Branch Campus
Malaysian Institute of Chemical & Bioengineering Technology

Programme Handbook
July/September 2018

Disclaimer:

The Programme Handbook Bachelor July/September 2018 Intake is meant for the students for Bachelor July/September 2018 Intake.

Universiti Kuala Lumpur Branch Campus
Malaysian Institute of Chemical & Bioengineering Technology
(UniKL MICET)
reserves the right to change the content without prior notice.

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Vision & Mission of University

Academic Activities Calendar for July/September 2018 Intake – Bachelor Only

DESCRIPTION	JULY/SEPTEMBER SEMESTER
Semester Registration for New Students	**2 September/12 September 2018**
Classes	**WK1-WK10 (WK8- for returning students)** **13 Sept – 23 November**
Revision	**26 – 30 November**
Final Examination for September 2018 Intake - Bachelor	**1 – 7 December**
FINAL EXAMINATION FOR ALL STUDENTS	**24 Nov – 7 Dec. 2018**

Academic Top Management Team UniKL MICET

	Associate Professor Ts. Dr Ruzainah binti Ali@Jaafar Dean of UniKL MICET Email: ruzainah@unikl.edu.my Phone: 06-551 2146
	Dr Kelly Yong Tau Len Deputy Dean Academic and Technology Email: kytlen@unikl.edu.my Phone: 06-551 2016
	Dr Mohd Zulkhairi bin Abdul Rahim Deputy Dean Student Development & Campus Lifestyle Email: mohd.zulkhairi@unikl.edu.my Phone: 06-551 2009
	Ts. Dr Zulhafiz bin Tajudin Deputy Dean IIIP Email: zulhafiz@unikl.edu.my Phone: 06-551 2139

Academic Staff Member of UniKL MICET

TECHNICAL FOUNDATION SECTION

SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	ZAIDA RAHAYU BINTI YET (Head of Section)	MASTER OF SCIENCE	SENIOR LECTURER
2.	ABDUL HAKIM BIN HJ ABU BAKAR	MASTER ELECTRICAL ENGINEERING	SENIOR LECTURER
3.	ABU HASSAN BIN ABD RAHMAN	MASTER OF ART	LECTURER
4.	ASIMI ANA BINTI AHMAD	MASTER OF ENGINEERING (CHEMICAL)	LECTURER
5.	AZLINA DIN	MASTER OF SCIENCE	LECTURER
6.	HANIZA BINTI KAHAR	MASTER OF SCIENCE	LECTURER
7.	MD SOHRAB HOSSIN (Dr)	PhD (ENVIRONMENTAL TECHNOLOGY)	SENIOR LECTURER
8.	MOHD ZULKHAIRI BIN ABDUL RAHIM (Dr)	PhD (CHEMISTRY)	SENIOR LECTURER
9.	NAZATULSHIMA BINTI HASSAN (SL)	MASTER OF SCIENCE	LECTURER
10.	NOOR AFIQAH BINTI MOHD (Dr)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
11.	SITI NUR ELMI BINTI ABDUL AZIZ	MASTER OF SCIENCE	LECTURER
12.	TEO SIEW HWAY	MASTER OF INFORMATION TECHNOLOGY	LECTURER
13.	YUSHAZAZIAH BINTI MOHD YUNOS (SL)	MASTER OF SCIENCE (MECHANICAL ENGINEERING)	LECTURER

PROCESS ENGINEERING TECHNOLOGY SECTION

SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	ASSOC. PROF. Dr. INDOK NURUL HASYIMAH BINTI MOHD AMIN (Head of Section)	PhD (CHEMICAL ENGINEERING TECHNOLOGY)	ASSOC. PROF.
2.	AIMAN NAZMI ROSLI	MASTERS OF ENG. (CHEMICAL)	LECTURER
3.	AIZA SYUHANIZ BINTI SALLEH	MASTER OF ENGINEERING	LECTURER
4.	ALIFF RADZUAN BIN MOHAMAD RADZI (Dr)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
5.	AMIN SAFWAN BIN ALIKASTURI (Dr)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
6.	AHMAD AZAHARI BIN HAMZAH (SL)	MASTER OF SCIENCE	LECTURER
7.	AZRIN BIN ABDUL RAHMAN	MASTER OF SCIENCE (PROCESS PLANT MANAGEMENT)	SENIOR LECTURER
8.	AZYYATI BINTI JOHARI	MASTER OF CHEMICAL ENGINEERING WITH ENTERPRENEUR	LECTURER
9.	FARIDAH BINTI GHAFAR (SL)	MASTER OF SCIENCE	SENIOR LECTURER
10.	KELLY YONG TAU LEN (Dr.)	PhD (MECHANICAL SCIENCE & ENGINEERING)	SENIOR LECTURER
11.	LAW JENG YIH	MASTER OF ENGINEERING	LECTURER
12.	MARMY ROSHAIDAH BINTI MOHD SALLEH	MASTER OF ENGINEERING	LECTURER
13.	MOHD ZULKHAIRI BIN ABDUL RAHIM (Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
14.	MUHAMMAD REMANUL ISLAM (Dr.)	DOCTOR OF PHILOSOPHY (CHEMICAL ENGINEERING)	SENIOR LECTURER
15.	NADIA BINTI ISA	MASTER OF SCIENCE	LECTURER
16.	NAJUA DELAILA BINTI TUMIN	MASTER OF ENGINEERING(POLYMER)	SENIOR LECTURER
17.	NAZERAH BINTI AHMAD (SL)	MASTER OF ENGINEERING	LECTURER
18.	NOR AFIFAH BINTI KHALIL	MASTER IN ENG. TECH. (CHEMICAL ENGINEERING)	LECTURER
19.	NOR AINI BINTI BUROK (Ts.)	MASTER OF INDUSTRIAL SAFETY MANAGEMENT	SENIOR LECTURER
20.	NOR SHAHIRAH BINTI MOHD NASIR(Dr)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
21.	NORULAKMAL BINTI NOR HADI	MASTER OF SCIENCE	SENIOR LECTURER

22.	NURULAIN BINTI NGAH	MASTER OF ENG. (CHEMICAL)	LECTURER
23.	RABIATUL ADAWIAH BINTI MAT NOOR	MASTER OF SCIENCE	LECTURER
24.	SITI AFIFAH BINTI MUDA	MASTER IN ENG. (CHEMICAL)	LECTURER
25.	SYAHIDI FADZLI BIN ALFAN	MASTER OF SCIENCE (INDUSTRIAL & TECHNOLOGY MANAGEMENT)	LECTURER
26.	SYED AZHAR BIN SYED AB RAHMAN (SL)	MASTER OF SCIENCE (CHEMICAL ENGINEERING)	SENIOR LECTURER
27.	ZAINAL ABIDIN BIN MOHD YUSOF (SL)	MASTER OF SCIENCE	SENIOR LECTURER
28.	ZULHAFIZ BIN TAJUDIN (Ts. Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
29.	ZURAIDAH BINTI RASEP	MASTER OF ENGINEERING	LECTURER

BIOENGINEERING TECHNOLOGY SECTION

SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	Ts. Dr. SHARIFAH SOPLAH BINTI SYED ABDULLAH (Head of Section)	PhD (ENVIRONMENTAL ENGINEERING)	SENIOR LECTURER
2.	FARA WAHIDA BINTI AHMAD HAMIDI (SL)	MASTER OF SCIENCE (BIOPROCESS ENGINEERING)	LECTURER
3.	IZUME AYUNA BINTI MOHAMED KHAMIL	MASTER OF SCIENCE	LECTURER
4.	LEONG CHEAN RING (Dr)	PhD IN MEDICINE	SENIOR LECTURER
5.	MOHAMMED DANISH (Dr)	PhD (CHEMICAL MODIFICATION OF BIORESOURCE)	SENIOR LECTURER
6.	MOHAMAD ZULKEFLEE BIN SABRI (SL)	MASTER OF ENGINEERING	LECTURER
7.	MOHD AZIZAN BIN MOHD NOOR (Prof. Dr.)	PhD (BIOCHEMISTRY)	PROFESSOR
8.	MOHD NASIR MAHMUD	MASTER OF SCIENCE	LECTURER
9.	MUHAMAD YUSUF BIN HASAN	MASTER OF SCIENCE (PROCESS PLANT MANAGEMENT)	SENIOR LECTURER
10.	MUHAMMAD SHARIR BIN ABDUL RAHMAN	MASTER OF CHEMICAL ENGINEERING	LECTURER
11.	NIK IDA MARDIANA BINTI NIK PA	MASTER OF SCIENCE	LECTURER
12.	NORHANI BINTI JUSOH	MASTER OF ENGINEERING	SENIOR LECTURER
13.	NURDIYANA BINTI HUSIN (SL)	MASTER OF SCIENCE	LECTURER
14.	NURUL FAEZAWATY BINTI JAMALUDIN	MASTER OF SCIENCE	SENIOR LECTURER
15.	NURUL NABIHAH BINTI RAHMAN	MASTER OF SCIENCE	LECTURER
16.	ROZYANTI BINTI MOHAMAD (Dr)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
17.	RUZAINAH BINTI ALI @ JAAFAR (Assoc. Prof. Ts. Dr.)	PhD (BIOTECHNOLOGY)	ASSOC. PROF
18.	SALEHA BINTI ATAN	MASTER OF ENVIRONMENTAL ENGINEERING	LECTURER
19.	SHARIFAH MARIAM BINTI SAYED HITAM (Dr.)	PhD (BIOPROCESS ENGINEERING)	SENIOR LECTURER
20.	SUZANA BINTI WAHIDIN (Dr.)	PhD (BIOPROCESS ENGINEERING)	SENIOR LECTURER
21.	TONG WOEI YENN (Dr.)	PhD IN MICROBIOLOGY	SENIOR LECTURER
22.	WAN MOHAMMAD BIN HAJI WAN ABDULLAH (Prof. Ts. Dr.)	PhD (AGRICULTURAL ENGINEERING)	PROFESSOR
23.	ZAINATUL 'ASYIQIN BINTI SAMSU	MASTER OF SCIENCE	LECTURER

ENVIRONMENT AND POLYMER ENGINEERING TECHNOLOGY SECTION

SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	Dr. NOR NADIAH BINTI MOHAMAD YUSOF (Head of Section)	PhD (ENERGY & ENVIRONMENTAL ENGINEERING)	SENIOR LECTURER
2.	ABBAS F MUBAREK AL KARKHI (Dr)	PhD (STATISTICS)	ASSOC. PROF.
3.	AHMAD NAIM BIN AHMAD YAHAYA (Assoc. Prof. Ts. Dr.)	PhD (ENVIRONMENT ENGINEERING TECHNOLOGY)	ASSOC. PROF.
4.	AMELIA BINTI MD SOM (Dr.)	PhD (GEOENVIRONMENT ENGINEERING)	SENIOR LECTURER
5.	ELMY NAHIDA BINTI OTHMAN (Ts.)	INTERNATIONAL MASTER OF SCIENCE (RURAL DEVELOPMENT) (Erasmus Mundus Programme)	SENIOR LECTURER
6.	KHAIRUL NADIAH BINTI IBRAHIM	MASTER OF TECHNOLOGY	SENIOR LECTURER
7.	MOHD SYAZWAN BIN MOHD GHAZALI	MASTER OF SCIENCE	LECTURER
8.	MOHD ZAHIT BIN ALI (Assoc. Prof. Dr.)	PhD (ENVIRONMENTAL ENGINEERING TECHNOLOGY)	ASSOC. PROF.
9.	NADIA BINTI RAZALI (Dr.)	PhD (CONSTRUCTION)	SENIOR LECTURER
10.	NOR ZALINA BINTI KASIM (Dr.)	PhD (CIVIL ENGINEERING)	SENIOR LECTURER
11.	NORHAYATI BINTI MOHD IDRUS (SL)	MASTER OF SCIENCE	LECTURER
12.	NORILHAMIAH BINTI YAHYA (SL)	MASTER OF ENVIRONMENT	LECTURER
13.	ROBERT THOMAS BACHMANN (Assoc. Prof. Dr.)	PhD (ENVIRONMENTAL ENGINEERING TECHNOLOGY)	ASSOC. PROF.
14.	SABRINA BINTI KARIM (Ts. Dr.)	PhD (CIVIL & ENVIRONMENTAL ENGINEERING)	SENIOR LECTURER
15.	SALEM S S ABU AMRO (Dr.)	PhD (WATER & WASTEWATER TREATMENT)	SENIOR LECTURER
16.	SITI NOORAIN BINTI ROSLAN (SL)	MASTER IN ENGINEERING	LECTURER
17.	TENGKU FAZLI BIN TG JAYA @ TG YAHYA	MASTER OF ENGINEERING	SENIOR LECTURER
18.	AHMAD MARZIO BIN MOHD YUSOF (Assoc. Prof. Dr.)	PhD (POLYMER ENGINEERING TECHNOLOGY)	ASSOC. PROF
19.	AHMED ABDULKAREEM AHMED AL DULAIMI (Dr.)	DOCTOR OF PHILOSOPHY	SENIOR LECTURER
20.	AZANAM SHAH BIN HASHIM (Prof. Dato' Dr.)	DOCTOR OF ENGINEERING (MATERIAL SCIENCE)	PROFESSOR
21.	FAHMI ASYADI BIN MD YUSOF (SL)	MASTER OF ENGINEERING	SENIOR LECTURER

