAZERAH BINTI AHMAD	MASTER OF ENGINEERING	LECTURER
14.	NOR AINI BINTI BUROK (Ts.)	MASTER OF INDUSTRIAL SAFETY MANAGEMENT	SENIOR LECTURER
15.	NOR SHAHIRAH BINTI MOHD NASIR (Dr)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
16.	MS. NORULAKMAL BINTI NOR HADI	MASTER OF SCIENCE	SENIOR LECTURER
17.	MS. RABIATUL ADAWIAH BINTI MAT NOOR (SL)	MASTER OF SCIENCE	LECTURER
18.	MR. SYAHIDI FADZLI BIN ALFAN	MASTER OF SCIENCE (INDUSTRIAL & TECHNOLOGY MANAGEMENT)	LECTURER
19.	MR. SYED AZHAR BIN SYED AB RAHMAN	MASTER OF SCIENCE (CHEMICAL ENGINEERING)	SENIOR LECTURER
20.	WAN NOOR AIDAWATI BINTI WAN NADHARI (Dr.)	PhD (BIORESOURCE, PAPER AND COATINGS TECHNOLOGY)	SENIOR LECTURER
21.	ZAINAL ABIDIN BIN MOHD YUSOF (Ts.)	MASTER OF SCIENCE	SENIOR LECTURER



22.	ZULHAFIZ BIN TAJUDIN (Ts. Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
23.	MS. ZURAIDAH BINTI RASEP (SL)	MASTER OF ENGINEERING	LECTURER

## BIOENGINEERING TECHNOLOGY SECTION

SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	MS. FARA WAHIDA BINTI AHMAD HAMIDI (Head of Section)	MASTER OF SCIENCE (BIOPROCESS ENGINEERING)	LECTURER
2.	LEONG CHEAN RING (Dr)	PhD IN MEDICINE	SENIOR LECTURER
3.	MOHAMAD ZULKEFLEE BIN SABRI (Ts. Dr)	MASTER OF ENGINEERING	LECTURER
4.	NIK IDA MARDIANA BINTI NIK PA (Dr.)	MASTER OF SCIENCE	SENIOR LECTURER
5.	MS. NORHANI BINTI JUSOH (SL)	MASTER OF ENGINEERING	SENIOR LECTURER
6.	MS. NURDIYANA BINTI HUSIN	MASTER OF SCIENCE	LECTURER
7.	NURUL FAEZAWATY BINTI JAMALUDIN (Ts.)	MASTER OF SCIENCE	SENIOR LECTURER
8.	ROZYANTI BINTI MOHAMAD (Ts. Dr)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
9.	RUZAINAH BINTI ALI @JAAFAR (Assoc. Prof. Dr.)	PhD (BIOTECHNOLOGY)	ASSOCIATE PROFESSOR
10.	TONG WOEI YENN (Dr.)	PhD IN MICROBIOLOGY	SENIOR LECTURER
11.	ZAINATUL 'ASYIQIN BINTI SAMSU (Ts. Dr)	MASTER OF SCIENCE	LECTURER

## ENVIRONMENT AND POLYMER ENGINEERING TECHNOLOGY SECTION

SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	FAHMI ASYADI BIN MD YUSOF (Dr) (Head of Section)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
2.	AMELIA BINTI MD SOM (Dr)	PhD (GEOENVIRONMENT ENGINEERING)	SENIOR LECTURER
3.	AHMAD NAIM BIN AHMAD YAHAYA (Assoc. Prof. Ts. Dr.)	PhD (ENVIRONMENT ENGINEERING TECHNOLOGY)	ASSOCIATE PROFESSOR
4.	MS. KHAIRUL NADIAH BINTI IBRAHIM	MASTER OF TECHNOLOGY	SENIOR LECTURER
6.	MR. MOHD SYAZWAN BIN MOHD GHAZALI (SL)	MASTER OF SCIENCE	LECTURER
7.	NOR ZALINA BINTI KASIM (Dr.)	PhD (CIVIL ENGINEERING)	SENIOR LECTURER
8.			
9.	ROBERT THOMAS BACHMANN (Prof. Dr.)	PhD (ENVIRONMENTAL ENGINEERING TECHNOLOGY)	PROFESSOR
10.	SITI NOORAIN BINTI ROSLAN (Dr)	DOCTOR OF ENGINEERING (CIVIL & ENVIRONMENTAL ENGINEERING)	SENIOR LECTURER
11.	Ts. Dr NORILHAMIAH BINTI YAHYA	PhD (FUEL CELL ENGINEERING)	SENIOR LECTURER
12.	MS. MAZLINA BINTI GHAZALI (Ts.)	BACHELOR OF ENGINEERING (HONS) IN POLYMER ENGINEERING	ASST. LECTURER
13.	MR. MOHD EDYAZUAN BIN AZNI (SL)	MASTER OF ENG. TECH. (GREEN & ENERGY EFFICIENT BUILDINGS)	LECTURER
14.	MR. MUAZZIN BIN MUPIT	MASTER OF SCIENCE	SENIOR LECTURER
15.	MUZAFAR BIN ZULKIFLI (Ts. Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
16.	NOOR FAIZAH BINTI CHE HARUN (Dr)	DOCTOR OF ENGINEERING (ENVIRONMENTAL CHEMISTRY & ENGINEERING)	SENIOR LECTURER
17.	NOR NADIAH BINTI MOHAMAD YUSOF (Dr)	PhD (ENERGY & ENVIRONMENT SCIENCE)	SENIOR LECTURER
18.	ONG SIEW KOOI (Assoc. Prof. Ts. Dr.)	PhD (POLYMER TECHNOLOGY)	ASSOCIATE PROFESSOR
19.	RAJA NAZRUL HAKIM BIN RAJA NAZRI (Dr)	PhD (MATERIAL & METALLURGICAL ENGINEERING)	SENIOR LECTURER
20.	NADIA BINTI RAZALI (Dr.)	PhD (CONSTRUCTION)	SENIOR LECTURER
21.	MS. SUHAINI BINTI MAMAT	MASTER OF ENGINEERING	LECTURER
22.	YUSRIAH BINTI LAZIM (Dr.)	PhD IN MATERIAL SCIENCE AND ENG.	SENIOR LECTURER
23.	ZAIHAR BIN YAACOB (Dr.)	MASTER OF ENGINEERING	SENIOR LECTURER

## FOOD ENGINEERING TECHNOLOGY SECTION

SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	SITI FATIMAH BINTI IBRAHIM (Dr.) (Head of Section)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
2.	ABDUL MANAN BIN DOS MOHAMED (Assoc. Prof. Dr.)	PhD (BIOSCIENCE & BIOTECHNOLOGY)	ASSOCIATE PROFESSOR
3.	MS. FARAH SALINA BINTI HUSSIN	PhD (FOOD BIOTECHNOLOGY)	SENIOR LECTURER
4.	HARUN BIN SARIP (Assoc. Prof. Ts. Dr.)	PhD (FOOD TECHNOLOGY)	ASSOCIATE PROFESSOR
5.	KHAIRUL FAIZAL BIN PA'EE (Dr.)	PhD (FOOD & NUTRITIONAL SCIENCE)	SENIOR LECTURER
6.	MS. LILY SUHAILA BINTI YACOB	MASTER OF ENVIRONMENT (ENVIRONMENTAL SCIENCE)	LECTURER
7.	MS. MASNIZA BINTI MOHAMED @ MAHMOOD	PhD (KEJURUTERAAN KIMIA DAN PROSES)	SENIOR LECTURER
8.	NOR ZANARIAH BINTI SAFIEI (Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
9.	NORIZA BINTI AHMAD (Ts. Dr)	PhD (FOOD SCIENCE & TECHNOLOGY)	SENIOR LECTURER
10.	MS. RINANI SHIMA BINTI ABD. RASHID (SL)	MASTER OF SCIENCE (FOOD TECHNOLOGY)	SENIOR LECTURER
11.	SHARIFAH SOPLAH BINTI SYED ABDULLAH (Ts Dr)	PhD (ENVIRONMENTAL ENGINEERING)	SENIOR LECTURER
12.	MUHAMAD YUSUF BIN HASAN (Ts. Dr.)	MASTER OF SCIENCE (PROCESS PLANT MANAGEMENT)	SENIOR LECTURER
13.	MOHD ZULKHAIRI BIN ABDUL RAHIM (Dr)	PhD (CHEMISTRY)	SENIOR LECTURER
14.	MR. MUHAMMAD SHARIR BIN ABDUL RAHMAN	MASTER OF CHEMICAL ENGINEERING	LECTURER
15.	SHARIFAH MARIAM BINTI SAYED HITAM (Ts. Dr.)	PhD (BIOPROCESS ENGINEERING)	SENIOR LECTURER

## CHEMICAL ENGINEERING SECTION

SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	NOOR AINA BINTI MOHD NAZRI (Dr.) (Head of Section)	PhD IN ENGINEERING (GAS)	SENIOR LECTURER
2	WONG CHEE SIEN (Dr.)	PhD (BIOPROCESS ENGINEERING)	SENIOR LECTURER
3.	CHIN LIP HAN (Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
4.	CHONG YUAN FOONG (IR.)	BACHELOR OF ENGINEERING (CHEMICAL)	SPECIALIST
5.	FARRA WAHIDA BINTI SHAARANI (Dr.)	PhD (CHEMICAL PROCESS ENGINEERING)	SENIOR LECTURER
6.	MS. NOR NABIHA BINTI MD ZAN	MASTER (ENGINEERING SCIENCE)	LECTURER
7.	RAPIDAH BINTI OTHMAN (Dr)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
8.	SITI NURUL ATIKAH BINTI ABD HALIM (Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
9.	YUHANEES BINTI MOHAMED YUSOF (Dr.)	PhD (APPLIED SCIENCE)	SENIOR LECTURER
10.	SUZANA BINTI WAHIDIN (Assoc. Prof. Dr)	PhD (BIOPROCESSING ENGINEERING)	ASSOCIATE PROFESSOR

## STUDENT DEVELOPMENT SECTION

SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	MS. INTAN NORJAHAN BINTI AZMAN (Head of Section)	MASTER OF ARTS IN ENGLISH LANGUAGE	LECTURER
2.	ANISAH BAHYAH AHMAD (Dr.)	PhD (ISLAMIC CIVILIZATION)	SENIOR LECTURER
3.	AZMAN BIN YUSOF (Assoc. Prof. Dr.)	PhD (PHILOSOPHY AND CIVILIZATION STUDIES)	ASSOCIATE PROFESSOR
4.	AZU FARHANA BINTI ANUAR	MASTER OF ARTS (ENGLISH COURSE)	LECTURER
5.	MS. MARIATI BINTI MOHD SALLEH	MASTER OF EDUCATION	LECTURER
6.	MS. NOORHAYATI BINTI SAHARUDDIN	MASTER OF ARTS IN ENGLISH LANGUAGE	SENIOR LECTURER
7.	MS. ROSIAH BINTI OTHMAN	MASTER OF CORPORATE COMMUNICATION	LECTURER
8.	MS. SA'ADIAH BINTI HUSSIN	MASTER OF SCIENCE (CORPORATE COMMUNICATION)	SENIOR LECTURER

## IIIP SECTION

SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	MR. ABD RAZAK BIN HAJI MOHD YUSOFF	MASTER OF BUSINESS ADMINISTRATION	LECTURER
2.	MR. NORAZMI BIN OMAR	MASTER OF BUSINESS ADMINISTRATION	LECTURER

# PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

- **PEO 1**

UniKL graduates who are knowledgeable, competent and innovative which will contribute towards the requirement of the human capital in chemical and/or process/food/polymer/bioprocess/environment engineering technology related industry.