22.	MAZLINA BINTI GHAZALI (Ts.)	BACHELOR OF ENGINEERING (HONS) IN POLYMER ENGINEERING	ASST. LECTURER
23.	MOHD EDYAZUAN BIN AZNI (Ts.)	MASTER OF ENG. TECH. (GREEN & ENERGY EFFICIENT BUILDINGS)	LECTURER
24.	MUAZZIN BIN MUPIT	MASTER OF SCIENCE	SENIOR LECTURER
25.	MUZAFAR BIN ZULKIFLI (Ts. Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
26.	NOOR FAIZAH BINTI CHE HARUN (Dr)	DOCTOR OF ENGINEERING (ENVIRONMENTAL CHEMISTRY & ENGINEERING)	SENIOR LECTURER
27.	NURUL IMAN BINTI ABDUL RAZAK	MASTER OF CHEMICAL ENGINEERING	LECTURER
28.	ONG SIEW KOOI (Assoc. Prof. Ts. Dr.)	PhD (MATERIAL SCIENCE ENGINEERING)	ASSOC. PROF
29.	RAJA NAZRUL HAKIM BIN RAJA NAZRI	MASTER OF SCIENCE (POLYMER ENGINEERING)	LECTURER
30.	SUHAINI BINTI MAMAT	MASTER OF ENGINEERING	LECTURER
31.	YUSRIAH BINTI LAZIM (Dr.)	PhD IN MATERIAL SCIENCE AND ENG.	SENIOR LECTURER
32.	ZAIHAR BIN YAACOB	MASTER OF ENGINEERING	SENIOR LECTURER

FOOD ENGINEERING TECHNOLOGY SECTION

SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	Ts. Dr. NORIZA BINTI AHMAD (Head of Section)	PhD (FOOD SCIENCE & TECHNOLOGY)	SENIOR LECTURER
2.	ABDUL MANAN BIN DOS MOHAMED (Assoc. Prof. Ts. Dr.)	PhD (FOOD BIOTECHNOLOGY)	ASSOC. PROF.
3.	FARAH SALINA BINTI HUSSIN (SL)	MASTER OF SCIENCE (FOOD TECHNOLOGY)	SENIOR LECTURER
4.	FARIDATUL AIN BINTI MOHD ROSDAN	MSC (AGRICULTURAL PROCESS ENG.)	LECTURER
5.	HARUN BIN SARIP (Assoc. Prof. Ts. Dr.)	PhD (PROCESS ENGINEERING)	ASSOC. PROF.
6.	HISHAMUDDIN BIN JAMALUDIN	MASTER OF SCIENCE	SENIOR LECTURER
7.	KHAIRUL FAIZAL BIN PA'EE (Dr.)	PhD (FOOD BIOPROCESS)	SENIOR LECTURER
8.	LILY SUHAILA BINTI YACOB	MASTER OF ENVIRONMENT (ENVIRONMENTAL SCIENCE)	LECTURER
9.	MASNIZA BINTI MOHAMED @ MAHMOOD (SL)	MASTER OF SCIENCE	SENIOR LECTURER
10.	MAZIDAH ABDUL RAHMAN (Ts. Dr.)	PhD (SCIENCE FOOD TECHNOLOGY)	SENIOR LECTURER
11.	MOHD NIZAM BIN ZAHARI	MASTER OF ENG. TECH. (GREEN & ENERGY EFFICIENT BUILDINGS)	LECTURER
12.	NOR RAIHANA BINTI MOHAMED ZAM (Dr.)	PhD (NUTRITION)	SENIOR LECTURER
13.	NOR ZANARIAH BINTI SAFIEI (Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
14.	NORZAHIR SAPAWE (Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
15.	RINANI SHIMA BINTI ABD. RASHID (SL)	MASTER OF SCIENCE (FOOD TECHNOLOGY)	SENIOR LECTURER
16.	SHAHRULZAMAN BIN SHAHARUDDIN (Dr.)	PHISOLOPHY DOCTORATE OF BIOPROCESS ENG.	SENIOR LECTURER
17.	SITI FATIMAH BINTI IBRAHIM (Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
18.	WAN NOOR AIDAWATI BINTI WAN NADHARI (Dr.)	PhD (BIORESOURCE, PAPER AND COATINGS TECHNOLOGY)	SENIOR LECTURER

CHEMICAL ENGINEERING SECTION

SL: STUDY LEAVE

NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	Dr. RAPIDAH BINTI OTHMAN (Head of Section)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
2.	CHIN LIP HAN (Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
3.	FARRA WAHIDA BINTI SHAARANI (SL)	MASTER OF SCIENCE	SENIOR LECTURER
4.	MOHD SALIHIN BIN MOHD SAIDI	MASTER OF ENGINEERING (CHEMICAL & NANOTECHNOLOGY)	LECTURER
5.	NOOR AINA BINTI MOHD NAZRI (Dr.)	PhD IN ENGINEERING (GAS)	SENIOR LECTURER
6.	NOR NABIHA BINTI MD ZAN	MASTER (ENGINEERING SCIENCE)	LECTURER
7.	RUSMAWARNI BINTI RAMLI	MASTER (CHEMICAL ENGINEERING)	LECTURER
8.	SITI NURUL ATIKAH BINTI ABD HALIM (Dr.)	PhD (CHEMICAL ENGINEERING)	SENIOR LECTURER
9.	WONG CHEE SIEN (Dr.)	PhD (BIOPROCESS ENGINEERING)	SENIOR LECTURER
10.	YUHANEES BINTI MOHAMED YUSOF (Dr.)	PhD (APPLIED SCIENCE)	SENIOR LECTURER

STUDENT DEVELOPMENT SECTION

SL: STUDY LEAVE

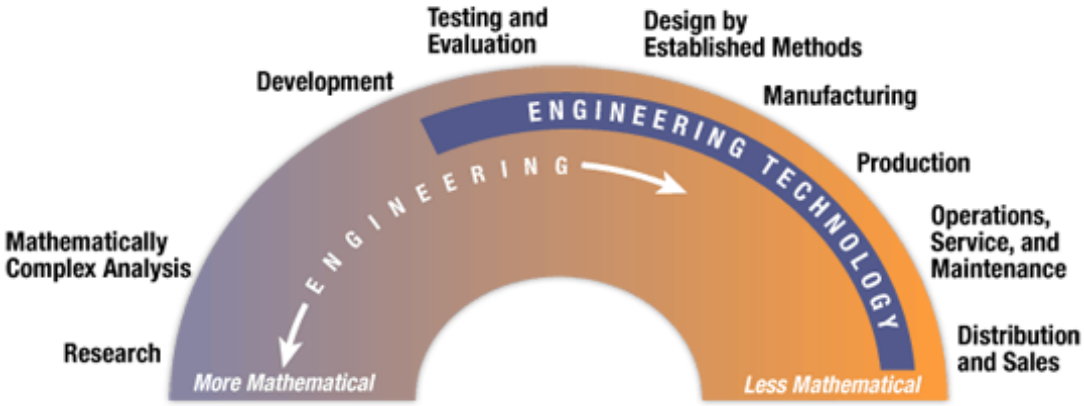
NO.	NAME	HIGHEST QUALIFICATION	DESIGNATION
1.	MARIATI BINTI MOHD SALLEH (Head of Section)	MASTER OF EDUCATION	LECTURER
2.	ANISAH BAHYAH AHMAD (Dr.)	PhD (ISLAMIC CIVILZATION)	SENIOR LECTURER
3.	AZMAN BIN YUSOF (Assoc. Prof. Dr.)	PhD (PHILOSOPHY AND CIVILIZATION STUDIES)	ASSOC. PROF.
4.	AZU FARHANA BINTI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

IIIP SECTION

SL: STUDY LEAVE

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

Differences between Engineering Programme and Engineering Technology Programme



	Engineering Technology	Engineering
Accreditation Body	BEM – ETAC	BEM – EAC
Theory vs Practical	Theory – 40% Practical – 60%	Theory – 80% Practical – 20%

ENGINEERING TECHNOLOGY PROGRAMME

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO1	UniKL graduates who are knowledgeable, competent, and innovative, who will contribute to the human capital in the industry related to chemical engineering technology.
PEO2	UniKL graduates who have effective leadership and team work skills, as well as verbal, non-verbal, and interpersonal communication skills to support their role in the industry.
PEO3	UniKL graduates who are committed towards the importance of lifelong learning and continuous improvement.
PEO4	UniKL graduates who practice professionalism with ethics and social responsibility.
PEO5	UniKL graduates who are capable of embarking on business and technopreneurial activities.

PROGRAMME LEARNING OUTCOMES (PLO)

PLO1	Apply the knowledge of mathematics, science and engineering technology fundamentals and specialization specialisation principles to well-defined applied engineering technology procedures, processes, systems or methodologies in chemical engineering technology.
PLO2	Plan and conduct experimental investigations of broadly-defined problems using data from relevant sources.
PLO3	Select and apply appropriate techniques, resources and modern engineering tools, including prediction and modelling, to broadly-defined engineering activities, with an understanding of the limitations.
PLO4	Identify, formulate, research literature, and solve broadly-defined chemical engineering technology problems, reaching substantiated conclusions using analytical tools appropriate to the area of specialisation.
PLO5	Design solutions to broadly-defined problems and contribute to the design of systems, components or processes related to chemical engineering technology for sustainable development.
PLO6	Communicate effectively with the engineering technology community and society.
PLO7	Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities and norms of chemical engineering technology practice.
PLO8	Understand the impact of engineering technology solutions in a societal context and demonstrate knowledge of and the need for sustainable development.
PLO9	Function effectively as an individual, and as a member and/or leader in diverse technical teams.
PLO10	Understand and commit to professional ethics and, responsibilities, and norms of chemical engineering technology practice.
PLO11	Recognise the requirements for and the need of for professional development and to engage in independent and lifelong learning.
PLO12	Demonstrate an awareness and understanding of management, business practices, and technopreneurial competencies, as well as identify business opportunities.

NATIONAL REQUIREMENT

MPU 3113 HUBUNGAN ETNIK
MPU 3173 PENGAJIAN MALAYSIA 3
MPU 3123 TAMADUN ISLAM & TAMADUN ASIA (TITAS)
MPU 3143 BAHASA MELAYU KOMUNIKASI 2
MPU 3333 ISU-ISU KONTEMPORARI MUSLIM DI MALAYSIA/
MPU 3343 CULTURE AND LIFESTYLE IN MALAYSIA
MPU3412 CAREER GUIDANCE 2
MPU3422 COMMUNITY SERVICE 2
MPU3432 CULTURE 2
MPU3442 RAKAN MASJID 2
MPU3452 SISWA-SISWI BOMBA DAN PENYELAMAT 2
MPU3462 SISWA-SISWI PERTAHANAN AWAM 2
MPU3472 SPORTS MANAGEMENT 2

MPU 3113 Hubungan Etnik

Rationale for inclusion of the course in the program:

Kursus Hubungan Etnik ini bertujuan untuk melahirkan pelajar yang mempunyai pengetahuan dan penghayatan terhadap nilai-nilai mulia dan sejarah.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Menerangkan peranan pluraliti budaya, masyarakat dan kumpulan etnik dalam memupuk perpaduan
2. Mengenalpasti cabaran pluralisasi budaya dan pelaksanaannya dalam konteks permuafakatan sosial di Malaysia
3. Mengaplikasi kemahiran sosial dalam kalangan pelajar ke arah mewujudkan masyarakat bersatu padu
4. Menganalisis isu-isu dan cabaran dalam konteks hubungan etnik di Malaysia

MPU 3173 Pengajian Malaysia 3

Rationale for inclusion of the course in the program:

This unit focuses on the history and politics, the constitution of Malaysia, community and solidarity, development and other issues of national concern. The objective of this unit is to produce students who understand the socio-cultural society, the process of nation-building and political structure in Malaysia as well as to appreciate the role of Malaysia at the international level.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Describe the history of the nation and the development of socio-cultural aspects of society, politics and economy
2. Discuss the main components of the systems and the military administration of the country
3. Explain the historical and political process to achieve independence
4. nterpret the key government structure and its contribution to national development related to current issues happens in Malaysia.

MPU 3123 Tamadun Islam & Tamadun Asia (TITAS)

Rationale for inclusion of the course in the program:

Kursus TITAS disediakan untuk melahirkan pelajar yang mempunyai pengetahuan dan penghayatan terhadap nilai-nilai mulia dan sejarah.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Menyenaraikan konsep-konsep utama Tamadun Islam dan Tamadun Asia.
2. Menerangkan kepentingan dan peranan agama dan budaya masing-masing dalam kehidupan.
3. Mengaplikasi kemahiran komunikasi secara berkesan dalam penulisan dan lisan di peringkat individu, kumpulan dan masyarakat.

MPU 3143 Bahasa Melayu Komunikasi 2

Rationale for inclusion of the course in the program:

Kursus ini adalah untuk membolehkan pelajar menguasai kemahiran asas bahasa Melayu dan kecekapan berbahasa untuk berkomunikasi bagi melahirkan idea dan perasaan secara lisan dan penulisan.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Mengenal pasti sistem bunyi, sistem ejaan rumi, kosa kata dan tatabahasa bahasa Melayu dalam ayat mudah
2. Mendengar, memahami pertuturan dan bertutur dalam pelbagai situasi harian
3. Mengenal pasti teknik-teknik khusus berkomunikasi dalam perbualan formal atau tidak formal

MPU 3333 Isu-Isu Kontemporari Muslim Di Malaysia

Rationale for inclusion of the course in the program:

Kursus ini memperkenalkan realiti dan cabaran masyarakat dalam menghayati Islam sebagai Ad-Deen. Pelbagai isu dan realiti umat Islam daripada sudut politik, ekonomi dan sosial yang melakari senario umat Islam di Malaysia dibincangkan. Kursus ini juga melangkau ke arah potensi kejayaan umat Islam dengan fakta-fakta dan dalil wahyu.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Menerangkan sejarah dan aspek-aspek perkembangan Islam di Malaysia
2. Menghuraikan realiti dan isu-isu kontemporari yang melingkungi umat Islam di Malaysia
3. Menjelaskan peranan dan masa depan Islam dalam konteks semasa dan wahyu.