- **PEO 2**

UniKL graduates who are effective leaders with teamwork skills, as well as verbal and nonverbal interpersonal communication skills;

- **PEO 3**

UniKL graduates who are committed towards the importance of lifelong learning and continuous improvement;

- **PEO 4**

UniKL graduates who are professional, ethical, and socially responsible;

- **PEO 5**

UniKL graduates who are capable of embarking on business and technopreneurial activities

# PROGRAMME LEARNING OUTCOMES (PLO)

PLO 1	Apply knowledge of applied mathematics, applied science, engineering fundamentals and an engineering specialisation as specified in DK1 to DK4 respectively to wide practical procedures and practices in chemical and process/food/polymer/bioprocess/environment engineering technology.
PLO 2	<b>Problem analysis:</b> Identify and analyse well-defined engineering problems reaching substantiated conclusions using codified methods of analysis specific to their field of activity (DK1 to DK4).
PLO 3	<b>Design/development of solutions:</b> Design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (DK5).
PLO 4	<b>Investigation:</b> Conduct investigations of well-defined problems; locate and search relevant codes and catalogues, conduct standard tests and measurements.
PLO 5	<b>Modern Tool Usage:</b> Apply appropriate techniques, resources, and modern engineering and IT tools to well-defined engineering problems, with an awareness of the limitations (DK6)
PLO 6	<b>The Engineer and Society:</b> Demonstrate knowledge of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering technician practice and solutions to well-defined engineering problems (DK7).
PLO 7	<b>Environment and Sustainability:</b> Understand and evaluate the sustainability and impact of engineering technician work in the solution of well-defined engineering problems in societal and environmental contexts.

PLO 8	<b>Ethics:</b> Understand and commit to professional ethics and responsibilities and norms of technician practice.
PLO 9	<b>Individual and Team Work:</b> Function effectively as an individual, and as a member in diverse technical teams.
PLO 10	<b>Communications:</b> Communicate effectively on well-defined engineering activities with the engineering community and with society at large, by being able to comprehend the work of others, document their own work, and give and receive clear instructions.
PLO 11	<b>Project Management and Finance:</b> Demonstrate knowledge and understanding of engineering management principles, business practices, and technopreneurial competencies, as well as identify business opportunities, and apply these to one's own work, as a member and leader in a technical team and to manage projects in multidisciplinary environments.
PLO 12	<b>Life Long Learning:</b> Recognize the need for, and have the ability to engage in independent updating in the context of specialised technical knowledge.



# DIPLOMA IN CHEMICAL ENGINEERING TECHNOLOGY

*JPT (N/524/4/0072) 04/26 MQA/PA14383*

## PROGRAMME OVERVIEW

As Industrial Revolution 4.0 such as additive manufacturing, advanced material, big data, and advanced simulation continue to redefine industrial production, Malaysia's chemical industry is increasingly searching for highly skilled manpower with Industry 4.0-ready skill sets to enhance its transformation.

In order support this, UniKL MICET will begin offering a 2.5-year diploma programme in Chemical Engineering Technology (DCET) in July 2021. The curriculum is designed to produce manpower with the requisite skills for economic and national development of the nation. The four major specialisations in the program are Sustainable Process Engineering, Biotechnology & Bioengineering, Advanced Material, and Environmental Engineering Technology & Sustainability.

This program's courses are enhanced by embedding Professional Certifications including Smart 3D Modelling Software (Intergraph) and Ergonomic Trained Person. With credit transfer eligibility of up to 57 credits, graduates from this programme can continue and complete Bachelor of Chemical Engineering Technology at UniKL MICET in 2.5 years. This programme is also in line with the post pandemic socioeconomics drivers, which are focused on energy, smart technology and systems, water and food, environment, and biodiversity.

## CAREER PATH

- Chemical Manufacturing Companies
- Petroleum and Petrochemical Industries
- Energy and Transportation Industries
- Oleochemical Industries
- Safety and Health
- Design and Simulation Industries
- Bioplastic Industries
- Rubber and Latex Industries
- Cosmeceutical Industries
- Nutraceuticals Industries
- Biopharmaceutical Companies and Medical Research Institutes
- Environmental Consulting Firms
- Solid Waste and Wastewater Management Sector
- Chemical Production Assistant Engineer
- Plating Technician
- Plant Assistant Engineer
- Plant 3D Software Trainer

- Laboratory Technician
- Chemical Production Assistant
- Chemical Sales & Service Technician
- Primary Production Executive
- Compounding Supervisor
- QA Executive
- Quality and Reliability Technician
- Materials Analysis Technician
- Wastewater Treatment Process Technician

# **TYPES OF COURSES**

- 1. NATIONAL REQUIREMENT**
- 2. UNIVERSITY REQUIREMENT**
- 3. COMMON CORE**
- 4. DISCIPLINE CORE**
- 5. ELECTIVES**

## **NATIONAL REQUIREMENT**

**MPU2313 AMALAN ISLAM DI MALAYSIA**  
**MPU2323 RELIGIOUS PRACTICES IN MALAYSIA**  
**MPU2213 BAHASA KEBANGSAAN (A)**  
**MPU2232 INTERPERSONAL SKILLS**  
**MPU 2133 BAHASA MELAYU KOMUNIKASI 1**  
**MPU 2163 PENGAJIAN MALAYSIA 2**  
**MPU2412 CAREER GUIDANCE 1**  
**MPU2422 COMMUNITY SERVICE1**  
**MPU2432 CULTURE 1**  
**MPU2442 RAKAN MASJID 1**  
**MPU2452 SISWA-SISWI BOMBA DAN PENYELAMAT 1**  
**MPU2462 SISWA-SISWI PERTAHANAN AWAM 1**  
**MPU2472 SPORTS MANAGEMENT 1**  
**MPU2482 PERSONAL FINANCIAL MANAGEMENT 1**  
**MPU24102 INTEGRITI & ANTI RASUAH**

## **MPU2313 AMALAN ISLAM DI MALAYSIA**

Kursus ini membincangkan aspek-aspek amalan Islam yang diaplikasikan di Malaysia. Perbincangan ini meliputi konsep manusia dan agama, asas-asas Islam dan sejarah kedatangan agama Islam di Malaysia serta menerangkan keistimewaan Islam melalui institusi pendidikan, kekeluargaan, ekonomi dan pentadbiran di Malaysia. Di samping itu, perbincangan juga dilengkapkan dengan isu-isu semasa dalam masyarakat berlandaskan ajaran Islam.

### **Learning Outcomes:**

Setelah tamat kursus ini, pelajar akan dapat:

1. Menghuraikan konsep manusia dan agama, asas-asas Islam dan sejarah kedatangan agama Islam di Malaysia.
2. Menguasai ibadat solat dengan betul, menghafal doa-doa selepas solat dan menghafal ayat-ayat al-Quran yang ditetapkan
3. Menerangkan keistimewaan Islam melalui institusi pendidikan, kekeluargaan, ekonomi dan pentadbiran di Malaysia serta isu-isu dalam masyarakat.
4. Menjelaskan isu-isu semasa dalam masyarakat berlandaskan ajaran Islam

### References:

1. Azis Jakfar Soraji. (2012). **Pengajian Islam**. Shah Alam, Oxford Fajar.
2. Nasrudin Yunus et.al (2007). **Pengajian Islam**. Shah Alam, Oxford Fajar.
3. Paizah Ismail, (2008) *Hudud: Hukum dan Pelaksanaan*. Shah Alam: Karya Bestari.

## **MPU2323 RELIGIOUS PRACTICES IN MALAYSIA**

This course enables students to understand their roles in developing the nation by exposing them to the influence of religions on the lives of Malaysians, Students should also be able to understand their roles as members of the society according to the constitutions of Malaysia.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Explain the concept of man and religion
2. Describe the practices of religion as stated in Malaysian constitution
3. Explain current issues related to various religions practiced in Malaysia.

### References:

1. Saw Swee-Hock (2015). *The Population of Malaysia (Second Edition)*, ISEAS Publishing, Singapore.
2. Mohd. Azizuddin Mohd Sani (2014), *Politics of Religious Expression in Malaysia*. ISEAS Publishing, Singapore.
3. Gerhard Hoffstaedter (2011), *Modern Muslim Identities: Negotiating Religion and Ethnicity in Malaysia*. NIAS Press.

## **MPU2213 BAHASA KEBANGSAAN (A)**

Mata pelajaran Bahasa Kebangsaan (A) ini disediakan untuk mempertingkatkan kecekapan berbahasa, sesuai dengan intelek pelajar untuk berkomunikasi dengan berkesan secara lisan dan tulisan dalam konteks rasmi, kreatif dan bukan kreatif.