MPU 3343 Culture And Lifestyle In Malaysia

Rationale for inclusion of the course in the program:

The main objective of this course is to expose students to the rich culture and lifestyle in Malaysia. This is to foster and instill national unity. It will introduce various cultures to the local as well as the international students. This course will help to bridge the gap among students as well as further develop the understanding and respect for Malaysian culture and lifestyle.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Distinguish acceptable cultural practices, norms and lifestyle in Malaysia
2. Demonstrate clear understanding of cultural values, ethnicity and lifestyle in Malaysia
3. Communicate information on cultural and lifestyles issues

MPU 3412 Career Guidance 2

Rationale for inclusion of the course in the program:

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 students to understand the importance 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 employer's expectations in job hunt.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Identify their personality types towards career & leadership
2. Determine ways in managing stress in the workplace
3. Demonstrate awareness of real work environment and the industry
4. Outline their future career and targets

MPU 3422 Community Service 2

Rationale for inclusion of the course in the program:

This course is one the co-curriculum modules offered to develop well-rounded individuals through involvement in high impact social and community activities. Specifically, it aims to develop interest among the students to participate in community service programmes. It also enables student to understand the importance of performing community service and the ways to implement the programmes and activities. Besides that, it provides better understanding to the students 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 large scale/ high impact community service programmes and activities
2. Apply knowledge learnt in course in community service programmes and activities
3. Demonstrate entrepreneurship skills in community service programmes and activities
4. Explain the values, ethics and benefits of participating in community service programmes and activities.

MPU 3432 Culture 2

Rationale for inclusion of the course in the program:

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' personality and social interaction skills, as well as foster closer relationships among the students 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. Demonstrate appropriate skills in organising a culture event
3. Evaluate the effectiveness of the management of a cultural event.

MPU3442 Rakan Masjid 2

Rationale for inclusion of the course in the program:

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 give exposure to students on managing mosque effectively and implementing various activities related to the mosque. This is to enable students to play their role in developing the ummah through the mosque.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Explain about the importance of religious programmes implemented in Malaysia
2. Practice activities in relation to significant events in Islam
3. Recognise the functions of agencies/bodies relevant to the development of Islam in Malaysia

MPU3452 Siswa Siswi Bomba & Penyelamat 2

Rationale for inclusion of the course in the program:

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 and Rescue Department, foot marching technique, fire rescue, ascending and descending technique and basic emergency aid.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Organize a 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 knowledge of rescue, fire rescue and first aid.

MPU3462 Pasukan Siswa-Siswi Pertahanan Awam 2

Rationale for inclusion of the course in the program:

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

Learning Outcomes:

Upon completion of this course students should be able to:

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

UNIVERSITY REQUIREMENT

WEB 10302 Fundamental English
WEB 20202 Professional English 1
WEB 20302 Professional English 2

MPU3242 Innovation Management

WMD10101 Mandarin 1
WMD 10201 Mandarin 2

WIB41009 Industrial Training

WEB 10302 Fundamental English

Rationale for inclusion of the course in the program:

Rationale for inclusion of the course in the program: This course is to enable students to enhance their learning of English vocabulary; understand the structure of simple, compound and complex sentences: as well as explain and identify errors in sentences. This course also encourages students to share opinions and suggestions based on chosen text; and utilize vocabulary skills and basic writing in producing article review. Students will also be exposed to correct and effective presentation techniques

Learning Outcomes:

Upon completion of this course students should be able to:

1. Acquire grammar and vocabulary skills to construct sentence structures
2. Produce an article review based on a chosen text
3. Present using appropriate presentation techniques

WEB 20202 Professional English 1

Rationale for inclusion of the course in the program:

This module is aimed to enable students to utilize various skills in professional communication. The topics taught are business correspondence (business letters, proposals. memo, e-mail & fax) meetings and documentations of a meeting and job hunting skills.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Employ appropriate mechanics in writing business letters, memos, e- mails, faxes and proposals
2. Demonstrate the ability to conduct, participate and compile relevant information for meeting
3. Apply job hunting skills by preparing cover letter and resume, and promote oneself during interview

WEB 20302 Professional English 2

Rationale for inclusion of the course in the program:

This course teaches students on effective report writing and how to utilize skills in writing a technical report_ Students would be able to transfer information from linear to non-linear format In addition. Students would be able to utilize all skills in identifying a personnel in the industry for information seeking activity via interview questions and interviewing techniques.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Apply appropriate language for report writing
2. Produce reports with their necessary components by
3. Present information orally

MPU3242 Innovation Management

Rationale for inclusion of the course in the program:

This course is to help students to understand the complex process of innovation which depends on people and their interactions; to stimulate new thinking rather than prescribe some definitive methodology; to understand the issues involved in being an innovator and the culture for supporting innovation; understand the critical issues that organizations need to develop to support innovation; to be able to develop a marketing strategic planning and able to do qualitative and quantitative market analysis; to understand the process of product development and market testing; and to understand commercialization strategy i.e. marketing mix and future plan. These teaching components would benefit the students in becoming future entrepreneurs.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Explain the importance of innovation in organisation
2. Analyse the different types of innovation, products classes and the impact to the industry.
3. Distinguish the steps in the innovation process
4. Assess the key challenges to innovation.
5. Develop a viable innovative project.

WMD10101 Mandarin 1

Rationale for inclusion of the course in the program:

Having a basic command of Mandarin will enhance learners' communicative ability, which enables them to have an extra edge in the job market. Thus, the objective of the course is to introduce basic Chinese with emphasis on conversations, which will enable the learner to exchange conversations in structured sentences.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Use Mandarin in simple conversation, express feelings and emotions as well as exchange opinions
2. Write basic Chinese characters.

WMD 10201 Mandarin 2

Rationale for inclusion of the course in the program:

Having a basic command of Mandarin will enhance learners' communicative ability, which enables them to have an extra edge in the job market. Thus, the objective of the course is to introduce basic Chinese with emphasis on conversation, which will enable learners to exchange conversations in structured sentences using slightly difficult vocabularies.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Use Mandarin in a more complex conversation, express feelings and emotions as well as exchange opinions
2. Write Chinese characters.

WIB41009 Industrial Training

Rationale for inclusion of the course in the program:

This course is aimed at exposing students to real industrial environment and the opportunity to practice the knowledge and skills acquired during their academic years.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Apply the skills and knowledge that they have gained throughout their academic years in the companies that they are attached to.
2. Explain new knowledge and skills acquired during Industrial attachment
3. Handle and perform specific task with minimum supervision and achieve the companies' expectation.
4. Display safety and health practices in industry.
5. Show good analytical and problem solving skills.
6. Demonstrate the ability to work in team either as a leader or team member and good communication skills.

COMMON CORE

CLB 19203 Mathematics 1
WBB20103 Technopreneurship
CLB 10703 Physical Chemistry
CLB 19303 Mathematics 2
CLB 10803 Analytical & Organic Chemistry
CLB40002 Engineering Technologist in Society

CLB19203 Mathematics 1

Rationale for inclusion of the course in the program:

This course is aimed to prepare the student to be well versed in the mathematical knowledge needed for applying the concepts of calculus in applications of science and engineering. They should also be well prepared for courses in differential equations, linear algebra and advanced calculus.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Describe the basic of trigonometry functions, derivatives and integrations.
2. Apply the skills to solve problems in chemicals and process engineering.
3. Solve derivatives and integration for various types of functions.

WBB20103 Technopreneurship

Rationale for inclusion of the course in the program:

Across the world, entrepreneurial ventures are creating and bringing to market new products and services that make our lives easier, enhance our productivity at work, improve our health, and entertain us in new and fascinating ways. Thus, the purpose of this course is to provide students with a thoughtful, practical guide to the process of successfully launching and growing an entrepreneurial venture. In order to achieve this, the course provides students with a thorough analysis of the entrepreneurial process.
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Learning Outcomes:

Upon completion of this course students should be able to:

1. Describe business environment and management within the scope of the course
2. Estimate operation capacity and material requirement planning
3. Prepare sale forecast and financial projection statement.
4. Develop a viable business plan and be involved in entrepreneurship activities.

CLB10703 Physical Chemistry

Rationale for inclusion of the course in the program:

This course will provide students with knowledge and hands on skill in physical chemistry. They will be equipped with knowledge in thermodynamic, equilibrium as well as kinetic study. It will create awareness on importance of physical chemistry in chemical engineering technology and its related application.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Apply the basic physical chemistry principles such as thermodynamic, equilibrium concept and chemical kinetic.
2. Discuss the results of experimental work that based on basic energy concept in the following topics; thermodynamic, equilibrium concept and chemical kinetic.
3. Collaborate with team members in performing a good laboratory techniques such as planning, running, observing, recording, interpreting, evaluating and reporting data effectively.

CLB19303 Mathematics 2

Rationale for inclusion of the course in the program:

This course is aimed at providing students with the fundamental concepts in advanced calculus which is applicable for chemical engineering technology.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Solve advanced differentiation questions such as gradient functions, rate of changes, small increment and approximation by using implicit differential, total differential and second order derivatives.
2. Solve differential equations by using the properties of the Laplace Transform, evaluation and the use of inverse of Laplace Transform.
3. Sketch area under one curve, volumes of solid revolution, numerical integration and find the solutions.
4. Solve the problems for first order differential equations and second order differential problems.

CLB10803 Analytical & Organic Chemistry

Rationale for inclusion of the course in the program:

This course provides students with the basic concepts in chemistry as well as the analytical techniques used in the field of chemistry.

Learning Outcomes:

Upon completion of this course students should be able to:

1. State and apply the phenomena, basic concepts, laws and principles in analytical and organic chemistry.
2. Handle chemicals and perform experiments effectively.
3. Analyze and interpret organic compounds from analysis output using analytical equipment.

CLB40002 Engineering Technologist in Society

Rationale for inclusion of the course in the program:

Engineering Technology is devoted not only to the acquisition of technical skills, but is also concerned with the appreciation of the place and potential of technologies in society. There are many challenges in society derive from the expansion of knowledge, expertise and information. The acquisitions of skills enable students to develop problem solving strategies and procedures of paramount importance. The ability to discern the key problems in a given task will benefit the student greatly and will ultimately lead to increased innovation in the work place.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Identify the scope of engineering ethics and its connection with the career of an engineering technologist.
2. Revise the potential issues on career of an engineering technologist in various aspects such as job aspects, job requirements, job challenges, job markets, politics, economics, society, public, personal matter, morality, environmental and others.
3. Relate the ethics solution on the respective issues.
4. Assemble the information of the issue on engineering technologist in term of safety and risk using quantitative risk assessment (QRA) software.

DISCIPLINE CORE

CEB20003 Introduction to Environmental Engineering
CLB10402 Fundamental of Electric & Electronics
CLB10903 Engineering Drawing and Computing
CLB10904 Chemical Process Principles
CLB11003 Fluid Mechanics
CLB20903 Engineering Statistics
CLB21403 Engineering Design
CLB21303 Process Instrumentation and Control
CKB20104 Reaction Engineering
CKB30103 Industrial Safety & Health
CLB20403 Thermodynamics
CLB21204 Transport Process Principles

WPB 49804 Final Year Project (Proposal)
WPB 49806 Final Year Project (Implementation)

CEB20003 Introduction to Environmental Engineering Technology

Rationale for inclusion of the course in the program:

The course will provide students with basic principles of environmental engineering technology with the relation to natural system of the environment, 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. Estimate the impacts of natural and anthropogenic activities towards the environment.
2. Analyze various environmental processes and engineering technology applications in mitigating, controlling and treating pollutions.
3. Perform group works on environmental quality analysis techniques in the laboratory or fieldworks to quantify various environmental systems.

CLB10402 Fundamental of Electric & Electronics

Rationale for inclusion of the course in the program:

This is an introductory course aimed at providing students with the fundamentals concept and knowledge of electrical technology. This course will provide students with skills and understanding to operate electrical tools and machines safely and effectively.

Learning Outcomes:

Upon completion of this course students should be able to:

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

CLB10903 Engineering Drawing And Computing

Rationale for inclusion of the course in the program:

This introductory course aimed at providing students with the basic concepts of computer applications used in the current practice and its application in chemical engineering technology. This course will equip students with concepts and knowledge that are essential to encounter any related problems that need to be solved using a computer application including using computer for engineering design..

Learning Outcomes:

Upon completion of this course students should be able to:

1. Identify the basic terminology, symbols, tools and features used in computing and engineering drawing.
2. Demonstrate the understanding of computer application, technical drawing and chemical process diagram.
3. Demonstrate the usage of Microsoft Office and CAD software.

CLB10904 Chemical Process Principles

Rationale for inclusion of the course in the program:

This is an introductory course aimed at providing students with the fundamental concepts of chemical process which form the foundation for their study in later years. These concepts are essential in preparing students to formulate and solve material and energy balances on chemical process systems.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Organize known information about process variables on individual process units and multiple-unit processes.
2. Solve material balances and energy balances to account for the flows to and from the process and its units.
3. Examine and analyze pertinent data to solve material and energy balance problems.

CLB11003 Fluid Mechanics

Rationale for inclusion of the course in the program:

This course is an introduction to fluid mechanics and emphasizes fundamental concepts and problem solving techniques. Topics to be covered include fluid properties, pressure and fluid statics, control volume analysis and internal flow (flow in pipes and conduits), external flow (drag and lift) and equipments in fluid flow. The student also will be familiarized with the basic concepts in selecting and analyzing components of fluid systems.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Describe the fundamental concepts in fluid static and dynamic.
2. Conduct experiments related to fluid static and dynamic by following standard operation procedure and safety awareness.

Apply the basic theory of fluid in solving problems related to fluid static and dynamic.

CLB20903 Engineering Statistics

Rationale for inclusion of the course in the program:

This course is aimed at introducing students to the appropriate statistical methods in engineering.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Select appropriate statistical models to calculate the probability of an event
2. Apply appropriate statistical methods to solve statistical problems
3. Adapt their lesson on statistical software to analyze data
4. Solve practical problems involving statistical data.