### **Learning Outcomes:**

Setelah tamat kursus ini, pelajar akan dapat:

1. Mengetahui asal usul dan perkembangan Bahasa Melayu
2. Berkomunikasi secara lisan dengan berkesan dari segi sebutan dan intonasi,serta menggunakan struktur tatabahasa yang betul
3. Menghasilkan pelbagai jenis teks dengan bahasa yang betul dan berkesan serta mampu berkomunikasi secara lisan dan bertulis dalam pelbagai situasi.

### References:

1. Siti Hajar Abdul Aziz. (2011) *Bahasa Melayu 1*. Kuala Lumpur: Oxford Fajar
2. Adenan Ayob (2009). Bahasa Kebangsaan. Shah Alam. Oxford Fajar.
3. Nik Safiah Karim et al. (2006) *Tatabahasa Dewan*. Kuala Lumpur: Dewan Bahasa dan Pustaka.
4. Dewan Bahasa dan Pustaka (2007). Kamus Dewan. Edisi Keempat. Kuala Lumpur: Dewan Bahasa dan Pustaka, Kementerian Pendidikan Malaysia

## **MPU2232 INTERPERSONAL SKILLS**

This course is aimed directly at fostering one's aspect of Interpersonal skills namely communication skills; leadership; teamwork; problem-solving and decision-making skills. Students' abilities to participate and interact with others effectively are addressed through individual tests and group projects.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Apply the principles of intrapersonal and interpersonal skills.
2. Communicate effectively using various communication media.
3. Demonstrate leadership and teamwork skills.

### References:

1. Wood, J.T. (2016) *Interpersonal Communication: Everyday Encounters*. 8<sup>th</sup> Edition. Chapel Hill: University of North Carolina.

## **MPU 2133 BAHASA MELAYU KOMUNIKASI 1**

Kursus ini melatih pelajar antarabangsa untuk berkomunikasi dalam bahasa Melayu asas yang meliputi situasi kehidupan harian. Pelajar akan diperkenalkan dengan pertuturan dan penulisan bahasa Melayu mudah. Pengajaran dan pembelajaran akan dilaksanakan dalam bentuk kuliah, tutorial, tugas dan pengalaman pembelajaran pelajar di dalam dan di luar kelas. Pada akhir kursus ini, pelajar diharapkan dapat berkomunikasi dan menggunakan ayat mudah dengan berkesan.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Menerangkan kandungan teks penuh yang menggunakan ayat mudah dan ayat berlapis..
2. Bertutur dalam pelbagai situasi dengan menggunakan ayat mudah dan ayat berlapis;
3. Menyusun idea secara kreatif dan sistematik dalam penulisan karangan pendek.

### References:

1. Kamarul Afendey Hamimi. 2015. Bahasa Melayu Komunikasi Oxford Fajar Sdn.Bhd Zarina Othman, Roosfa Hashim & Rusdi Abdullah.2012. Modul Komunikasi Bahasa Melayu Antarabangsa ,KPT: Penerbit UKM Press.
2. Yong Chyn Chye, Rohaidah Mashudi, Maarof Abd Rahman, 2012. Bahasa Kebangsaan untuk pelajar luar negara: Malay language for international students. Petaling Jaya : Pearson Malaysia.
3. Adenan Ayob. 2009. Bahasa Kebangsaan. Shah Alam: Oxford Fajar.
4. Siti Hajar Abdul Aziz. 2008. Siri Pendidikan Guru Bahasa Melayu I. Shah Alam: Oxford Fajar Sdn. Bhd.

## **MPU 2163 PENGAJIAN MALAYSIA 2**

Kursus ini membincangkan Sejarah dan Politik, Perlembagaan Malaysia, Sistem dan Struktur Pentadbiran Negara dan Agama Kepercayaan. Kursus ini adalah bertujuan untuk melahirkan graduan yang mempunyai identiti kebangsaan dan semangat patriotisme yang unggul. Pengajaran dan pembelajaran akan dilaksanakan dalam bentuk kuliah, tugas, peperiksaan dan pengalaman pembelajaran.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Menghurai dan membahaskan kepelbagaian dalam masyarakat.
2. Mengulas kepentingan identiti kebangsaan ke arah mengukuhkan semangat patriotisme.
3. Membina dan memupuk hubungan dan interaksi sosial dalam kalangan pelajar.

### References:

1. Mardiana Nordin & Hasnah Hussiin. 2014. Pengajian Malaysia (Edisi Kelima), Shah Alam : Oxford Fajar .
2. Abdul Halim Ramli, 2015, Perlembagaan Malaysia: Isu dan Persoalan Perhubungan Kaum, Dewan Bahasa dan Pustaka : Kuala Lumpur.

## **MPU2412 CAREER GUIDANCE 1**

This course is one of the co-curriculum modules offered to develop well-rounded individuals through involvement in social and community activities. Specifically, it enables student to understand the important of career planning. It also promotes soft skills that can be applied in their future careers. Apart from that, it creates a better understanding about potential employers' expectations in job hunt.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Apply appropriate interpersonal skills in building up their own towering personalities
2. Differentiate their self-concept and self-image which reflect their personalities
3. Demonstrate ability to plan their future career and targets.

### References:

1. Devito, J. A. (2013). The interpersonal communication book (13thed.). U.S.A. Pearson
2. Zulkifli Musa (2008). Malaysia Job Seeker's Dilemma: A Practical Guide on How to Land a Dream Job. Kuala Lumpur: true Wealth Publishing.
3. James A. Athanasou & Raoul Van Esbroeck (2008). International handbook of career guidance. Springer.

## **MPU2422 COMMUNITY SERVICE 1**

This course is one of the co-curriculum modules offered to develop well-rounded individuals through involvement in social and community activities. Specifically, it aims to develop interest among the students to participate in community programs. It also enables student to understand the important of performing of community services and the ways to implement the programmes and activities. Besides that, it provides better understanding to the student on the values, ethics and benefits of carrying out community service programmes.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Organize and participate in the community service programmes and activities.
2. Apply knowledge learnt in course in community service programmes and activities
3. Demonstrate basic entrepreneurship skills in community service programmes and activities
4. Explain the values, ethics and benefits of participating in community service programmes and activities.

### References:

1. Christine M. Cress, Peter J. Collier & Vicki L. Reitenauer. 2013. *Learning Through Serving: A Student Guidebook for Service-Learning and Civic Engagement Across Academic Disciplines and Cultural Communities*. US: Stylus.
2. Pusat Transformasi Komuniti Universiti. 2013. *Berilmu Berbakti 2012: Penglibatan Komuniti Untuk Penajaan dan Perkongsian Ilmu*. Serdang: Penerbit Universiti Putra Malaysia.
3. Saran Kaur Gill, Prabha Deri & Kamelia Shamsuddin. 2012. *The Power of Community Engagement: A Selection of Inspiring Initiatives*. Bangi: Penerbit Universiti Kebangsaan Malaysia.



## **MPU2432 CULTURE 1**

This course is one of the co-curriculum modules offered to develop well-rounded individuals through involvement in social and community activities. Specifically, it aims to develop students' personalities and social interaction skills, as well as foster closer relationship among the student in the university through the organization of and participation in cultural activities.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Apply knowledge gained in planning and organizing a cultural event.
2. Apply appropriate skills in participating in a cultural event.
3. Explain the benefits of participating in a cultural activity.

### References:

1. Hatta. 2013. Teater Filem dan Pengurusan Seni. Kuala Lumpur; Dewan Bahasa dan Pustaka.
2. Ab Samad Kechot & Sabzali Musa Kahn. 2011. Pengurusan Artistik: Kajian Mengenai Peranan Set Selaku Tenaga Kreatif Dalam Seni Persembahan Pentas di Malaysia. Bangi: Universiti Kebangsaan Malaysia.
3. Norliza Rofli & Eddin Khoo. 2009. Malaysian Culture: An Introduction. Kuala Lumpur: Jabatan Kebudayaan dan Kesenian Negara.

## **MPU2442 RAKAN MASJID 1**

This course is one of the co-curriculum modules offered to develop well-rounded individuals through involvement in social and community activities. Specifically, it aims to develop students' who understand their roles as Muslims and are responsible to develop the ummah. This course also aims to expose students to the function of mosque as the main institution in developing the Muslim society.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Explain the beauty of Islam in every aspect in their life.
2. Demonstrate several activities in relation to the Muslim practice.
3. Discuss the significance of the organized activities in the course.

### References:

1. Mohd Ismail Mustari & Kamarul Hasmi Mustari (2008). Pengimarahen Masjid dalam agenda ummah. Universiti Teknologi Malaysia Press: Skudai
2. Mohd Ismail Mustari & Kamarul Hasmi Mustari (2008). Fungsi dan peranan masjid dalam masyarakat. Universiti Teknologi Malaysia Press: Skudai.
3. Mohd Ismail Mustari & Kamarul Hasmi Mustari (2008). Pengurusan berkualiti memacu kecemerlangan pengurusan masjid. Universiti Teknologi Malaysia Press: Skudai.

## **MPU2452 SISWA-SISWI BOMBADAN PENYELAMAT 1**

This course is one of the co-curriculum modules offered to develop well-rounded individuals through involvement in social and community activities. Specifically, it gives exposure on the introduction to Malaysian Fire Rescue Department, foot marching techniques, fire rescue, ascending and descending technique and basic emergency aid.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Participate actively in Project (theory and practically about BOMBA activities).
2. Communicate and demonstrate leadership and team skills through BOMBA activities (rescue, fire rescue and first aid).
3. Apply appropriate fundamental of rescue, fire rescue and first aid.

### References:

1. Akademi Bomba & Penyelamat Malaysia. 2012. *Mencari dan Menyelamat*. Jabatan Bomba dan Penyelamat Malaysia: Kuala Lumpur.
2. Akademi Bomba dan Penyelamat Malaysia. 2012. *Pengenalan Tali, Simpulan dan Ikatan*. Jabatan Bomba dan Penyelamat Malaysia: Kuala Lumpur.
3. Akademi Bomba & Penyelamat Malaysia. 2012. *Kawad Operasi Kebombaan*. Jabatan Bomba dan Penyelamat Malaysia: Kuala Lumpur.