CLB21403 Engineering Design

Rationale for inclusion of the course in the program:

This course provides fundamental background in utilizing Computer Aided Drafting and Design (CADD) in engineering drawing to the students which will enable them to work more effectively in the various fields of engineering.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Practice 3D assembly and documentation using CAD software.
2. Produce 2D drawing of process plant layout using CAD software.
3. Demonstrate 2D and 3D process plant drawing including equipment, piping and structure.

CLB21303 Process Instrumentation and Control

Rationale for inclusion of the course in the program:

This course will impart knowledge to the students on various aspects on fundamental of instrumentation and basic control system in the chemical industries.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Differentiate various types of process instrumentation and control system based on real applications in chemical industries.
2. Evaluate results, graphs and controller tuning data obtained from practical session to provide valid conclusion.
3. Demonstrate understanding towards the importance of employing appropriate process instrumentation and control in chemical industries

CKB20104 Reaction Engineering

Rationale for inclusion of the course in the program:

This course is aimed at providing students with the understanding of basic principles and fundamentals in chemical reaction kinetics, types of reactor and its design characteristics, and heterogeneous reactions. This knowledge is vital since students will use these fundamentals in applications of chemical engineering technology.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Design chemical reactors for isothermal and non-isothermal processes.
2. Solve problems related to chemical reactions based on the fundamental concepts.
3. Follow procedures accurately and conduct experiments safely.

CKB30103 Industrial Safety & Health

Rationale for inclusion of the course in the program:

To impart the knowledge and demonstrate an awareness of industrial safety and health by implementing the techniques, legal, society and cultural issues in making the work place as safe as possible.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Display the ability to recognize type of hazards related to occupational safety and health, determine an appropriate control measures and evaluate the risks associate with it.
2. Demonstrate the ability to work in team and communicate effectively as a leader or ordinary member.
3. Analyze the safety and health issues at workplace by comparing to Malaysian laws and regulations.

CLB20403 Thermodynamics

Rationale for inclusion of the course in the program:

The course is aimed at providing students with the basic understanding on theory and application of chemical engineering thermodynamics. It is essential for engineering technology students to acquire this fundamental concept since thermodynamics is one of the pillars supporting the engineering science.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Analyse engineering problem based on thermodynamics principles and concepts and solve it by using thermodynamics property tables and figures.
2. Perform laboratory experiments and relate the collected data with thermodynamic tables and figures.
3. Solve problems related to the application of thermodynamics.

CLB21204 Transport Process Principles

Rationale for inclusion of the course in the program:

This is an introductory course aimed at providing students with the study of heat transfer by conduction, convection, and radiation with relative to engineering application. Students also will learn on several chemical process like distillation, absorption and extraction process. The course will provide students with the knowledge related to the utilization and application of a process heat transfer and mass transfer in an industrial area. Students will apply the knowledge of heat and mass transfer in designing related major equipment.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Show ability to identify problems, formulate solutions and solve using heat and mass transfer principles.
2. Perform laboratory experiments and relate the collected data with the concepts and laws of heat and mass transfer.
3. Design heat and mass transfer equipment and solve engineering problems related to heat and mass transfer.

WPB49804 Final Year Project (Proposal)

Rationale for inclusion of the course in the program:

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

Learning Outcomes:

Upon completion of this course students should be able to:

1. Demonstrate the abilities to plan and to work effectively
2. Analyze related literature for the proposed research problems.
3. Propose specific research method to solve the research problems.
4. Produce a feasible project proposal in accordance to the specified standard format.
5. Present and defend project proposal in a clear and concise manner.

WPB49806 Final Year Project (Implementation)

Rationale for inclusion of the course in the program:

This course is a progression of FYP1 focussing on enhancing the abilities and skills in conducting 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. Manage and execute project plan in solving research problems
2. Analyse project results using appropriate technique or
3. Produce a project report in accordance to the specified standard format.
4. Present and defend project outcomes effectively.

BACHELOR OF ENGINEERING TECHNOLOGY (HONS) IN BIOSYSTEM

1. **Program Structure**
2. **Major Courses**

PROGRAM STRUCTURE

- subject to amendments

YEAR 1: SEMESTER 1

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB19203	Mathematics 1	3	28	24	0	6	62	120
2	WBB20103	Technopreneurship	3	10	20	0	2	88	120
3	WEB 20202	Professional English 1	2	10	16	0	5	49	80
4	MPU3123/ MPU3143	Tamadun Islam & Tamadun Asia (TITAS)/ Bahasa Melayu Komunikasi 2	3	10	0	0	46	64	120
5	WEB10302	Fundamental English	2	10	16	0	4	50	80
		TOTAL	**13**	**68**	**76**	**0**	**63**	**313**	**520**

YEAR 1: SEMESTER 2

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB10402	Fundamental of Electric & Electronics	2	14	0	27	4	35	80
2	CLB10703	Physical Chemistry	3	17	14	37	6	46	120
3	CLB 19303	Mathematics 2	3	28	24	0	6	62	120
4	CLB10903	Engineering Drawing & Computing	3	15	30	36	9	30	120
5	MPU3113/ MPU3173	Hubungan Etnik / Pengajian Malaysia 3	3	17	0	0	25	78	120
6	CLB11103	Biology of Cell	3	22	0	50	6	42	120
7	CLB11003	Fluid Mechanics	3	28	0	51	5	36	120
		TOTAL	**20**	**100**	**38**	**138**	**22**	**183**	**481**

YEAR 2: SEMESTER 3

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB21403	Engineering Design	3	15	30	36	9	30	120
2	CLB10803	Analytical & Organic Chemistry	3	30	0	38	7	45	120
3	CLB20403	Thermodynamics	3	17	18	37	6	42	120
4	MPU34*2	Co-curriculum	2						80
5	MPU3333/ MPU3343	Isu-isu Kontemporari Muslim di Malaysia/Culture and Lifestyle in Malaysia	3	12	0	0	30	78	120
6	CSB 29403	Engineering Properties of Biological Material	3	30	0	47	3	40	120
7	CLB 20303	Biosystem Engineering	3	17	18	22	5	58	120
		TOTAL	**20**	**174**	**82**	**190**	**48**	**386**	**800**

YEAR 2: SEMESTER 4

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB21303	Process Instrumentation & Control	3	28	5	52	5	30	120
2	WEB 20302	Professional English 2	2	13	13	0	2	52	80
3	CLB 20603	Heat and Mass Transfer in Biosystem	3	30	0	47	3	40	120
4	WMD10101	Mandarin 1	1	21	0	0	4	25	50
5	CBB 20003	Principles of Microbiology	3	30	0	47	3	40	120
6	CSB20404	Biodiversity and Ecosystem Sustainability	4	34	0	64	13	49	160
7	CBB20303	Biochemistry	3	30	0	47	3	40	120
		TOTAL	**19**	**186**	**18**	**257**	**33**	**276**	**770**

YEAR 3: SEMESTER 5

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CBB30204	Bioseparations Engineering Technology	4	30	0	60	7	63	160
2	CKB30103	Industrial Safety & Health	3	28	8	26	5	53	120
3	CSB 30303	Scale up Process & Optmization	3	32	0	44	3	41	120
4	CLB20903	Engineering Statistics	3	28	28	0	8	56	120
5	CBB30503	Biopharmaceutical	3	32	0	45	3	40	120
6	CSB31003	Microbial Physiology	3	28	0	36	5	51	120
7	CLB40002	Engineering Technologist in Society	2	14	0	23	3	40	80
		TOTAL	**21**	**192**	**36**	**234**	**34**	**344**	**840**

YEAR 3: SEMESTER 6

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CSB31203	Biosystem Design Project 1	3	34	0	57	5	24	120
2	CEB20003	Introduction to Environmental Engineering Technology	3	26	13	10	9	62	120
3	CSB30003	Quality Assurance in Bio Product	3	21	0	36	5	58	120
4		Elective 1	3						120
5	WPB49804	Final Year Project (Proposal)	4	5	0	110	1	44	160
6		Elective 2	3						120
		TOTAL	**19**	**86**	**13**	**213**	**20**	**188**	**760**

YEAR 4: SEMESTER 7

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	WPB49906	Final Year Project (Implementation)	6	5	0	205	1	29	240
2	CSB40104	Biosystem Design Project 2	4	34	0	54	2	70	160
3	MPU3242	Innovation Management	2	15	30	0	5	30	80
4	WMD 10201	Mandarin 2	1	21	0	0	4	25	50
5		Elective 3	3						120
6		Elective 4	3						120
		TOTAL	**19**	**75**	**30**	**259**	**12**	**154**	**770**

YEAR 4: SEMESTER 8

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	WIB41009	Industrial Training	9	0	0	320	4	36	360
		TOTAL	**9**	**0**	**0**	**320**	**4**	**36**	**360**

Total Credit to Graduate (TCG): 140 Credit Hours

Electives**

Elective A (Primary Commodity Product)

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CJB30003	Palm Oil Technology 1	3	21	6	51	7	35	120
2	CJB40003	Palm Oil Technology 2	3	20	8	51	6	35	120
3	CPB30303	Oil & Fat Process Technology	3	16	10	37	5	52	120
4	CSB31103	Oil Palm Biomass Products	3	19	0	36	5	60	120

Elective B (Pharmaceutical Product)

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CJB30403	Product Formulation & Dosage Form	3	21	0	36	5	58	120
2	CJB30503	Product Development Process	3	28	0	36	6	50	120
3	CJB40203	Validation & Regulation of Pharmaceutical Product	3	21	0	36	5	58	120
4	CJB40303	Phytopharmaceutical Technology	3	30	0	47	5	38	120

Elective C (Industrial Biotechnology)

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CEB31003	Environmental Biotechnology	3	28	0	36	9	47	120
2	CBB20203	Principles of Bioprocess Technology	3	28	0	50	7	35	120
3	CBB30703	Enzyme Technology	3	30	0	47	3	40	120
4	CBB30303	Biomolecular Technique	3	28	0	45	7	40	120

Co-Curriculum*

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	MPU 3412	Career Guidance 2	2	17	6	2	4	51	80
2	MPU 3422	Community Service 2	2	17	0	0	12	51	80
3	MPU 3432	Culture 2	2	20	0	12	0	48	80
4	MPU 3442	Rakan Masjid 2	2	17	0	0	8	55	80
5	MPU 3452	Siswa-siswi Bomba & Penyelamat 2	2	17	0	20	0	43	80
6	MPU 3462	Siswa-siswi Pertahanan Awam 2	2	17	0	16	0	47	80
7	MPU 3472	Sports Management 2	2	17	0	16	0	47	80
8	MPU 3482	Personal Financial Management 2	2	17	0	18	3	42	80
9	MPU 3492	Askar Wataniah	2	17	0	23	0	40	80

Note :

1. ***Additional Module - MPU2213 Bahasa Kebangsaan A**
   a. For local students without credit in B. Melayu (SPM) only and the credit is not included in program Total Credit to Graduate (TCG).

2. **Legend :**
   a. (L) – For Local Students
   b. (I) - For International Students
   c. (L-M) – For Local Muslim Students
   d. (L-NM) – For Local Non-Muslim Students

3. **Passing mark for all MPU Compulsory subjects is 50 marks (C).**

MAJOR COURSES

BACHELOR OF ENGINEERING TECHNOLOGY (HONS) IN BIOSYSTEM

CLB11003 Biology of Cells
CLB20303 Biosystem Engineering
CSB29403 Engineering Properties of Biological Material
CBB20003 Principles of Microbiology
CBB20303 Biochemistry
CLB 20603 Heat and Mass Transfers in Biosystem
CSB20404 Biodiversity and EcosystemSustainability
CBB30204 Bioseparations Engineering Technology
CBB30503 Biopharmaceutical
CSB30303 Scale up Process & Optmization
CSB31003 Microbial Physiology
CSB30003 Quality Assurance in Bio-Product
CSB31203 Biosystem Design Project 1
CSB40104 Biosystem Design Project 2

CLB11103 Biology of Cells

Rationale for inclusion of the course in the program:

This is an introductory course aimed at providing students with the fundamental concepts of biology of cells components which form the foundation for their study in later years. These concepts are essential since the students will encounter these knowledge in others high level courses.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Describe the structure and functions of prokaryotes and eukaryotes cells and explain theoretical aspect of plant, animal, genetic and ecology including the importance of biodiversity element.
2. Perform biology laboratory procedures
3. Collaborate with team members in planning and performing scientific investigation.

CLB20303 Biosystem Engineering

Rationale for inclusion of the course in the program:

This course will provide students with knowledge and hands on skills in material and energy balance of unit operations.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Calculate problems in unit operations which involved mass and energy balance.
2. Practice the common unit operation involved in biosystem engineering.
3. Attain and communicate effectively in team while conducting the engineering operation.

CSB29403 Engineering Properties of Biological Material

Rationale for inclusion of the course in the program:

To provide students with the importance of engineering properties of biological materials in design systems. It is inclusive of physical, structure & composition, mechanical, rheological, thermal, electrical and optical properties of materials. Response of the material will also being covered in different condition.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Analyze properties of materials for various engineering applications.
2. Measure properties of materials by using appropriate procedures.
3. Demonstrate ability to work in team either as a leader or ordinary member.

CBB20003 Principles of Microbiology

Rationale for inclusion of the course in the program:

To introduce the principles of structure, diversity and characterization of microorganisms and the application of microorganisms in industries.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Identify the classification and characteristics of microorganisms, and their applications in various industries.
2. Explain microbiological concepts clearly, both verbally and in writing.
3. Report microbiological experimental results concisely, including accurately reporting observations and analysis.
4. Display competency in routine and specialized microbiological laboratory skills.