## **MPU2462 SISWA-SISWI PERTAHANAN AWAM 1**

Kursus ini memfokuskan perbincangan tentang peranan dan fungsi Angkatan Pertahanan Awam dan mengaplikasikan ilmu pengetahuan dalam pertolongan cemas, dan kawad kaki. Melalui aktiviti seperti ini, pelajar dapat membuat perancangan, perlaksanaan tugas, pertolongan kecemasan dan aktiviti kebakaran.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Memberi peluang kepada pelajar mendapat pengetahuan dan kemahiran untuk membantu diri sendiri dan orang lain
2. Memupuk nilai/sikap hormat-menghormati, menurut perintah, berdisiplin, bekerjasama, bertanggungjawab, berhemah, kejujuran, keyakinan diri dan kepimpinan
3. Menanam semangat kesedaran sivik, ketaatan dan cintakan negara serta penjagaan alam sekitar
4. Mempertingkatkan ketahanan fizikal, mental dan daya kerohanian yang seimbang.

### References:

1. Ahmad Zullaili Zamri & Shariff Harfun (2018). *Asas Pertahanan Awam*. Oxford Fajar, Shah Alam
2. Malaysian Civil Defence Force (2010). *Buku panduan pengurusan kor SISP*. Shah Alam: Pusat Penerbitan Universiti (UPENA), UiTM.

## **MPU2472 SPORTS MANAGEMENT 1**

This course is one of the co-curriculum modules offered to develop well-rounded individuals through involvement in social and community activities. Specifically, it aims to provide students with adequate information and understanding on the implementation and rules in sports management. This course also explores various aspects of sports management namely scope, basic principles, technique and current issues pertaining to sport management.

### **Learning Outcomes:**

Upon completion of this course students should be able to

1. Prepare document in order to organize competition.
2. Apply knowledge gained by managing competition.
3. Participate and evaluate the benefits of participating in lecture or practical class related to sport, recreation and leisure.

### References:

1. Russell Hoyer, Matthew Nicholson, Aaron Smith, Bob Stewart & Hana Westerbeek (2012). *Sport Management and Application 3rd edition*. Routledge Taylor & Francis.
2. Milena Parent & Sharon Smith-Swan (2012). *Managing Major Sport Events Theory & Practise*. Routledge Taylor & Francis Group.

## **MPU2482 PERSONAL FINANCIAL MANAGEMENT 1**

This course is to educate students on personal financial education. It is to open their minds to things that they should be prepared for financially when they enter the competitive job market. The course explains what they should start doing early in their life to achieve their financial dreams.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Apply the concept of financial planning, building financial wealth and avoiding financial troubles.
2. Plan and execute financial planning events at campus level.
3. Describe the program implementation.

### References:

1. AKPK (2011). *Power!* Kuala Lumpur : Agensi Kaunseling dan Pengurusan Kredit
2. AKPK (2010). *Money Sense: Getting Smart with Your Money*. Kuala Lumpur: Agensi Kaunseling dan Pengurusan Kredit.

## **MPU24102 INTEGRITI & ANTI RASUAH**

Kursus ini merangkumi konsep asas tentang nilai Integriti, bentuk perlakuan rasuah, salah guna kuasa dalam kehidupan seharian dan organisasi serta kaedah pencegahan rasuah. isu dan kes rasuah sebenar dibincangkan dalam sesi pembelajaran.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Menghuraikan nilai Integriti dalam kehidupan seharian.
2. Menilai bentuk perlakuan rasuah dan salah guna kuasa dalam kehidupan dan organisasi.

3. Mempamerkan nilai Integriti dan pencegahan rasuah melalui aktiviti masyarakat.

References:

1. Mohamad Tarmize (2014). Nilai Pencegahan Rasuah, Penerbit Bahagian Pendidikan Masyarakat, Suruhanjaya Pencegahan Rasuah Malaysia.
2. Zulkanain Abdul Rahman, Ahmad Kamal Ariffin Mohd Rus & Ors (2017). Sejarah Perjuangan SPRM Satu Perjalanan, Universiti Malaya, Kuala Lumpur.
3. Rahimah Abdul Rahim (2016). Siri Penyelidikan Pengajian Rasuah: Rasuah, Governance & Integriti. Penerbitan Akademi Pencegahan Rasuah Malaysia.

## **UNIVERSITY REQUIREMENT**

**WED 10402 COMPETENCY ENGLISH**

**WED 20202 COMMUNICATION ENGLISH 1**

**WED 20302 COMMUNICATION ENGLISH 2**

**WMD10101 MANDARIN 1**

**WMD10201 MANDARIN 2**

**WAD10101 ARABIC 1**

**WAD10201 ARABIC 2**

**WBD10102 INTRODUCTION TO ENTREPRENEURSHIP**

**WID41009 INDUSTRIAL TRAINING**

## WED 10402 COMPETENCY ENGLISH

This course focuses on both receptive (reading) and productive (speaking & writing) skills as well as grammar skills. It serves to enhance and strengthen students' proficiency in English. Assessments will be task-based where stimulating exercises and group activities will be employed to motivate students to use the language confidently in various situations..

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Apply correct grammatical components in written form.
2. Express themselves effectively using appropriate language skills through discussion and presentation.
3. Analyze linear and non-linear comprehension texts using appropriate reading skills.
4. Produce written work using correct writing techniques.

### References:

1. Azar, B.S. & Hagen, S.A. (2016). Understanding and using English Grammar (5th ed.) USA: Pearson.
2. West, C. (2010). Reading Techniques with Removable Key. Cambridge: Cambridge University Press
3. .Yat, C.W. (2015). Ace Ahead MUET. Kuala Lumpur: Oxford University Press.

## WED 20202 COMMUNICATION ENGLISH 1

This module is to enhance students' acquisition of English through language enrichment activities. The module enables students to enhance their English language proficiency through written work and oral communication. Students also engage in exploring and responding to ideas through group discussion and conducting a project. Students are then exposed to the fundamentals of presentation skills..

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Apply correct grammatical skills in written form.
2. Produce professional business correspondence documents
3. Organise an event through conducting a group discussion, writing a proposal, presenting and executing the event.

### References:

1. Canavos, N. (2016). Business writing today: A practical guide (2nd edition). CA: SAGE.
2. Sudharshana, N. P. & Savitri, C. (2016). English for Technical Communication. New Delhi: Cambridge University Press.
3. Guffey, M. E. & Loewy, D. (2013). *Essentials of business communication*. Mason, Ohio: South-Western Cengage Learning.

## WED 20302 COMMUNICATION ENGLISH 2

Students are exposed to fundamental writing skills that focus on academic writing. They are also exposed to language structures. In the second part of the course, students are guided to undertake academic writing assignment with consultation and previous writing assignment. In the last part of the course, students need to present based on the academic writing assignment using the learnt presentation skills.

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Use appropriate mechanics in writing effectively.
2. Produce essay using mechanics of writing techniques.
3. Prepare academic report by incorporating relevant academic resources.
4. Present Information using effective presentation techniques

### References:

1. Rentz, K. & Lentz, P. (2014). *Lesikar's business communication: Connecting in a digital world*. McGraw-Hill Companies.
2. Howard, R. M. (2014). *Writing matters: A handbook for writing and research*. New York: McGraw-Hill.
3. Nor Ainun Zakaria, Aishah Muslim, Mazlin Mohamad Mokhtar, Prapagaran B. K. (2013). *Polytechnic series: Communicative English 3*. Shah Alam, Selangor: Oxford Fajar

## WMD10101 MANDARIN 1

This course introduces the basic grammatical structures of Chinese sentences to acquire the basic oral and written communication skills. The contents of this course are Chinese writing system (including Pinyin), numbers, useful Chinese expressions to greet others, to introduce oneself and family members, date, time, food and beverages.

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Use words & phrases in Pinyin system and/or Chinese characters.
2. Practice basic Chinese language for daily communication within the limits of vocabularies and sentence structures acquired in the course,.
3. Perform learned Chinese vocabularies, phrases or short sentences in limited contexts.

### References:

1. Loi Hing Kee, Tan Hua An (2017). *Learn Mandarin 1*. Petaling Jaya: Cengage Learning Asia Pte Ltd.
2. Lai Siew Yoon, Tan Hua An, Tay Yang Lian. (2013). *Speak Chinese, An Introductory Course to the Chinese Language*. Petaling Jaya: Cengage Learning Asia Pte Ltd.
3. Lai Siew Yoon, Lim Yoke Len. (2010). *Shenghuo Huayu, An Introductory Course to the Chinese Language*. Singapore: Cengage Learning Asia Pte Ltd.

## **WMD10201 MANDARIN 2**

This course introduces the basic grammatical structures of Chinese sentences in order to acquire the basic oral and written communication skills. The contents of this course are useful expressions in Mandarin to activities in university, hobby and interest, shopping and purchases, locations, direction, seeing a doctor and holiday activities.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Use Chinese words, phrases, short sentences about learned topics.
2. Practice Chinese language for daily communication within the limits of vocabularies and sentence structures acquired in the course.
3. Perform learned Chinese vocabularies, phrases or short sentences in various contexts.

### References:

1. Lai Siew Yoon, Tan Hua An, Tay Yang Lian (2013). *Speak Chinese, An Introductory Course to the Chinese Language*. Petaling Jaya: Cengage Learning.
2. Loi Hing Kee, Tan Hua An (2018). *Learn Mandarin 2*. Petaling Jaya: Cengage Learning Asia Pte Ltd.
3. Yamin Ma, Xinying Li. (2007). *Easy Steps to Chinese*. Beijing: Beijing Language & Culture University Press. Available from: <http://www.yes-chinese.com/zh-cn/course/view.html?id=3681>

## **WAD10101 ARABIC 1**

### **Rationale for inclusion of the course in the program:**

This course is intended to expose the student with conversation skill of beginner-level Arabic language. Students will be familiarized with elemental Arabic grammar and be able to construct a Arabic report and essay. This course seeks to develop passion of students to the course, alphabetical, vocabulary, industrial terms, nouns, verbs, basic grammar and explain the benefit of learning Arabic to the students. Student are also expected to be able to write an Arabic sentences.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Explain basic Arabic grammar within the scope of the course.
2. write basic Arabic sentences and questions based on what they have learnt in the course.
3. Communicate orally in Arabic at a beginner's level.