CLB20303 Biochemistry

Rationale for inclusion of the course in the program:

To introduce biochemistry to the students by exposing them to the structure and functions of biomolecules, enzyme characteristics and reactions, metabolism and bioenergetics, and biological information flow.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Identify the fundamental structure and dynamic of biomolecules, enzymes characteristics and reactions, metabolism and bioenergetics.
2. Perform Biochemistry laboratory with accurate and highly coordinated skills.
3. Integrate team work ability in practical work or mini project either as a leader or an ordinary member.
4. Apply Biochemistry related practical skills to solve given bioengineering issues.

CLB20603 Heat and Mass Transfers in Biosystem

Rationale for inclusion of the course in the program:

This module is mainly to impart basic understanding on theory and application of heat and mass transfer.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Explain principles of heat and mass transfer in solving engineering problems.
2. Perform laboratory works related to heat and mass transfer concepts.
3. Demonstrate ability to work in a team either as a leader or ordinary member.

CSB20404 Biodiversity and Ecosystem Sustainability

Rationale for inclusion of the course in the program:

This is an in-depth course aimed at providing students with the concepts of ecological knowledge, which forms the basis for many other ecologically oriented disciplines, such as forestry, agriculture, wildlife, and environmental. These concepts are essential since the students will utilize these knowledge in more specific courses. This course also exposed students to investigate how all living organisms interact with each other and their environment.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Describe the technical aspect of ecology and biodiversity including the importance of biodiversity element.
2. Perform scientific biological survey and experiments.
3. Collaborate with team members in planning and performing scientific investigation.

CBB30204 Bioseparations Engineering Technology

Rationale for inclusion of the course in the program:

The students should be able to define and apply various techniques in bioproduct recovery technology.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Justify the appropriate techniques in bioproduct recovery stages.
2. Perform the operation in downstream processing.
3. Organize work in team either as a leader or ordinary member.
4. Perform the common unit operation involved in bioseparation to solve problems using data from relevant source.

CBB30503 Bio-Pharmaceutical

Rationale for inclusion of the course in the program:

The objective of this course is to provide the students with a knowledge related to the development process of biopharmaceutical products. Furthermore, it's also aim to provide an overview of the biopharmaceutical industry and also good manufacturing practice (GMP)..

Learning Outcomes:

Upon completion of this course students should be able to:

1. Discuss the manufacturing processes involved in biopharmaceutical products together with the product reaction mechanisms and verify the recently developed processes of biopharmaceutical products using data from relevant sources.

2. Conduct the laboratory works based on the theory learned.
3. Demonstrate the ability to work in a team either as a leader or an ordinary member.
4. Perform the common unit operation involved in bioseparation to solve problems using data from relevant source.

CSB30303 Scale Up Process And Optimization

Rationale for inclusion of the course in the program:

The students will be exposed to the scale up process and modeling activity as well as optimization of chemical and biological applied system.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Explain the application of scale up process in solving engineering problem.
2. Perform scaling up and optimization for biochemical process.
3. Demonstrate ability to work in team either as a leader or ordinary member.

CSB31003 Microbial Physiology

Rationale for inclusion of the course in the program:

The students will be exposed to various physiological metabolic processes of bacteria with emphasis on growth, nutrition, synthesis of cellular constituents and energy yielding processes.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Describe how the different biochemical and physiological functions are integrated, coordinately regulated, and expressed with in the cell.
2. Perform and explain the basic procedures used in studying microbial physiology.
3. Demonstrate ability to work in team either as a leader or ordinary member.
4. Apply the knowledge of microbial physiology to solve scientific problems arise in the biological industries.

CSB30003 Quality Assurance in Bio- Product

Rationale for inclusion of the course in the program:

This course will provide students with knowledge and hands on skill in imparting the knowledge on quality assurance in processing, end product as well as standardization methods involved together with regulations.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Analyse the quality characteristics of bio products and quality management systems implementation in bio products manufacturing process.
2. Perform the quality control analysis by applying selected quality management process and tools to maintain the quality of bio products.
3. Justify the importance of quality assurance towards ethical production of bio products.

CSB31203 Biosystem Design Project 1

Rationale for inclusion of the course in the program:

To impart the design concepts in biosystem plant and develop students' knowledge of contemporary issues related to bioproduct processing and process design.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Determine the fundamental knowledge and skills of biosystem engineering in designing bioproduct plant during preliminary stage.
2. Calculate the mass and energy balances to design a biosystem plant in order to produce a high profitable product.
3. Organize in teams by work effectively in problem solving and participate in regular project status meetings.

CSB40104 Biosystem Design Project 2

Rationale for inclusion of the course in the program:

To impart the design concepts in biosystem plant and develop students' knowledge of contemporary issues related to bioproduct processing and process design.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Construct the conceptual design equipment for biosystem plant design that solves the safety and environmental issues.
2. Construct the design using computational tools (software) which is simulation program.
3. Determine the profitability analysis and prepare a biosystem design report that covers the professional oral and written communication skills.
4. Demonstrate ability to work in team either as a leader or ordinary member by work effectively in problem-solving and participate in regular project status meetings.

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (HONS) IN PROCESS

1. **Program Structure**
2. **Major Courses**

PROGRAM STRUCTURE

- ***subject to amendments***

YEAR 1: SEMESTER 1

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB19203	Mathematics 1	3	28	24	0	6	62	120
2	WBB20103	Technopreneurship	3	10	20	0	2	88	120
3	WEB20202	Professional English 1	2	10	16	0	5	49	80
4	MPU3123/ MPU3143	Tamadun Islam & Tamadun Asia (TITAS)/ Bahasa Melayu Komunikasi 2	3	10	0	0	46	64	120
5	WEB 10302	Fundamental English	2	10	16	0	4	50	80
		TOTAL	**13**	**68**	**76**	**0**	**63**	**313**	**520**

YEAR 1: SEMESTER 2

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB10402	Fundamental of Electric & Electronics	2	14	0	27	4	35	80
2	CLB10703	Physical Chemistry	3	17	14	37	6	46	120
3	CLB19303	Mathematics 2	3	28	24	0	6	62	120
4	CLB10903	Engineering Drawing & Computing	3	15	30	36	9	30	120
5	MPU3113/ MPU3173	Hubungan Etnik / Pengajian Malaysia 3	3	17	0	0	25	78	120
6	CLB10904	Chemical Process Principles	4	28	14	59	7	53	161
7	CLB11003	Fluid Mechanics	3	28	0	51	5	36	120
		TOTAL	**21**	**147**	**82**	**210**	**62**	**340**	**841**

YEAR 2: SEMESTER 3

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB 21403	Engineering Design	3	15	30	36	9	30	120
2	CLB 10803	Analytical & Organic Chemistry	3	30	0	38	7	45	120
3	CLB20403	Thermodynamics	3	17	18	37	6	42	120
4	CLB21204	Transport Process Principles	4	28	18	29	5	80	160
5	CLB40002	Engineering Technologist in Society	2	14	0	23	5	38	80
6	MPU34*2	Co-curriculum	2	16	6	2	6	30	60
7	MPU3333/ MPU3343	Isu-isu Kontemporari Muslim di Malaysia/Culture and Lifestyle in Malaysia	3	12	0	0	30	78	120
		TOTAL	**20**	**132**	**72**	**165**	**68**	**343**	**780**

YEAR 2: SEMESTER 4

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB21303	Process Instrumentation & Control	3	22	0	33	5	60	120
2	WEB 20302	Professional English 2	2	13	13	0	2	52	80
3	CEB20003	Introduction to Environmental Engineering Technology	3	22	0	43	9	46	120
4	WMD10101	Mandarin 1	1	21	0	0	4	25	50
5	CKB 20104	Reaction Engineering	4	28	20	56	6	50	160
6	CPB21404	Separation Process	4	28	28	78	7	19	160
7	CKB30103	Industrial Safety & Health	3	28	8	28	5	51	120
		TOTAL	**20**	**162**	**69**	**238**	**38**	**303**	**810**

YEAR 3: SEMESTER 5

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CPB30004	Process Dynamics & Control	4	24	4	46	6	80	160
2	CPB20203	Numerical Methods in Chemical Engineering	3	22	30	0	10	52	114
3	CLB20903	Engineering Statistics	3	28	28	0	8	56	120
4	CPB30703	Design Project 1 (Design & Feasibility Study of Plant)	3	14	0	28	2	76	120
5	CPB 20403	Plant Utilities & Maintenance	3	17	17	29	7	50	120
6	CLB30303	Oil & Fat Process Technology	3	16	10	37	5	52	120
		TOTAL	**19**	**121**	**89**	**140**	**38**	**366**	**754**

YEAR 3: SEMESTER 6

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CPB30404	Design Project 2	4	34	0	96	0	30	160
2	CPB30503	Petrochemical & Petroleum Refining Technology	3	26	0	32	5	57	120
3	CPB30103	Biochemical Engineering	3	23	0	34	5	58	120
4	CPB40003	Introduction Renewable Energy	3	14	14	10	9	73	120
5	WPB49804	Final Year Project 1	4	5	0	110	1	44	160
6		Elective 1	3						
		TOTAL	**20**	**102**	**14**	**282**	**20**	**262**	**680**

YEAR 4: SEMESTER 7

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	WPB49906	Final Year Project 1	6	5	0	205	1	29	240
2	CPB30603	QA & QC in Chemical Engineering	3	28	24	0	6	62	120
3	MPU3242	Innovation Management	2	15	30	0	5	30	80
4	WMD 10201	Mandarin 2	1	21	0	0	4	25	50
5		Elective 2	3	28	28	0	8	56	120
6		Elective 3	3	34	17	0	4	65	120
		TOTAL	**18**	**131**	**99**	**205**	**28**	**267**	**730**

YEAR 4: SEMESTER 8

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	WIB41009	Industrial Training	9	0	0	320	4	36	360
		TOTAL	**9**	**0**	**0**	**320**	**4**	**36**	**360**

Total Credit to Graduate (TCG): 140 Credit Hours

Electives**

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CJB40303	Management for Chemical Engineering Technologist	3	28	28	0	8	56	120
2	CJB40503	Marketing for Chemical Engineering Technologist	3	34	17	0	4	65	120
3	CJB40803	Chemical Engineering Technologist Organizational Behavior	3	34	17	0	5	64	120
4	CBB30703	Enzyme Technology	3	30	0	47	3	40	120
5	CJB40303	Phytopharmaceutical Technology	3	30	0	47	5	38	120
6	CJB30303	Aqua, Meat and Dairy Products	3	28	0	42	5	45	120
7	CRB40203	Rubber Engineering	3	28	0	45	9	38	120
8	CRB40503	Biopolymer	3	23	0	42	4	53	122
10	CEB30203	Environmental Impact Assessment	3	36	0	40	11	33	120
11	CEB30403	Air Pollution Control Technology	3	21	0	45	4	50	120
12	CEB30503	Wastewater Treatment Technology	3	32	0	53	3	32	120

Co-Curriculum*

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	MPU 3412	Career Guidance 2	2	17	6	2	4	51	80
2	MPU 3422	Community Service 2	2	17	0	0	12	51	80
3	MPU 3432	Culture 2	2	20	0	12	0	48	80
4	MPU 3442	Rakan Masjid 2	2	17	0	0	8	55	80
5	MPU 3452	Siswa-siswi Bomba & Penyelamat 2	2	17	0	20	0	43	80
6	MPU 3462	Siswa-siswi Pertahanan Awam 2	2	17	0	16	0	47	80
7	MPU 3472	Sports Management 2	2	17	0	16	0	47	80
8	MPU 3482	Personal Financial Management 2	2	17	0	18	3	42	80
9	MPU 3492	Askar Wataniah	2	17	0	23	0	40	80

Note :

1. ***Additional Module - MPU2213 Bahasa Kebangsaan A**
   a. For local students without credit in B. Melayu (SPM) only and the credit is not included in program Total Credit to Graduate (TCG).

2. **Legend :**
   a. (L) – For Local Students
   b. (I) - For International Students
   c. (L-M) – For Local Muslim Students
   d. (L-NM) – For Local Non-Muslim Students

3. **Passing mark for all MPU Compulsory subjects is 50 marks (C).**

MAJOR COURSES

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (HONS) IN PROCESS

CPB21404 Separation Process
CPB20203 Numerical Methods in Chemical Engineering
CPB20403 Plant Utilities & Maintenance
CPB30004 Process Dynamics & Control
CPB 30303 Oil & Fat Process Technology
CPB30703 Design Project 1 (Design & Feasibility Study of Plant)
CPB30103 Biochemical Engineering
CPB30404 Design Project 2
CPB30503 Petrochemical & Petroleum Refining Technology
CPB40003 Introduction Renewable Energy
CPB 30603 QA & QC in Chemical Engineering

CPB21404 Separation Process

Rationale for inclusion of the course in the program:

Separation processes are crucial in chemical engineering because almost all industrial chemical processes include operations for separating chemicals contained in the process feed(s) and/or produced in reactors within the process. This course is intended to impart the students with the basic principles and operations of separation methods, such as humidification, drying, crystallization, adsorption, and filtration.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Explain the basic principles of humidification, drying, crystallization, adsorption and filtration operations.
2. Apply formula related to the humidification, drying, crystallization, adsorption and filtration processes.
3. Use psychometrics chart to determine the properties in air-water system.
4. Perform laboratory works related to mass transfer operation using semi-pilot rigs, describe the data results, and manipulate the parameters for each experiment.

CPB20203 Numerical Methods in Chemical Engineering

Rationale for inclusion of the course in the program:

This is an introductory course aimed at providing students with fundamental concepts of biology of cells' components which form the foundation for their study in later years. These concepts are essential as students will encounter them at higher-level courses.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Apply numerical methods to various types of problems in solving a system of linear equations and nonlinear equations
2. Select appropriate numerical methods to solve problems in chemical engineering using regression, interpolation and numerical differentiation of data and functions
3. Apply numerical solution algorithms to solve the ordinary differential equations
4. Apply numerical solution algorithms to solve the 1-D/2-D heat equation and 2-D wave equation

CPB20403 Plant Utilities & Maintenance

Rationale for inclusion of the course in the program:

The course is aimed at providing students with the basic knowledge in supporting equipments or facilities found in chemical processing plants and also to provide students with the framework in plant maintenance.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Differentiate Plant Utilities System and plant management in chemical processing plants.
2. Demonstrate ability to work in team either as a leader or ordinary group member.
3. Apply standard monitoring and critical analysis on typical maintenance during commissioning, plant operation and shutdown.

CPB30004 Process Dynamics & Control

Rationale for inclusion of the course in the program:

This course will impart knowledge to the students on the various aspects of fundamental process control and its applications in the chemical industries.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Develop an understanding of process dynamics and control system.
2. Distinguish the results, graph and control tuning data obtained from practical session.
3. Analyze process behaviour in various control strategies in chemical process.
4. Construct a mathematical modelling of dynamic process with selected software.

CPB30303 Oil & Fat Process Technology

Rationale for inclusion of the course in the program:

This course introduces students to the Oils and Fat Technology and practises. The course encompass source of oils, common methods of extraction, refining, modification, usage and nutritional perspective. Furthermore, Malaysia is one of the major producer of palm oil which contributes half of global oils and fats market

Learning Outcomes:

Upon completion of this course students should be able to:

1. Integrate basic chemistry and engineering courses to Oil and Fat Technology fundamental.
2. Demonstrate pilot plant experiments with relevant apparatus and standards given to produce desire products.
3. Develop potential products or modification process as entrepreneurship projects.

CPB30703 Design Project 1 (Design & Feasibility Study of Plant)

Rationale for inclusion of the course in the program:

This course is aimed at providing students with the understanding of basic principles and fundamentals in the various aspects of designing a chemical plant. It also aims at introducing the use of computer aided process design software in solving engineering problems.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Apply basic fundamentals and concepts in chemical engineering in developing solutions to chemical engineering design problems.
2. Perform preliminary design of a chemical processing plant.
3. Use design computational tools for employ process simulation program.
4. Effectively perform in process design team to plan and modify a design process as needed.

CPB30103 Biochemical Engineering

Rationale for inclusion of the course in the program:

This course introduces the fundamental biochemical engineering concepts primarily to chemical engineers. To accommodate those who do not have the biological background, the course will first introduce the basic ideas from microbiology, biochemistry, and biology.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Analyse different biochemical engineering concepts and ways of thinking.
2. Perform laboratory works related to the enzyme activity and microbial growth according to standard operating procedure and safety working procedure.
3. Evaluate biochemical engineering process and reactors in terms of analysis, design, operation and monitoring.

CPB30404 Design Project 2

Rationale for inclusion of the course in the program:

This course is aimed at providing students with the understanding of basic principles and fundamentals in the various aspects of designing a chemical plant. It also aims at introducing the use of computer aided process design software in solving engineering problems.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Perform chemical engineering design solution by applying chemical engineering principles.
2. Conduct equipment design for an industrial chemical process.
3. Demonstrate an awareness and understanding of social, safety and health, environment consideration and economic impacts in solving chemical engineering design.
4. Demonstrate the ability to work in team and communicate effectively as a leader or team members to discuss and plan the design.

CPB 30503 Petrochemical & Petroleum Refining Technology

Rationale for inclusion of the course in the program:

Petrochemical & Petroleum Refining Technology is one of the most important fields in chemical industry. This course will impart knowledge on fundamentals of petroleum refining, petrochemical technology and natural gas processing technology. The topics include theoretical and practical for Petroleum Products Testing and Natural Gas Analysis.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Compare the process involved in petroleum refining, natural gas and petrochemicals synthesis.
2. Solve the problems involve in petroleum refining, natural gas and petrochemical synthesis using data/information given.
3. Analyze properties of crude oil and petroleum products based on results obtained by crude assays, laboratory experiments and Material Safety Data Sheet (MSDS).
   Propose solutions on problems or effects related to petroleum refining, natural gas processing and petrochemical industries.

CPB 40003 Introduction Renewable Energy

Rationale for inclusion of the course in the program:

This is an introductory course aiming to provide students with a basic understanding of renewable energy technology, the current and forecasted energy requirement scenarios and the roles of renewable energies in Malaysia.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Identify the sources and importance of renewable energy
2. Recognise the processes to converted renewable energy to useful forms.
3. Discuss their opinions on issues relating the renewable energy.

CPB 30603 QA & QC in Chemical Engineering

Rationale for inclusion of the course in the program:

This course is aimed at providing students with the concept of controlling chemical process and products via quality control and statistical techniques.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Explain the concept of statistical quality control (SQC), statistical process control (SPC) and the process capability study.
2. Construct the quality tools to solve quality problems in conducting quality improvement activities.
3. Explain the process outcome based on control charts and acceptance sampling.

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (HONS) IN ENVIRONMENT

1. **Program Structure**
2. **Major Courses**

PROGRAM STRUCTURE

- ***subject to amendments***

YEAR 1: SEMESTER 1

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB19203	Mathematics 1	3	28	24	0	6	62	120
2	WBB20103	Technopreneurship	3	10	20	0	2	88	120
3	WEB20202	Professional English 1	2	10	16	0	5	49	80
4	MPU3123/ MPU3143	Tamadun Islam & Tamadun Asia (TITAS)/ Bahasa Melayu Komunikasi 2	3	10	0	0	46	64	120
5	WEB 10302	Fundamental English	2	10	16	0	4	50	80
		TOTAL	**13**	**68**	**76**	**0**	**63**	**313**	**520**

YEAR 1: SEMESTER 2

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB10402	Fundamental of Electric & Electronics	2	14	0	27	4	35	80
2	CLB10703	Physical Chemistry	3	17	14	37	6	46	120
3	CLB19303	Mathematics 2	3	28	24	0	6	62	120
4	CLB10903	Engineering Drawing & Computing	3	15	30	36	9	30	120
5	MPU3113/ MPU3173	Hubungan Etnik / Pengajian Malaysia 3	3	17	0	0	25	78	120
6	CLB10904	Chemical Process Principles	4	28	14	59	7	53	161
7	CLB11003	Fluid Mechanics	3	28	0	51	5	36	120
		TOTAL	**21**	**147**	**82**	**210**	**62**	**340**	**841**

YEAR 2: SEMESTER 3

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB 21403	Engineering Design	3	15	30	36	9	30	120
2	CLB 10803	Analytical & Organic Chemistry	3	30	0	38	7	45	120
3	CLB20403	Thermodynamics	3	17	18	37	6	42	120
4	CLB21204	Transport Process Principles	4	28	18	29	5	80	160
5	MPU34*2	Co-curriculum	2	16	6	2	6	30	60
6	MPU3333/ MPU3343	Isu-isu Kontemporari Muslim di Malaysia/Culture and Lifestyle in Malaysia	3	12	0	0	30	78	120
7	CLB40002	Engineering Technologist in Society	2	14	0	23	5	38	80
		TOTAL	**20**	**118**	**72**	**142**	**63**	**305**	**700**

YEAR 2: SEMESTER 4

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CEB 20303	Environmental Microbiology & Chemistry	3	18	5	33	5	59	120
2	CLB21303	Process Instrumentation & Control	3	22	0	33	5	60	120
3	WEB 20302	Professional English 2	2	13	13	0	2	52	80
4	CKB 20104	Reaction Engineering	4	28	20	56	6	50	160
	WMD10101	Mandarin 1	1	21	0	0	4	25	50
5	CEB20003	Introduction to Environmental Engineering Technology	3	22	0	43	9	46	120
6	CKB30103	Industrial Safety & Health	3	28	8	28	5	51	120
		TOTAL	**19**	**152**	**46**	**193**	**36**	**343**	**770**

YEAR 3: SEMESTER 5

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CEB 30003	Environmental Management System	3	36	0	40	11	33	120
2	CEB 20103	Surface and Groundwater Hydrology	3	30	0	44	6	40	120
3	CEB 30403	Air Pollution Control Technology	3	21	0	45	4	50	120
4	CEB 30503	Waste Water Treatment Technology	3	32	9	53	3	32	120
5	CEB 31303	Life Cycle Analysis for Engineering Technology	3	22	0	33	5	60	120
6	CLB20903	Engineering Statistics	3	28	28	0	8	56	120
7	CPB30303	Oil & Fat Process Technology	3	16	10	37	5	52	120
		TOTAL	**21**	**185**	**47**	**252**	**42**	**323**	**840**

YEAR 3: SEMESTER 6

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CEB 30103	Pollution Prevention & Industrial Waste Minimization	3	15	16	35	-	54	120
2	CEB 31503	EnvironmentalToxicology and Public Health	3	30	0	44	6	40	120
3	CEB 30903	Solid and Hazardous Waste Management	3	22	0	43	9	46	120
4	CEB 30703	Water Treatment Technology	3	16	0	36	8	60	120
5	WPB49804	Final Year Project 1	4	5	0	110	1	44	160
6		Elective 1	3	34	17	0	5	64	120
		TOTAL	**19**	**122**	**33**	**268**	**29**	**308**	**760**

YEAR 4: SEMESTER 7

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CEB 40003	Environmental Engineering Design	3	28	42	30	-	60	160
2	WPB49906	Final Year Project 2	6	5	0	205	1	29	240
3	MPU3242	Innovation Management	2	15	30	0	5	30	80
4	WMD 10201	Mandarin 2	1	21	0	0	4	25	50
5		Elective 2	3	28	28	0	8	56	120
6		Elective 3	3	34	17	0	4	65	120
		TOTAL	**18**	**131**	**117**	**235**	**22**	**265**	**770**

YEAR 4: SEMESTER 8

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	WIB41009	Industrial Training	9	0	0	320	4	36	360
		TOTAL	**9**	**0**	**0**	**320**	**4**	**36**	**360**

Total Credit to Graduate (TCG): 140 Credit Hours

Electives**

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CJB40303	Management for Chemical Engineering Technologist	3	28	28	0	8	56	120
2	CJB40503	Marketing for Chemical Engineering Technologist	3	34	17	0	4	65	120
3	CJB40803	Chemical Engineering Technologist Organizational Behavior	3	34	17	0	5	64	120
4	CBB30703	Enzyme Technology	3	30	0	47	3	40	120
5	CJB40303	Phytopharmaceutical Technology	3	30	0	47	5	38	120
6	CJB30303	Aqua, Meat and Dairy Products	3	28	0	42	5	45	120
7	CRB40203	Rubber Engineering	3	28	0	45	9	38	120
8	CRB40503	Biopolymer	3	23	0	42	4	53	122
10	CEB30203	Environmental Impact Assessment	3	36	0	40	11	33	120
11	CEB30403	Air Pollution Control Technology	3	21	0	45	4	50	120
12	CEB30503	Wastewater Treatment Technology	3	32	0	53	3	32	120
13	CEB 40503	Remote Sensing & Geographical Information System	3	16	0	36	8	60	120
14	CEB 40603	Introduction to Renewable Energy	3	21	5	38	0	56	120

Co-Curriculum*

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	MPU 3412	Career Guidance 2	2	17	6	2	4	51	80
2	MPU 3422	Community Service 2	2	17	0	0	12	51	80
3	MPU 3432	Culture 2	2	20	0	12	0	48	80
4	MPU 3442	Rakan Masjid 2	2	17	0	0	8	55	80
5	MPU 3452	Siswa-siswi Bomba & Penyelamat 2	2	17	0	20	0	43	80
6	MPU 3462	Siswa-siswi Pertahanan Awam 2	2	17	0	16	0	47	80
7	MPU 3472	Sports Management 2	2	17	0	16	0	47	80
8	MPU 3482	Personal Financial Management 2	2	17	0	18	3	42	80
9	MPU 3492	Askar Wataniah	2	17	0	23	0	40	80

Note :

1. ***Additional Module - MPU2213 Bahasa Kebangsaan A**
   a. For local students without credit in B. Melayu (SPM) only and the credit is not included in program Total Credit to Graduate (TCG).

2. **Legend :**
   a. (L) – For Local Students
   b. (I) - For International Students
   c. (L-M) – For Local Muslim Students
   d. (L-NM) – For Local Non-Muslim Students

3. **Passing mark for all MPU Compulsory subjects is 50 marks (C).**

MAJOR COURSES

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (HONS) IN ENVIRONMENT

CEB20303 Environmental Microbiology and Chemistry
CEB20103 Surface and Groundwater Hydrology
CEB30003 Environmental Management System
CEB30403 Air Pollution Control Technology
CEB30503 Waste Water Treatment Technology
CEB31303 Life Cycle Analysis for Environmental Eng. Technology
CEB30103 Pollution Prevention & Industrial Waste Minimization
CEB30703 Water Treatment Technology
CEB30903 Solid and Hazardous Waste Management
CEB40503 Remote Sensing and Geographic Information System in Environmental Engineering
CEB 40004 Environmental Engineering Design

CEB20303 Environmental Microbiology & Chemistry

Rationale for inclusion of the course in the program:

This course introduces the fundamental concepts of chemistry and microbiology with application to the environment. The students are introduce to the existence, characteristics, behavior and effects of harmful chemical substance in environment medium and the control of it. They are also trained on basic principles and practical applications of microbiology to current environment problems.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Apply concepts of chemical and microbial processes occurring in the environment and their scientific basis.
2. Display basic laboratory skills in studying chemical and microbial processes in the environment. Demonstrate ability to work in a team and professional communication skills.

CEB20103 Surface and Groundwater Hydrology

Rationale for inclusion of the course in the program:

To provide students with the knowledge of the current practices and policies pertaining to the development, implementation and maintenance of environmental management system (EMS) in an organization. ISO standards will be examined and case studies will be used to highlight the key factors involved with EMS implementation. The process of assessing environmental impacts and aspects and implementing continuous improvement measured will be addressed. Comparable Environmental Quality Act (EQA) 1974 will be examined to reinforce management system concepts.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Appraise the various components in environmental management systems and EQA 1974.
2. Analyze and document environmental aspects and impacts for selected activities.
3. Measure the level of environmental management system implementation by applying standard environmental auditing principles and practices to environmental management system.