### References:

1. Amazing Bahasa Arab, Nur Aina Sabariah Md Isa, Akram Hijri Abdullah Akhill, Mohd Aminuddin Ab Rahaman. Oxford Fajar (2017)
2. Mustafa Umar, Perbualan Bahasa Arab, (2012), Darul Nu'man, Kuala Lumpur
3. Othman bin Arifeen, Dr. Mohd Phuzi Usop (2014). *learn Arabic by yourself (Book 6)*, Al-Hidayah Publication, Batu Caves Selangor



## **WAD10201 ARABIC 2**

### **Rationale for inclusion of the course in the program:**

This course is intended to familiarize students with conversational skills in Arabic at a beginner level. It exposes students with basic Arabic grammar in order to enhance their ability to construct a report and essay in the language. This course seeks to develop passionate and self-motivated students of Arabic by enhancing their basic grammatical knowledge in the language as well as their knowledge of daily and industry focused terms and phrases in an Arabic-speaking setting.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Produce written work using Arabic knowledge and skills learnt in the course.
2. Communicate in basic Arabic language in written and verbal form.
3. Prepare project using content and skills learnt in the course.

#### **References:**

1. Amazing Bahasa Arab, Nur Aina Sabariah Md Isa, Akram Hijri Abdullah Akhill, Mohd Aminuddin Ab Rahaman. Oxford Fajar (2017)
2. Mustafa Umar, Perbualan Bahasa Arab, (2012), Darul Nu'man, Kuala Lumpur
3. Othman bin Arifeen, Dr. Mohd Phuzy Usop (2014). learn Arabic by yourself (Book 6), Al-Hidayah Publication, Batu Caves Selangor

## **WBD10102 INTRODUCTION TO ENTREPRENEURSHIP**

This course aims to prepare students with the main characteristics of an entrepreneur and provide basic knowledge and skills in establishing a small venture.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Describe entrepreneurship value and culture
2. Demonstrate the ability to assess business environment
3. Identify entrepreneurship opportunity and explain the process in starting up a business
4. Develop a business idea and participate in entrepreneurship activities

#### **References:**

1. Azahari Jamaludin, Abd Razak Mohd Yusoff, Mohd Hazli Mohd Rusli, Salwah Che Mat & Zawiah Abdul Majid (2011). Introduction to entrepreneurship. Oxford Fajar
2. Donald F. Kuratko (2009). *Entrepreneurship: Theory, process, practice 8th Edition*. South Western Cengage Learning.
3. Azahari Jamaludin, Abd Razak Mohd Yusoff, Mohd Hazli Mohd Rusli, Hamidon Katan, Jimisiah Jaafar, Mohd Fauzi Zainol Abidin, Mohd Radzi Zainuddin, Rosnizza Ramlan, Salwah Che Mat & Zawiah Abdul Majid (2012). *Technopreneurship*. Kuala Lumpur: Oxford Fajar

## **WID41009 INDUSTRIAL TRAINING**

This course exposes students to real industrial environment and gives them the opportunity to practice the knowledge and skills they have acquired during their academic years.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Demonstrate the right work manner and attitude with deliberation on safety and health in a working environment.
2. Perform tasks with minimum supervision and meet the company's expectations.
3. Apply technical knowledge, analytical and problem-solving skills to accomplish task assigned by the company.
4. Report effectively on work experience during attachment, including knowledge and skills acquired, in oral and written form.

## **COMMON CORE**

**WQD10103 TECHNICAL MATHEMATICS 1**  
**WQD10203 TECHNICAL MATHEMATICS 2**  
**CLD22002 ENGINEERING STATISTICS**  
**CLD12303 GENERAL CHEMISTRY**  
**CLD10803 ORGANIC ANALYTICAL CHEMISTRY**  
**CLD12102 ELECTRICAL TECHNOLOGY**  
**CPD12303 THERMODYNAMIC**  
**CPD12403 FLUID MECHANICS**  
**CPD12504 MATERIAL AND ENERGY BALANCE**

## **WQD10103 TECHNICAL MATHEMATICS 1**

The course covers general mathematical components involving algebra, trigonometry and complex number. It emphasizes on developing students' competence to prepare them for higher level Mathematics. The main method of delivery combine lecture, tutorial and drilling activities to generate students' interest.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Solve operations and problems related to algebra.
2. Apply trigonometric functions in solving triangular problems.
3. Solve complex number operations in several forms.

### References:

1. Sophie, G. (2015) Pure Mathematics 2 and 3 (6th Ed) Hodder Education, UK.
2. Tony, B. (2017) Complete Additional Mathematics for Cambridge IGCSE & O Level (1st Edition). Oxford University Press, UK".

## **WQD10203 TECHNICAL MATHEMATICS 2**

This course provides fundamental concepts of calculus where students will be exposed to the theories and applications of trigonometry, functions, limits, differentiation and integration. These are essential mathematical components which students will encounter in science and engineering technology courses during their academic programme.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Apply the theories and concepts of trigonometry in problem solving.
2. Solve operations and problems related to functions.
3. Solve practical problems using differentiation and integration techniques.

### References:

1. Mathematics Central Committee Universiti Kuala Lumpur. 2012. Technical Mathematics 2 Workbook (Modules Prepared by MCC UniKL). Pearson Custom Publishing: Singapore.
2. Stroud, K. & Booth, D. 2013. Engineering Mathematics (7th Edn). Palgrave Macmillan: UK.
3. Bird, J. 2014. Engineering Mathematics (7th Edn). Routledge: Oxford.
4. Peterson, J. 2012. Technical Mathematics (4th Edn). Delmar Cengage Learning: New York.

## CLD22002 ENGINEERING STATISTICS

This course is a beginner level course in elementary applied statistics. This course covers introduction to statistics, descriptive data analysis, introduction to probability, probability distribution, sampling distribution, estimation, hypothesis testing and simple linear regression and correlation. Students will be able to apply statistical concepts to real situations.

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Explain a descriptive and inferential statistics for interpreting results.
2. Apply appropriate statistical methods to calculate the probability and solve statistical problems.
3. Interpret the outcome from statistical software output with the statistical concept.

### References:

1. David Freedman, Robert Pisani and Roger Purves (2018), Statistics, 4th Edition, WW Norton & Co.
2. Barbara Illowsky, Susan Dean (2017), Introductory Statistics, Samurai Media Limited.
3. Maria L. Rizzo (2019), Statistical Computing with R, 2nd Chapman and Hall

## CLD12003 GENERAL CHEMISTRY

A one-semester course designed to prepare engineering technology students with basic knowledge and hands-on skill in Chemistry. It will emphasize on the importance of knowledge in units of measurement, structure of atom and matter, quantitative relationship, the mole, chemical reaction, solution chemistry, introduction to acid base, electrochemistry and gaseous state of matter. It will create basic practical hands-on related laboratory skills.

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Apply appropriate knowledge on solving problems related to basic principles of chemistry.
2. Follow the correct way of handling chemicals and apparatus with during conducting experiments.
3. Assist affectively as a team member in preparing group assignments related to basic principles of chemistry.

### References:

1. Chang, R (2013), Chemistry, 11th ed., McGraw Hill
2. Zumdahl, S.S, Zumdahl, S.A. (2013), Chemistry, 9<sup>TH</sup> ed. Cengage Learning
3. John McMurry, Robert C. Fay, (2011), Chemistry, 6th ed, Prentice Hall.
4. Ebbing, D., (2012), General Chemistry, 10th ed., Houghton 4. Barrows.
5. Wentworth, R., Munk. H. B. (2012), Experiments in General Chemistry, Lab Manual, 10<sup>th</sup> ed,

## CLD10803 ORGANIC ANALYTICAL CHEMISTRY

This course provides students with an introduction into organic chemistry and the role of analytical techniques and tools used in identifying organic compounds. The topic include the theory and general applications of spectroscopy and chromatography techniques.

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Apply the phenomena, basic concepts, laws and principles in organic and analytical chemistry.
2. Perform laboratory works related to reaction of organic compound.
3. Assist affectively as team member in preparing group assignments related to basic principles of organic and analytical chemistry.

### References:

1. Chan, K. S. and Tan, J. (2016), Understanding Advanced Organic and Analytical Chemistry: The Leaner's Approach,(Revised Edition), WS Education
2. Carey, F.A., (2020) Organic Chemistry, 11th Edition, McGraw-Hill. 1. Carey, F.A., (2020) Organic Chemistry, 11th Edition, McGraw-Hill.
3. Solomon, T.W.G., (2017), Organic Chemistry, 12th Edition, Wiley.

## CLD12102 ELECTRICAL TECHNOLOGY

This course provides fundamental knowledge in electrical technology such as basic concept of electricity, circuit theorem, AC and DC circuit analysis, magnetism, principle of single and three phase system, electrical machinery and their applications.

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Describe basic principles and practices from electrical fundamental disciplines to solve electrical problems.
2. Perform experiments and project according to the standard operating procedure given.
3. Apply basic principles of electricity, circuit theorems, electrical system, magnetism and electrical machinery.

### References

1. Edward Hughes (2012) "Electrical Technology", 11th. Edition, Prentice Hall
2. Boylestad (2016), "Introductory Circuit Analysis", 13th Edition, Pearson.
3. Charles K. Alexander and Matthew N.O. Sadiku (2007), "Fundamental of Electric Circuit", 3rd Edition, McGraw-Hill

## CPD12303 THERMODYNAMICS

This is an introductory course to the study of the laws that govern the conversion of energy from one form to another, the direction in which heat will flow and the availability of energy to do work. In this course, student will be introduced to the First and Second Law of Thermodynamics and its applications in the other engineering courses. In this course, students will be studying the terminology, principles, theory, and practical application of the First and Second Law of Engineering Thermodynamics..

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Apply the basic concept and principle of thermodynamics to the various processes and systems.
2. Solve problems related to the application of thermodynamics.
3. Perform laboratory experiments safely based on procedures.

### References:

1. Cengel, Yunus A., Boles, Michael A. (2006) *Thermodynamics: An Engineering Approach*, 5th edition, McGraw-Hill.
2. Moran, M.J. and Shapiro, H.N. (2014). *Fundamentals of Engineering Thermodynamics*. (8th Edition). John Wiley & Sons, Inc.
3. Wark, K. and Richards, D.E. (1999). *Thermodynamics*. (6th Edition). McGraw-Hill

## CPD12403 FLUID MECHANICS

This course introduces principles of fluid mechanics and introductions to several topics, with emphasis on the incompressible case (liquids and/or gases at low speed). Topics to be covered include the introduction to fluid systems, fluid characteristics and behaviour, pressure and static fluid, internal flow (flow in pipe and conduits) and equipment in fluid flow.