CEB30003 Environmental Management System

Rationale for inclusion of the course in the program:

To provide students with the knowledge of the current practices and policies pertaining to the development, implementation and maintenance of environmental management system (EMS) in an organization. ISO standards will be examined and case studies will be used to highlight the key factors involved with EMS implementation. The process of assessing environmental impacts and aspects and implementing continuous improvement measured will be addressed. Comparable Environmental Quality Act (EQA) 1974 will be examined to reinforce management system concepts.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Assess and analyze research literature to be able to solve broadly defined chemical engineering technology problems reaching substantiated capacity towards maintaining of an existing environmental management system, or assisting in developing a new system.
2. Increase proficiency in the academic knowledge of the subject area, and also to formulate environmental management systems through working in partnership with a 'real-life' client organization.
3. Select and manipulate the applicable tools appropriate to area of specialization and help develop environmental management systems, with an understanding of the limitations.

CEB30403 Air Pollution Control Technology

Rationale for inclusion of the course in the program:

To provide students with strong fundamental knowledge of the sources of air, noise and vibration pollution, monitoring and control techniques and parameters addressed in Malaysia's Clean Air Regulation, Industry Code of Practice on Indoor Air Quality and Factory and Machinery Act.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Characterize the principle of air quality control equipment and analyze the factors that would affect the efficiency of the equipment in terms of performance and cost effectiveness.
2. Describe the current issues in air pollution and perform air quality monitoring and evaluate the results based on sound engineering judgement.
3. Identify the sources of air pollutions and evaluate the requirement of Malaysian laws related to it.
4. Demonstrate good communication, teamwork, leadership, problem solving and lifelong learning.

CEB30503 Waste Water Treatment Technology

Rationale for inclusion of the course in the program:

To provide students with strong fundamental knowledge of wastewater treatment techniques and to provide students in understanding the differences between chemical and biological treatment in wastewater treatment. Other than that, to provide students with basic design of wastewater treatment technology.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Distinguish the primary and secondary standards for treated wastewater effluent towards compliance discharge standards.
2. Perform different physiochemical and biological wastewater treatment processes.
3. Select and apply appropriate techniques to design a complete wastewater treatment plant
4. Communicate effectively through the preparation of reports and technical papers.

CEB31303 Life Cycle Analysis for Environmental Engineering Technology

Rationale for inclusion of the course in the program:

To provide student knowledge about Life Cycle Analysis (LCA), a framework for evaluation of the environmental footprints of various systems and technologies. Application of Life Cycle Analysis on various energy, product and transport technologies and system.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Assess and analyze research literature to be able to solve broadly defined chemical engineering technology problems reaching substantiated capacity towards the development and application of techniques and methodologies at advanced level.
2. Increase proficiency in the academic knowledge of the subject area, and also to formulate environmental management systems through properly evaluating the environmental impact or sustainability of a process or product
3. Select and manipulate the applicable tools appropriate to area of specialization and help assessing and quantifying sustainability by using particularly suitable multicriteria decision techniques.

CEB30103 Pollution Prevention & Industrial Waste Minimization

Rationale for inclusion of the course in the program:

Building upon foundation laid by solid and hazardous waste management and LCA courses, this course seeks to provide a more in-depth analysis and application of generic pollution prevention and waste minimization methods focusing on the petrochemical industry. The skills obtained in this course are essential for any successful pollution prevention and waste minimization program to be conducted by the student in the future job. Due to the generic nature of the methods the principles are applicable in a wide range of industrial sectors.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Develop concepts and solutions of industrial pollution prevention, industrial ecology and waste minimization at macro- and mesoscale using appropriate resources.
2. Discuss the need of legislative acts related to pollution prevention and waste minimization for sustainable development.
3. Evaluate waste management alternatives based on financial methods (e.g. total cost assessment, financial forecast and planning).
4. Demonstrate ability to work in a team.

CEB 30703 Water Treatment Technology

Rationale for inclusion of the course in the program:

This course aimed to provide students with strong fundamental knowledge of water treatment techniques and basic design of water treatment technology to produce quality drinking water required by World Health Organization (WHO)standard and Environmental Quality Act (EQA) 1974.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Differentiate the types of water treatment processes using basic design approach.
2. Measure the water quality and construct a report.
3. Shows the ability to propose a plan to mitigate the problems related to water quality issues in Malaysia.

CEB30903 Solid and Hazardous Waste Management

Rationale for inclusion of the course in the program:

This course is important for the household and industrial management waste for the students to embark in their career. It is crucial to have basic in the management of both solid and hazardous waste in industry for sustainable development.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Revise the principle aspects of waste management, relevant issues and implications related to solid and hazardous waste management.
2. Differentiate the principle of waste processing, treatment, transformation, recovery and disposal operation technologies for sustainable development.
3. Organize suitable waste program/project to include potential economic aspects of waste as resources.
4. Ability to identify problems and also potential engineering solutions

CEB40503 Remote Sensing and Geographic Information System in Environmental Engineering

Rationale for inclusion of the course in the program:

This basic course highlighted the advantages of remote sensing assistance in the ability to learn about the Earth's surface and atmosphere from a distance (or those of other planets), and it allows us to study large regions more easily than we could do on the ground. This course is an introduction to the techniques of observing the Earth from air- and space-borne instruments. Some basic issues of geometry and scale associated with making these measurements, electromagnetic properties of Earth surface materials, the range of instruments used to observe the Earth, and applications of satellite remote sensing to geological and environmental questions will be covered.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Investigate the current issues and the importance terms using remote sensing and geographic information system.
2. Explain the concepts of GIS and spatial methods including digital imagery, data acquisition, interpretation, processing, storage and retrieval as modern tool.
3. Relate the theoretical knowledge with the actual uses of remote sensing and GIS during field work.
4. Identify problem and solve using appropriate engineering method.

CEB40003 Environmental Engineering Design

Rationale for inclusion of the course in the program:

To guide students through Senior Design Project effort through consultation, and interaction with student groups in formal presentation and informal bi-weekly meeting setting. Develop an understanding of Professional Practice issues related to Professional Ethics and Liability, relationship with Owner/Operators and Constructors, Professional Licensing, and products of engineering design projects.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Recommend the best solution in engineering problem.
2. Design the environmental treatment facilities.
3. Write process design report that covers the professional oral and written communication skills.
4. Demonstrate ability to work in team either as a leader or ordinary member by work effectively in problem-solving and participate in regular project status meetings.

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (HONS) IN POLYMER

1. **PROGRAM STRUCTURE**
2. **MAJOR COURSES**

PROGRAM STRUCTURE

- subject to amendments

YEAR 1: SEMESTER 1

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB19203	Mathematics 1	3	28	24	0	6	62	120
2	WBB20103	Technopreneurship	3	10	20	0	2	88	120
3	WEB20202	Professional English 1	2	10	16	0	5	49	80
4	MPU3123/ MPU3143	Tamadun Islam & Tamadun Asia (TITAS)/ Bahasa Melayu Komunikasi 2	3	10	0	0	46	64	120
5	WEB 10302	Fundamental English	2	10	16	0	4	50	80
		TOTAL	**13**	**68**	**76**	**0**	**63**	**313**	**520**

YEAR 1: SEMESTER 2

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB10402	Fundamental of Electric & Electronics	2	14	0	27	4	35	80
2	CLB10703	Physical Chemistry	3	17	14	37	6	46	120
3	CLB19303	Mathematics 2	3	28	24	0	6	62	120
4	CLB10903	Engineering Drawing & Computing	3	15	30	36	9	30	120
5	MPU3113/ MPU3173	Hubungan Etnik / Pengajian Malaysia 3	3	17	0	0	25	78	120
6	CLB10904	Chemical Process Principles	4	28	14	59	7	53	161
7	CLB11003	Fluid Mechanics	3	28	0	51	5	36	120
		TOTAL	**21**	**147**	**82**	**210**	**62**	**340**	**841**

YEAR 2: SEMESTER 3

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB 21403	Engineering Design	3	15	30	36	9	30	120
2	CLB 10803	Analytical & Organic Chemistry	3	30	0	38	7	45	120
3	CLB20403	Thermodynamics	3	17	18	37	6	42	120
4	CLB21204	Transport Process Principles	4	28	18	29	5	80	160
5	MPU34*2	Co-curriculum	2	16	6	2	6	30	60
6	MPU3333/ MPU3343	Isu-isu Kontemporari Muslim di Malaysia/Culture and Lifestyle in Malaysia	3	12	0	0	30	78	120
7	CRB 20003	Introduction to Polymer Science & Technology	3	16	0	28	6	67	117
		TOTAL	**21**	**732**	**282**	**998**	**268**	**1600**	**3880**

YEAR 2: SEMESTER 4

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB21303	Process Instrumentation & Control	3	22	0	33	5	60	120
2	WEB 20302	Professional English 2	2	13	13	0	2	52	80
3	CKB 20104	Reaction Engineering	4	28	20	56	6	50	160
4	WMD10101	Mandarin 1	1	21	0	0	4	25	50
5	CEB20003	Introduction to Environmental Engineering Technology	3	22	0	43	9	46	120
6	CRB 20103	Latex Technology	3	23	0	27	8	64	122
7	CRB 30003	Composite Technology	3	27	0	43	8	42	120
		TOTAL	**19**	**156**	**33**	**202**	**42**	**339**	**772**

YEAR 3: SEMESTER 5

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CKB30103	Industrial Safety & Health	3	28	8	28	5	51	120
2	CLB20903	Engineering Statistics	3	28	28	0	8	56	120
3	CLB30003	Oil & Fat Process Technology	3	16	10	37	5	52	120
4	CLB40002	Engineering Technologist in Society	2	14	0	23	5	38	80
5	CRB 30203	Plastics Processing	3	33	0	45	6	36	120
6	CRB30103	Polymer Synthesis	3	26	0	49	6	46	127
7	CRB 30303	Rubber Technology	3	23	0	39	8	49	119
		TOTAL	**20**	**168**	**46**	**221**	**43**	**328**	**687**

YEAR 3: SEMESTER 6

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CRB30803	Polymeric Material Design 1	3	14	0	42	2	64	125
2	CRB 30403	Polymer Reaction Engineering	3	26	0	38	9	47	123
3	CRB 30603	Polymer Rheology	3	26	0	36	9	49	120
4	WPB49804	Final Year Project 1	4	5	0	110	1	44	160
5		Elective 1	3						120
6		Elective 2	3						120
		TOTAL	**19**	**71**	**0**	**226**	**21**	**204**	**768**

YEAR 4: SEMESTER 7

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	WPB49906	Final Year Project 2	6	5	0	205	1	29	240
2	MPU3242	Innovation Management	2	15	30	0	5	30	80
3	WMD 10201	Mandarin 2	1	21	0	0	4	25	50
4	CRB 40003	Mold & Die Design	3	30	0	24	9	56	119
5	CRB 40603	Polymeric Material Design 2	3	14	0	42	2	64	122
6		Elective 3	3						120
		TOTAL	**18**	**85**	**30**	**271**	**21**	**204**	**731**

YEAR 4: SEMESTER 8

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	WIB41009	Industrial Training	9	0	0	320	4	36	360
		TOTAL	**9**	**0**	**0**	**320**	**4**	**36**	**360**

Total Credit to Graduate (TCG): 140 Credit Hours

Electives**

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CJB40303	Management for Chemical Engineering Technologist	3	28	28	0	8	56	120
2	CJB40503	Marketing for Chemical Engineering Technologist	3	34	17	0	4	65	120
3	CJB40803	Chemical Engineering Technologist Organizational Behavior	3	34	17	0	5	64	120
4	CBB30703	Enzyme Technology	3	30	0	47	3	40	120
5	CJB40303	Phytopharmaceutical Technology	3	30	0	47	5	38	120
6	CJB30303	Aqua, Meat and Dairy Products	3	28	0	42	5	45	120
7	CRB40203	Rubber Engineering	3	28	0	45	9	38	120
8	CRB40503	Biopolymer	3	23	0	42	4	53	122
10	CEB30203	Environmental Impact Assessment	3	36	0	40	11	33	120
11	CEB30403	Air Pollution Control Technology	3	21	0	45	4	50	120
12	CEB30503	Wastewater Treatment Technology	3	32	0	53	3	32	120

Co-Curriculum*

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	MPU 3412	Career Guidance 2	2	17	6	2	4	51	80
2	MPU 3422	Community Service 2	2	17	0	0	12	51	80
3	MPU 3432	Culture 2	2	20	0	12	0	48	80
4	MPU 3442	Rakan Masjid 2	2	17	0	0	8	55	80
5	MPU 3452	Siswa-siswi Bomba & Penyelamat 2	2	17	0	20	0	43	80
6	MPU 3462	Siswa-siswi Pertahanan Awam 2	2	17	0	16	0	47	80
7	MPU 3472	Sports Management 2	2	17	0	16	0	47	80
8	MPU 3482	Personal Financial Management 2	2	17	0	18	3	42	80
9	MPU 3492	Askar Wataniah	2	17	0	23	0	40	80

Note :

1. ***Additional Module - MPU2213 Bahasa Kebangsaan A**
   a. For local students without credit in B. Melayu (SPM) only and the credit is not included in program Total Credit to Graduate (TCG).