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Discuss the concepts of static and dynamic fluid and its application in fluid system.
2. Assess the basic theory of fluid in solving problems related fluid static and dynamic
3. Perform laboratory experiments safely based on procedures..

### References:

1. Cengel, Y.A. and Cimabala, J.A. (2006). *Fluid Mechanics*. Boston: Mc Graw Hill
2. Munson B.R., Young D.F., Okiishi T.H., (2006). *Fundamentals of Fluid*. (5<sup>nd</sup> Ed). New Jersey: J. Wiley & Sons. [TA357.M86 2006]
3. Noel de Nevers (2004). *Fluid Mechanics for Chemical Engineers* (3rd Ed.). McGraw Hill

## CPD12504 MATERIAL AND ENERGY BALANCE

This course is to introduce students to the principles and calculations used in basic chemical process systems, to acquaint students with material and energy balances and the techniques to formulate and solve problems. This course covers the basic calculations used in chemical processes. It includes units and dimensions, process variables, material balance, energy balance, single phase and multiphase systems.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Solve pertinent data on process variables to account for the flows to and from the process and its units.
2. Apply the concept of phase system, material balances and energy balances in chemical process plants.
3. Perform laboratory experiments safely based on procedures.

### References:

1. Felder & Rousseau (2015), Elementary Principles of Chemical Processes, 4th Edition, John Wiley & Sons.
2. Himmeblau, D.M. (2012), Basic Principle and Calculation in Chemical Engineering, 8th Edition, Prentice-Hall."



## **DISCIPLINE CORE**

**CLD22103 ENGINEERING DRAWING**

**CPD22002 HEAT TRANSFER**

**CLD22103 PROCESS INSTRUMENTATION &  
CONTROL**

**CPD22203 MASS TRANSFER**

**CPD22303 INDUSTRIAL SAFETY & HEALTH**

**CPD22604 REACTION ENGINEERING**

**CPD39806 FINAL YEAR PROJECT**

## **CLD22103 ENGINEERING DRAWING**

This course will emphasize on introduction to engineering drawing and Piping and Instrumentation Diagram (P&ID). The contents cover the knowledge of technical drawing standard and practicing the modern tools using Computer Aided Drafting and Design (CAD) including 2D and 3D design.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Practice engineering drawing standard and P&ID.
2. Construct 2D design and 3D design parts using CAD software.
3. Assemble 3D parts including chemical process equipment and piping design.

### **References:**

1. Scott Onstott (2017) "AutoCAD 2018 and AutoCAD LT 2018 Essentials", John Wiley & Sons Inc.
2. Randy Shih (2018) "Learning Autodesk Inventor 2018", SDC Publication.

## **CPD22002 HEAT TRANSFER**

This course is intended to serve as an elementary treatment of the principles of heat transfer. The primary objective of the course is to present the fundamental principles of heat transfer by relating those principles to practical, real-world applications. By showing how basic heat-transfer concepts relates to real thermal systems. Students are introduced to some of the most widely encountered applications in which heat transfer processes are vital. Second, by offering a balanced blend of basic theory and applications, this course helps bridge the gap between heat transfer theory and heat transfer practice. In addition it covers introduction to heat transfer, conduction heat transfer, convection heat transfer, radiation heat transfer and the application of heat transfer especially in heat exchanger.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Explain three modes of heat transfer which are conduction, convection and radiation. (C2, PLO1)
2. Apply basic calculation in solving problems related to heat transfer. (C3, PLO2)
3. Perform laboratory experiments safely based on procedures. (P3, PLO4)

### **References:**

1. Geankoplis, C.J., (2018) Transport Processes and Separation Processes Principle, (Includes Unit Operations) (5th Edition).
2. Cengel, Y.A., (2007), Heat and Mass Transfer: A Practical Approach, 3rd Edition, McGraw Hill.

## **CPD22103 PROCESS INSTRUMENTATION & CONTROL**

This is an Introductory Course in fundamental concept in both Process Control and Process Instrumentation as well as their application in Industry. This Course focuses on the Measurement of Pressure, Level, Temperature and Flow and also Principle of Maintenance, Troubleshooting and Safety for Process Instrumentation. In Process Control, the concepts to be covered are fundamental of Process Control, Controller Tuning and Control Strategies for Chemical Process. Last but not least, the students will also be exposed towards various Process Instrumentation And Control equipment via Laboratory Experimentations.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Employ the knowledge of instrumentation and control in chemical process flow diagram.
2. Apply the principles of instruments with different control strategies for various chemical process applications.
3. Conduct laboratory experiment safely based on procedures.

### **References:**

1. Seborg, D.E., Edgar, T.F. and Mellichamp, D.A. ( 2019 ) Process Dynamics And Control, 4th Edition, John Wiley & Sons.
2. Doebelin, E.O., ( 2003 ) Measurement System; Application And Design, 5th Edition, McGraw Hill International Editions.
3. Perry, R.H. & Green, D., (2019), Perry's Chemical Engineer's Handbook, 9th Edition , McGraw Hill International Editions.
4. Thomas, A.H., (2015), Measurement And Control Basics, 5th Edition, ISA Control Series.

## **CPD22203 MASS TRANSFER**

This course introduces different types of unit operations involved in the chemical and other physical processing industries such as distillation, absorption, liquid-liquid extraction and solid-liquid extraction (leaching). It also deals with design of separation operations using mass transfer principles.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Explain the principles of mass transfer in different types of unit operation in chemical industries.
2. Solve the principles of mass transfer problems in different types of unit operation in chemical industries.
3. Perform laboratory experiments safely based on procedures.

### **References**

1. Geankoplis, C.J., (2018) Transport Processes and Separation Processes Principle, (Includes Unit Operations) (5th Edition).
2. McCabe and Smith (2005), Unit Operations of Chemical Engineering, 6th Edition. McGraw-Hill.
3. Coulson & Richardson (1983). Chemical Engineering, Vol.2, Pergamon Press, Oxford."

## CPD22303 INDUSTRIAL SAFETY & HEALTH

To impart the knowledge and create awareness of occupational safety and health. Student will expose to the techniques, legal, society and cultural issues in making the workplace as safe as possible.

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Illustrate the ability to recognize the types of hazards, the appropriate control measures and risks associated with safety and health at workplace.
2. Develop the ability to collaborate with team members in carrying out activities related to occupational safety and health, with referred to relevant safety and health laws.
3. Demonstrate business practices as well as technopreneurial competencies to all work activities related to occupational safety and health.

### References:

1. Crowl, D.A., and Louvar, J.F., (2019), Chemical Process Safety Fundamentals with Applications, 4th Edition, Prentice Hall.
2. CCPS (Center for Chemical Process Safety), (2016), Introduction to Process Safety for Undergraduates and Engineers, 1st Edition, Wiley-AIChE.
3. CCPS (Center for Chemical Process Safety), (2011), Layer of Protection Analysis: Simplified Process Risk Assessment, 1st Edition, Kindle Edition, Wiley-AIChE
4. Goetsch, D.L., (2014), Occupational Safety And Health For Technologies, Engineers And Managers, 8th Ed. Prentice Hall.

## CPD22604 REACTION ENGINEERING

This course will impart knowledge in basic principles and fundamental in chemical reaction kinetics, types of reactor and its design characteristic and catalyst and catalytic reaction. Students will be exposed to a number of chemical reaction calculations involving different types of reactors.

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Solve problems related to chemical reactions.
2. Analyze chemical kinetics in designing reactors.
3. Perform laboratory experiments safely based on procedures.

### References:

1. Fogler H.S., (2020), Elements of Chemical Reaction Engineering, 5th Edition, Prentice Hall International Series.
2. Hill, C.G., (2014) Introduction to Chemical Engineering Kinetics and Reactor Design, 2nd Edition, New Jersey, John Wiley & Sons.
3. Holland C.D., (1989), Fundamental of Chemical Reaction Engineering, 2nd Edition Prentice Hall Englewood Cliffs.
4. Smith, J.M., (1986), Chemical Engineering Kinetics, 3rd Edition, Singapore, McGraw-Hill International"

## **CPD39806 FINAL YEAR PROJECT**

This course introduces students with ability and skills in conducting a technical project based on their specialization area. It provides students with technical writing and presentation skills.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Plan the project activities to fulfil the proposed research problem.
2. Manage and execute the project plan to accomplish project objectives.
3. Analyse project results using appropriate technique or tools.
4. Produce a project report in accordance with the specified standard format.
5. Present and defend the project outcomes effectively.

# **ELECTIVES**

## **Sustainable Process Engineering**

Elective 1: CPD22403 Plant Utility & Safety

Elective 2: CPD22503 Petrochemical & Petroleum Refining Technology

Elective 3: CPD22703 Plant Maintenance & Inspection

Elective 4: CPD22803 Oil & Fat Process Technology

## **CPD22403 PLANT UTILITY AND SAFETY**

This course introduces students to basic chemical and non-chemical plant utility system such as prime movers, electrical system, water system, cooling system, boiler feed water treatment, boiler operation, electrical steam generation, compressor, and their safety aspects. Knowledge on plant utility and safety will be enhanced further during industrial visit.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Describe the function of various equipment utility and basic troubleshooting of plant.
2. Apply fundamental operation of plant equipment and basic safety practice for various plant utilities.
3. Display understanding of the plant utilities and safety fundamental based on industrial visit. (P3,

### **References**

1. Nag P.K. (2004). Power Plant Engineering, 3rd Edition, Mc Graw Hill International
2. Handbook of Power (1992). Utility and Boiler. 6th Ed., Penwell Publishing Co
3. Perry, R.H. & Green, D. (1994). Perry's Chemical Engineer's Handbook, 6th Ed., McGraw Hill International Editions.
4. Sinnott, R.K. (1983). Chemical Engineering, Vol. 6, Pergamon Press Ltd, Oxford.
5. Boiler Operators Handbook. (1989). National Fuel Efficiency Service Ltd., Graham & Trotman."

## **CPD22503 PETROCHEMICAL & PETROLEUM REFINING TECHNOLOGY**

This course focus on the processing involved in petroleum refining such as pre-treatment, separation, conversion and treatment. It also covers the subtopic of petroleum exploration, composition and classification of crude oil, crude assay and blending of petroleum product. This course also covers the processing of natural gas and petrochemical synthesis.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Solve the problems involve in petroleum refining, natural gas and petrochemical synthesis.
2. Assess the processes involve in petroleum refining, natural gas and petrochemical.
3. Perform analysis of petroleum product and natural gas by following standard application.

### **References**

1. Gary, J.H. and Handwerk, G.E., 2019, Petroleum Refining: Technologies and Economics., 6th edition, Marcel Dekker, Inc.
2. James G. Speight, 2016. Handbook of Petroleum Refining, 1st Edition CPC Press
3. Speight, James G., The Chemistry and Technology of Petroleum, 2007, Taylor & Francis
4. The Institute of Petroleum, London., Standard Methods for Analysis and Testing of Petroleum and Related Products, John Wiley & Sons.

## **CPD22703 PLANT MAINTENANCE & INSPECTION**

This course is to provide fundamental knowledge in plant maintenance and inspection. It also introduces students to the importance of maintenance strategy and principles.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Explain basic management and maintenance in a plant process.
2. Relate between maintenance, commissioning, shutdown and start up procedure.
3. Propose related maintenance strategy and inspection of plant equipment.

### **References**

1. Higgins L.R and Mobley R. K, (1998). Maintenance Engineering Handbook, 6th Edition, Mc Graw Hill
2. Richard D. Palmer, (2019) Maintenance Planning and Scheduling Handbook, 4th Edition, McGraw-Hill
3. Mobley R.K (2004), Maintenance Fundamentals 2nd Edition, Elsevier

## **CPD22803 OIL & FAT PROCESS TECHNOLOGY**

This course introduces students to edible oil processing from raw materials to final product. It includes origin of edible oils, feedstock characteristic, fatty acid isolation and glycerine recovery and purification, fatty acids clusters, reactions and industrial application of oil and fat, the analysis of fatty acid and esters.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Relate the fundamental knowledge of Oil and Fat Technology with engineering parts.
2. Develop potential products or modification process as entrepreneurship projects.
3. Perform experimental activities associate with oil and fats technology.

### **References**

1. Advances in Oil Palm Research Vol 1 and Vol 2, POB (Ministry of Primary Industries Malaysia, 2000)
2. Balley's Industrial Oil and Fat Products Vol 1 – Vol 6, 6th Edition, A John Wiley & Sons, Inc., Publication, 2005
3. Fats And Oils; Formulating and Processing Application, 2nd Edition, CRC Press, 2004
4. Edible Oil Processing / edited by Woolf Hamm and Richard J. Hamilton, Sheffield, England; Boca Raton, FL: Sheffield Academic Press Sheffield, England; Boca Raton, FL: CRC Press, 2000
5. Bleaching And Purifying Fats And Oils Theory And Practice / H.B.W. Patterson Urbana, Ill.: AOCS PRESS, 2009
6. Ullman's Encyclopedia of Industrial Chemistry, 6th Edition, 2003
7. The Lipid Handbook, 2nd Edition, Chapman & Hall Chemical Data Base, 199433 /



# **Biotechnology & Bioengineering**

Elective 1: CBD22003 Introduction to Bioprocess Technology

Elective 2: CBD22103 Principle of Microbiology

Elective 3: CBD22203 Analytical Methods in Bioprocessing

Elective 4: CBD22303 Techniques in Bioproduct Recovery

## **CBD22003 INTRODUCTION TO BIOPROCESS TECHNOLOGY**

This course encompasses on the scope and applications of bioprocess technology in making use of microbial, animal and plants cells and components of cells such as enzymes to manufacture new products. The scope of this subject includes fermentation technology, cell growth kinetics, bioreactors, inocula development, sterilization processes, agitation and aeration.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Explain the principles and scopes of bioprocess engineering technology including its application.
2. Demonstrate skills in fermentation operations.
3. Display ability to work and communicate effectively in team either as a leader or ordinary member.

### **References:**

Main References:

1. Michael L. Shuler, Fikret Kargi, Matthew DeLisa. (2017) Bioprocess engineering : basic concepts. Boston : Prentice Hall. [TP248.2 .S58 2017]
2. Stanbury, P.F., Whitaker, A. and Hall, S. J. (2017). Principles of Fermentation Technology, Oxford. [TP156.F4 .S73 2017]
3. Doran P.M. (2013). Bioprocess Engineering Principles (2nd ed). Academic Press, Harcourt Brace & Company (TP248.3.D67 2013 (2nd ed))

## **CBD 22103 PRINCIPLES OF MICROBIOLOGY**

This is an introductory course to basic microbiology including the diversity, characterization, microbial growth & cultivation as well as industrial application of microorganism such as bacteria, viruses and fungi.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Distinguish microorganism through its principles and characterization.
2. Perform laboratory works related to microbiological techniques.
3. Discuss the implementation of microbial technology in bioprocess industry through communication and presentation.

### **References:**

Main ref

1. Denise Anderson, Sarah Salm and Deborah Allen. (2019) Nester's Microbiology: A Human Perspective, 9th Edition McGraw-Hill. NY, USA
2. Brown, A. and Smith, H. (2017).Benson's microbiological applications, laboratory manual in general microbiology. 14th ed. Mc-Graw-Hill, NY, USA (MAIN REF)

## **CBD 22203 ANALYTICAL METHODS IN BIOPROCESSING**

This is a study of the fundamental biological material principle such as amino acids & peptides, protein, enzymes, carbohydrates, lipids, natural products and discusses the current innovative technology in the processing of biological products

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Explain general knowledge, characteristic and properties of biological material.
2. Show ability to identify problems, and solve using source of biological material principles.
3. Acquire knowledge and skills for lifelong learning.

### **References:**

1. Moran, L.A., Horton, H.R., Scrimgeour, K.G. and Perry, M.D. (2012). Principles of Biochemistry. 5th ed. Pearson Education Inc. USA (MAIN REF) QP 514.2 P75 2012 (5th ed)
2. David L. Nelson and Michael Cox. (2017) Lehninger Principles of Biochemistry: International Edition. W.H. Freeman & Co Ltd.
3. Michael L. Shuler, Fikret Kargi, Matthew DeLisa. (2017) Bioprocess engineering: basic concepts. Boston: Prentice Hall. TP248.2 .S58 2017"

## **CBD22303 TECHNIQUES IN BIOPRODUCT RECOVERY**

This subject aims to expose the student about product recovery methods such as filtration, centrifugation, cell disruption, solvent extraction, chromatography, membrane processes, evaporation and drying. Besides, student will be able to understand the downstream processing with various types unit operation equipment.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Apply the appropriate techniques in bioproduct recovery stages.
2. Perform the operation in downstream processing.
3. Discuss the knowledge and techniques in bioproduct recovery to meet the desired needs of society.

### **References:**

Main Reference:

1. Roger, G.H. et. Al. (2015). Bioseparations Science and Engineering, Oxford University Press.
2. Michael L. Shuler, Fikret Kargi, Matthew DeLisa. (2017) Bioprocess engineering : basic concepts. Boston : Prentice Hall. [TP248.2 .S58 2017]

# Advanced Material

Elective 1: CRD22303 Rubber Processing

Elective 2: CRD22103 Plastics Processing

Elective 3: CRD22203 Latex Science & Technology

Elective 4: CRD22303 Composite Technology

## CRD22303 Rubber Processing

This module is aimed to convey an introductory knowledge of rubber technology. Various processing methods such as mixing, moulding, extrusion and calendering are also discussed. Troubleshooting of common moulding, extrusion and calendering problems are also highlighted. The relationship between different rubber properties, rubber chemicals, manufacturing techniques and applications is emphasized.

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Analyze the types, properties, rubber manufacturing techniques, testing and applications of rubber.
2. Perform the correct rubber processing and analysis techniques according to different requirements.
3. Demonstrate entrepreneurial elements in selected lab report.

### References:

1. James Lindsay White (1995). Rubber Processing: Technology, Materials, Principles, Hanser Publishers.
2. Grossman R.F. (2012). The Mixing of Rubber, Springer Science & Business Media
3. NIIR Board Consultant of Engineers. (2010), The Complete Book on Rubber Processing and Compounding, NIIR Project Consultancy Services.
4. James E. Mark, Burak Erman, Frederick R. Eirich (2013). Science and Technology of Rubber, (4th Edition), Academic Press.
5. Indian Rubber Institute (1999). Rubber Engineering, McGraw Hill Education
6. Peter S. Johnson (2001). Rubber Processing: An Introduction, Hanser Publishers.
7. Blow C.M. (2009). Rubber Technology and Manufacture, Butterworths-Heinemann London"

## CRD22103 Plastics Processing

This course includes introduction to plastics, injection moulding, extrusion, blow moulding, thermoforming, processing of reinforced plastics, other processes, auxiliary equipment and secondary operations.

### Learning Outcomes:

Upon completion of this course students should be able to:

1. Differentiate various types of plastic materials, additives, plastic processing techniques and defects in the finished products.
2. Perform correct plastic processing techniques according to different processing techniques and requirements.
3. Demonstrate ability to work in a team either as a leader or ordinary member in completing practical session.

### References:

1. Brent Strong, 3rd ed (2006), Plastics Materials and Processing, Upper Saddle River, NJ: Pearson Prentice Hall.
2. Charles A. Harper, Edward M. Petrie, (2003). Plastics Materials and Processes: A Concise Encyclopedia, Wiley-Interscience.
3. Susan E.M. Selke, John D. Culter, Ruben J. Hernandez, (2004), Plastics Packaging Properties, Processing, Applications, and Regulations, 2nd Ed, Hanser Gardner Publications.

## **CRD22203 Latex Science & Technology**

This is an elementary course aimed at providing students with latex science and technology knowledge; enhancing skills in preparation, testing and evaluation of latex concentrate as well as the basic principles in latex manufacturing and product testing.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Integrate fundamental knowledge of latex science and technology through various applications of latex.
2. Perform laboratory works of latex concentrate correctly.
3. Demonstrate role either as a leader or ordinary member in a team effectively during laboratory work sessions.

### **References:**

1. D.C. Blackley. (1997). Polymer Latices– Science and Technology 2nd Edition Vol.1: Fundamental Principles. Chapman & Hall.
2. D.C. Blackley. (1997). Polymer Latices – Science and Technology 2nd Edition Vol.2: Types of Latices. Chapman & Hall.
3. D.C. Blackley. (1997). Polymer Latices – Science and Technology 2nd Edition Vol.3: Applications of Latices. Chapman & Hall.
4. Rani Joseph, (2013). Practical Guide to Latex Technology, Smithers Rapra
5. Third International Conference on Synthetic Emulsions, Natural Latex and Latex Based Products, (2004). Rapra Technology Ltd.
6. Anderson C.D and E.S. Daniels. (2003). Emulsion, Polymerization and Latex Applications, Smithers Rapra"

## **CRD22303 Composite Technology**

This module is aimed to convey a basic knowledge of polymer composites. The advantages of polymer composites and their applications are highlighted. The common polymeric materials that can be used as composite matrix and reinforcement are discussed in detail. Common polymer composite manufacturing processes are also discussed in detail.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Analyze the components of polymer composites, functions, commercial applications and composite manufacturing.
2. Perform practical-based project on composite materials.
3. Present an enthusiastic and well practiced presentation on practical-based project.

### **References:**

1. Astrom B.T. (2002), Manufacturing of Polymer Composites, Chapman & Hall.
2. McRum, N.G. (1997). Principles of Polymer Engineering, 2nd Edition. Oxford University Press.
3. Hull, D. (1981). Introduction to Composite Materials. Cambridge University Press.
4. Harris, B. (1986). Engineering Composite Materials. Institute of Materials.
5. Campbell, F.C. (2004). Manufacturing Processes for Advanced Composites. Elsevier, Oxford
6. Gupta, M.C. and Gupta A.P. (2007) Polymer Composite. New Age International."

# **Environment Engineering Technology and Sustainability**

Elective 1: CED22003 Wastewater Treatment Technology

Elective 2: CED22103 Air Pollution Control Technology

Elective 3: CED22203 Introduction to Environmental Engineering Technology

Elective 4: CED22303 Solid and Hazardous Waste Management

## **CED22003 Wastewater Treatment Technology**

Students will be introduced with basic principles of wastewater treatment plant and residuals processing unit operations (physical, biological and chemical treatment options), the concepts of effluent residuals disposal and reuse particularly when treating and removing water pollutants. Other than that, students will be exposed with sustainable treatment methods for the removal of heavy metal from wastewater at reasonable cost and a fieldwork will be implemented at a various industry to gain more knowledge and hands-on experience.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Analyze the physical, chemical and biological parameters of raw wastewater with explanation on how these parameter can help in determining the appropriate treatment units for a municipal or industrial wastewater treatment plant.
2. Perform laboratory work based on the manual or guidelines given or guided by the instructor.
3. Able to follow the instruction/safety procedure and use the appropriate tools during the laboratory experiments.

### **References:**

1. Riffat., R. (2012). Fundamentals of wastewater treatment and engineering. IWA Publishing. Taylor & Francis Group.[online book]
2. Metcalf & Eddy. (1991). Wastewater Engineering: Treatment, Reuse and Disposal. (3rd edition).McGraw Hill.
3. Hammer MJ. (2004). Water and Wastewater Technology. 5th edition. Prentice Hall.
4. Masters GM.(1998).Introduction to Environmental Engineering and Science. Prentice-Hall.

## **CED22103 Air Pollution Control Technology**

An operating and measurement equipment typical used in controlling air pollutants are introduced. History of air pollution and air pollution legislation are discussed. Air quality management techniques are introduced. Physical principles used to detect and measure pollutants in the ambient air and from the sources are introduced. Laboratory experiments involving air controlling device unit to remove CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, and particulate matter are introduced. An awareness of modern environmental protection legislation and ethical considerations are discussed.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Discuss air pollution management practices in term of its regulations, strategies and technologies. (C4,PLO1)
2. Apply appropriate methods for measurement, control, and prevention of air pollution with respect to industrial economic viability and availability. (P3,PLO4)
3. Demonstrate good communication and showing respect to one another. (A3,PLO10)

### **References:**

1. Noel, D.N. (1994). Air Pollution Control Engineering.McGraw-Hill
2. Masters, G.M.(1998). Introduction to Environmental Engineering and Science. Prentice-Hall.
3. Purwer, D. (1997). Fundamental Aspects of Pollution Control and Environment. Elsevier, London.



## **CED22203 Introduction to Environmental Engineering Technology**

The course will provide students with basic principles of environmental engineering technology with relation to natural environment system, principles of pollution and treatment/control methods of various environmental pollutants. Several important law and regulations will enhance student's knowledge on institutional environment.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Demonstrate knowledge in applied engineering processes, mathematics, and sciences to manage environmental challenges and able to recognise, explain and discuss the concepts of resilience and sustainable development.
2. Perform fieldwork and laboratory analysis by applying the knowledge gain during classes.
3. Design solution through problem-solving skills by means of information gathering, social interaction within team and communication of results to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

### **References:**

1. Davis, M.L., and Cornwell, D.A. (2013), Introduction to Environmental Engineering, 5th Edition, McGraw Hill.
2. Nathanson JA. (2008). Basic Environmental Technology:Waste Supply, Waste Disposal, Pollution Control, 5th Edition, Pearson Prentice Hall.
3. Masters, Gilbert M and Ela, Wendell (2008). Introduction to Environmental Engineering and Science, 3rd Ed., Prentice Hall"

## **CED22303 Solid and Hazardous Waste Management**

This course will introduce the students to waste management, emphasizing on waste accumulation, generation rates, characteristics, handling, storage and disposal options, pollution prevention, environmental auditing, remediation, cleanup and modern combustion processes such as engineered incineration systems. The important impact of various treatment methods available in both type of waste management with respect to human and environmental health will be taken into account. Furthermore, Characterization of solid wastes and introduction to pertinent federal and state regulations will be discussed. On the other hand, Environmental protection legislation and ethical considerations will also be discussed.

### **Learning Outcomes:**

Upon completion of this course students should be able to:

1. Infer the basic principles of waste management, processing methods, 6Rs, treatment, disposal, remedial action and current issues related to solid and hazardous waste management.
2. Organize a case study on solid waste management activity involving with the suitable stakeholder.
3. Participate actively in class/project/discussion activity.

### **References:**

#### **Main References**

1. Bahadori, A. (2013). Waste Management in the Chemical and Petroleum Industries. Wiley.

# Academic Calendar 2022

Academic Calendar 2022 Undergraduate

UniKL Main Academic Calendar 2022 (14Wks-7Wks-14Wks)

Day	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23
Sun				Worker's Day 1									1
Mon				Eid Fitri* 2			Wk 2 1					Wk13 2	
Tues	CNY* 1	1		Eid Fitri* 3			2			Wk5 1		3	
Wed	CNY* 2	2		Eid Fitri* 4	0		3			2		4	1
Thurs		3		Wk10 5	2		4		1	3	1	5	2
Friday	4	4	1		3	1	5		2	4	2	6	3
Sat	5	5	2	7	4	2	6	3	1	5	3	7	4
Sun	6	6	3	8	5	3	7	4	2	6	4	8	5
Mon		7	Wk3 7	Awal Ramadhan 4	Wk11 9	YDPA Bday 6	4	Wk3 8	Wk7 5	Wk1 3	Wk6 7	Wk9 5	Wk14 9
Tues		8		Wk7 5	10	7	5	9	6	4	8	6	10
Wed		9		6	11	Rev	8	10	7	5	9	7	11
Thurs		10		7	12		9	11	8	6	10	8	12
Friday		11		8	13		10	12	9	7	11	9	13
Sat		12		9	14		Eid Adha 9	13	10	8	12	10	14
Sun	Reg 13	13		10	15		11	14	11	9	13	11	15
Mon		14	Wk4 14		16		12	15	12	10	14	12	16
Tues		15		11	Wk12 17		13	16	13	11	15	13	17
Wed	WOW 16	16		12	18	FE	14	17	14	12	16	14	18
Thurs		17		13	19		15	18	15	13	17	15	19
Friday		18		14	20		16	19	16	14	18	16	20
Sat		19		15	21		17	20	17	15	19	17	21
Sun		20		16	22	Reg 17	18	21	18	16	20	18	22
Mon	Wk1 21	Wk5 21	Wk 8 21	Wk13 23	FE 20		19	22	19	Wk3 17	Wk11 19	CNY* 23	20
Tues		22		19	24		20	23	20	18	22	20	21
Wed		23		20	25	WOW 22	21	24	21	19	23	21	22
Thurs		24		21	26	FE 23	22	25	22	20	24	22	23
Friday		25		22	27		23	26	23	21	25	23	24
Sat		26		23	28		24	27	24	22	26	24	25
Sun		27		24	29		25	28	25	23	27	25	26
Mon	Wk2 28	Wk6 28	Wk9 25	Wk14 30	27	Wk 1 25	26	29	26	Deepavali* 24	Wk8 28	Wk12 26	27
Tues		29		31	28		27	30	27	Wk4 25	29	27	28
Wed		30			29		28	31	28	30	28	31	Senate*
Thu		31			30		29		29		31		
Fri						Senate* 29							
Sat						Awal Muharam*	30						
Sun							31						

Reg	New Intake Registration	Rev	Revision Session	*	Public Holiday		Public Holiday for Melaka
WOW	Welcome & Orientation Week	FE	Final Exam Session		Public Holiday but subject to change		
MSB	Mid Sem Break			Senate*	Subject to Change/Via Circulation		

Semester	Jan Sem 2022	July Sem 2022	September Sem 2022
Activity	Date	Date	Date
New Intake Registration	13-Feb-22	17-Jul-22	25-Sep-22
Welcome & Orientation Week	14-18 Feb	18-22 July	26 - 30 Sept
Lessons	21 Feb- 8 April	25 July-9 Sept	3 Oct-18 Nov
Mid Sem Break	11-15 Apr		21- 25 Nov
Lessons	18 Apr- 3 June		28 Nov 2022 - 13 Jan 2023
Revision	7 - 10 June		14- 18 Jan 2023
Final Exam	13 - 26 June	10 - 17 Sept	19 Jan-4 Feb 2023
End of Sem Break	27 June - 22 July	19-30 Sept	7 -18 Feb 2023