2. **Legend :**
   a. (L) – For Local Students
   b. (I) - For International Students
   c. (L-M) – For Local Muslim Students
   d. (L-NM) – For Local Non-Muslim Students

3. **Passing mark for all MPU Compulsory subjects is 50 marks (C).**

MAJOR COURSES

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (HONS) IN POLYMER

CRB20003 Introduction to Polymer Science & Technology
CRB20103 Latex Technology
CRB30003 Composite Technology
CRB30103 Polymer Synthesis
CRB30203 Plastic Processing
CRB30303 Rubber Technology
CRB30403 Polymer Reaction Engineering
CRB30603 Polymer Rheology
CRB30803 Polymeric Material Design 1
CRB40003 Mold & Die Design
CRB40603 Polymeric Material Design 2

CRB 20003 Introduction to Polymer Science & Technology

Rationale for inclusion of the course in the program:

This is an important course aimed at providing students with the fundamental principles of polymeric materials; the various polymerization mechanism and methods; rubbers, plastics, thermoplastic elastomers and composites key characteristics, applications as well as their manufacturing techniques. This course is essential for students majoring in polymer as these fundamental concepts are a must for subsequent semesters.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Summarize commercial rubbers, plastics, thermoplastic elastomers and composites – their characteristics, applications and manufacturing techniques
2. Differentiate between number average and weight average molecular weight of polymers; polymerization types and polymerization techniques
3. Propose suitable general manufacturing techniques of polymer products based on the current scenario
4. Demonstrate role as individual or team members effectively in assignment work.

CRB20103 Latex Technology

Rationale for inclusion of the course in the program:

This is a fundamental course to provide students with latex science and technology knowledge. This course covers skills in preparation, testing and evaluation of latex concentrate and compounded latex. Latex products and processing are also discussed.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Discuss the mechanism of stabilization of latex, latex compounding ingredients and their preparation methods
2. Evaluate test results using fundamental knowledge of latex science and technology
3. Discuss latex products manufacturing techniques.
4. Perform correct laboratory works and embedding technopreneurial element in selected laboratory report.

CRB 30003 Composite Technology

Rationale for inclusion of the course in the program:

This course is aimed at providing students with information on the fundamental characteristics of polymer composites and their applications. Materials that can be used to produce polymer composites are discussed. Composite design, manufacturing processes and their shortcomings are highlighted.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Analyze the components of polymer composites, their advantages, their commercial applications and composite design
2. Summarize between the different types of reinforcement, fibres and polymer composites manufacturing
3. Propose remedies for common composite defects
4. Performs the preparation and processing of polymer composites according to different processing techniques and requirement, embedding technopreneurial element in selected polymer composite laboratory works
5. Demonstrate ability to work in a team either as a leader or ordinary member.

CRB30103 Polymer Synthesis

Rationale for inclusion of the course in the program:

This course is aimed at providing students with information on; various polymerization processes; copolymerization processes and the methods to control it. Students also carry out the polymerization processes in laboratory sessions.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Compare and contrast types of polymers and polymerization
2. Evaluate the differences between step-growth polymerization, chain-growth polymerization and co-polymerization in terms of its mechanisms, kinetics and modes of polymerization
3. Perform suitable polymerization steps according to different polymerization methods safely
4. Work effectively as individuals and team members in laboratory sessions.

CRB30203 Plastic Processing

Rationale for inclusion of the course in the program:

This course provides students with detailed concepts of plastics processing which include details of selection and operation of the processing equipment. These concepts are essential in selecting different types of plastics processing methods used in the plastics industry.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Evaluate the various plastics materials, additives and their properties.
2. Evaluate the various plastics processing techniques.
3. Organize the preparation and processing of plastics products according to different processing techniques and requirements; embedding technoprenurial elements as part of the requirement.
4. Demonstrate role as a leader or a team member effectively.

CRB30303 Rubber Technology

Rationale for inclusion of the course in the program:

This course is aimed at providing students with the fundamental principles of rubber technology and skills in compounding, testing and evaluating compounded rubber. Rubber processing techniques are also covered.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Evaluate the various types of rubber, its properties and its applications.
2. Review on selected rubber processing methods and the remedies for typical defects.
3. Evaluate rubber compound and/or rubber vulcanizate performances based on test results.
4. Demonstrate the typical rubber processing and testing on rubber compounds and/or rubber vulcanizates as a team

CRB30403 Polymer Reaction Engineering

Rationale for inclusion of the course in the program:

This course aims to provide students with information on types of reactors and conceptual reactor modelling in step-growth and chain-growth polymerization. Impact of process variables, on-line monitoring and control are also highlighted.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Summarize the principles of processes, reactor modelling concept as well as effect of types of reactors for step-growth and chain-growth polymerizations.
2. Predict major issue arises in industry in various polymerization techniques and effects of major polymerization process variables.
3. Propose suitable on-line monitoring and control in polymerization process.
4. Join effective group discussion in completing assignment.

CRB30603 Polymer Rheology

Rationale for inclusion of the course in the program:

This course aimed to provide students basic rheology concept and shear viscosity relationship. Types of rheometry are also highlighted. Effects of additives to the rheology behaviour were also discussed. Polymer rheology behaviour during processing is explained.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Summarize the flow phenomena of polymeric fluid and types of rheometry.(C5)
2. Perform calculation on the capillary rheometer correction.(C4)
3. Predict the effects of chemical structure, molecular structure, temperature, pressure and presence of additives to the rheological behaviour of polymer melts in typical thermoplastic processing techniques.(C5)
4. Work effectively as individuals and team member.

CRB30803 Polymeric Material Design 1

Rationale for inclusion of the course in the program:

This course aims to provide students with information on types and functions of various additives. Students are then expected to propose general compounding formulation for specific applications using appropriate additives ingredients.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Summarize the material selection based on the role of materials, properties chart, process-design models and indices.
2. Propose the suitable polymer modifier, formulation, performance and analysis of polymer blends.
3. Prepare either polymer additives or blends using suitable methods in mini projects.
4. Demonstrate the ability to work with members of the team to discuss and plan the design.

CRB40003 Mold & Die Design

Rationale for inclusion of the course in the program:

The aim of this subject is to provide students with in-depth knowledge in the design and manufacture of moulds and dies for polymer engineering components, the related performance of moulds and dies as well as processes, and their effects on the quality of finished products.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Identifies proper techniques, tooling principles and design criteria for mould and die construction.
2. Justifies mould and die tools design criteria.
3. Construct product, mould and die drawing using CAD methods; including technoprenuerial elements in the mini-projects.
4. Work effectively in a team either as a leader or team member.

CRB40603 Polymeric Material Design 2

Rationale for inclusion of the course in the program:

This course aims to provide students with information of design and fabrication of polymeric materials. Selection of processing methods, testing and characterization are also discussed.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Evaluate the suitable processing method and testing and/or characterization in polymeric material design.
2. Perform processing testing and/or characterization in mini-project
3. Generate cost saving budget element in mini project.
4. Demonstrate the ability to work with members of the team to discuss and plan the design.

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (HONS) IN BIOPROCESS

1. PROGRAM STRUCTURE
2. MAJOR COURSES

PROGRAM STRUCTURE

- subject to amendments

YEAR 1: SEMESTER 1

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB 19203	Mathematics 1	3	28	24	0	6	62	120
2	WBB20103	Technopreneurship	3	10	20	0	2	88	120
3	WEB 20202	Professional English 1	2	10	16	0	5	49	80
4	MPU3123/ MPU 3143	Tamadun Islam & Tamadun Asia (TITAS)/ Bahasa Melayu Komunikasi 2	3	10	0	0	46	64	120
5	WEB 10302	Fundamental English	2	10	16	0	4	50	80
		TOTAL	**13**	**68**	**76**	**0**	**63**	**313**	**520**

YEAR 1: SEMESTER 2

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB10402	Fundamental of Electric & Electronics	2	14	0	27	4	35	80
2	CLB 10703	Physical Chemistry	3	17	14	37	6	46	120
3	CLB 19303	Mathematics 2	3	28	24	0	6	62	120
4	CLB 10903	Engineering Drawing & Computing	3	15	30	36	9	30	120
5	MPU3113/MPU 3173	Hubungan Etnik / Pengajian Malaysia 3	3	17	0	0	25	78	120
6	CLB 10904	Chemical Process Principles	4	28	14	59	7	53	161
7	CLB 11003	Fluid Mechanics	3	28	0	51	5	36	120
		TOTAL	**21**	**147**	**82**	**210**	**62**	**340**	**841**

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YEAR 2: SEMESTER 3

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB 21403	Engineering Design	3	15	30	36	9	30	120
2	CLB10803	Analytical & Organic Chemistry	3	30	0	38	7	45	120
3	CLB20703	Thermodynamics	3	17	18	37	6	42	120
4	CLB21204	Transport Process Principles	4	28	18	29	5	80	160
5	MPU34*2	Co-curriculum	2						80
6	MPU3333/MPU 3343	Isu-isu Kontemporari Muslim di Malaysia/Culture and Lifestyle in Malaysia	3	12	0	0	30	78	120
7	CLB 11103	Biology of Cell	3	22	0	50	6	42	120
		TOTAL	**21**	**124**	**66**	**190**	**63**	**317**	**840**

YEAR 2: SEMESTER 4

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB21303	Process Instrumentation & Control	3	22	0	33	5	60	120
2	WEB 20302	Professional English 2	2	13	13	0	2	52	80
3	CKB 20104	Reaction Engineering	4	28	20	56	6	50	160
4	WMD10101	Mandarin 1	1	21	0	0	4	25	50
5	CBB 20303	Biochemistry	3	30	0	47	3	40	120
6	CBB 20003	Principles of Microbiology	3	30	0	47	3	40	120
7	CBB 20503	Principles of Bioprocess Technology	3	28	0	50	7	35	120
		TOTAL	**19**	**172**	**33**	**233**	**30**	**302**	**770**

YEAR 3: SEMESTER 5

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB20903	Engineering Statistics	3	28	28	0	8	56	120
2	CPB30303	Oil & Fat Process Technology	3	16	10	37	5	52	120
3	CSB 30603	QA & QC in Bio Products	3	21	0	36	5	58	120
4	CBB30204	Bioseparations Engineering Technology	4	30	0	60	7	63	160
5	CBB30303	Biomolecular Technique	3	28	0	45	7	40	120
6	CKB30103	Industrial Safety & Health	3	28	8	28	5	51	120
7	CLB 40002	Engineering Technologist in Society	2	14	0	23	5	40	82
		TOTAL	**21**	**165**	**46**	**229**	**42**	**360**	**842**

YEAR 3: SEMESTER 6

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CBB 31003	Bioplant Design Project 1	3	34	0	57	5	24	120
2	CBB 31104	Bioprocess Development & Equipment	4	30	0	45	7	58	140
3	WPB49804	Final Year Project 1	4	5	0	110	1	44	160
4	CEB 20003	Introduction to Environmental Engineering Technology	3	26	13	10	9	62	120
5		Elective 1	3						120
6		Elective 2	3						120
		TOTAL	**20**	**95**	**13**	**222**	**22**	**188**	**780**

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YEAR 4: SEMESTER 7

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	WPB49906	Final Year Project	6	5	0	205	1	29	240
2	CBB 40104	Bioplant Design Project 2	4	34	0	54	2	70	160
4		Elective 3	3						120
5	MPU3242	Innovation Management	2	15	30	-	5	30	80
6	WMD 10201	Mandarin 2	1	21	0	0	4	25	50
		TOTAL	**16**	**75**	**30**	**259**	**12**	**154**	**530**

YEAR 4: SEMESTER 8

No	SUBJECT CODE	SUBJECT NAME	CREDIT	F2F				Non F2F	Total SLT
NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	WIB41009	Industrial Training	9	0	0	320	4	36	360
		TOTAL	**9**	0	0	320	4	**36**	**360**

Total Credit to Graduate (TCG): 140 Credit Hours

Electives**

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CJB 40403	Management for Chemical Engineering Technologist	3	28	28	0	8	56	120
2	CJB 40503	Marketing for Chemical Engineering Technologist	3	34	17	0	4	65	120
3	CJB 40603	Chemical Engineering Technology Organizational Behavior	3	34	17	0	5	64	120
4	CBB30703	Enzyme Technology	3	30	0	47	3	40	120
5	CJB40303	Phytopharmaceutical Technology	3	30	0	47	5	38	120
6	CJB30303	Aqua, Meat and Dairy Products	3	28	0	42	5	45	120
7	CRB 40203	Rubber Engineering	3	28	0	45	9	38	120
8	CRB40503	Biopolymer	3	23	0	42	4	53	120
9	CEB 40603	Introduction to Renewable Energy	3	20	20	2	4	80	120
10	CEB 30203	Environmental Impact Assessment	3	36	0	40	11	33	120
11	CEB 30403	Air Pollution Control Technology	3	21	0	45	4	50	120
12	CEB 30503	Wastewater Treatment Technology	3	32	0	53	3	32	120

Co-Curriculum*

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	MPU 3412	Career Guidance 2	2	17	6	2	4	51	80
2	MPU 3422	Community Service 2	2	17	0	0	12	51	80
3	MPU 3432	Culture 2	2	20	0	12	0	48	80
4	MPU 3442	Rakan Masjid 2	2	17	0	0	8	55	80
5	MPU 3452	Siswa-siswi Bomba & Penyelamat 2	2	17	0	20	0	43	80
6	MPU 3462	Siswa-siswi Pertahanan Awam 2	2	17	0	16	0	47	80
7	MPU 3472	Sports Management 2	2	17	0	16	0	47	80
8	MPU 3482	Personal Financial Management 2	2	17	0	18	3	42	80
9	MPU 3492	Askar Wataniah	2	17	0	23	0	40	80

Note :

1. ***Additional Module - MPU2213 Bahasa Kebangsaan A**
   a. For local students without credit in B. Melayu (SPM) only and the credit is not included in program Total Credit to Graduate (TCG).

2. **Legend :**
   a. (L) – For Local Students
   b. (I) - For International Students
   c. (L-M) – For Local Muslim Students
   d. (L-NM) – For Local Non-Muslim Students

3. **Passing mark for all MPU Compulsory subjects is 50 marks (C).**

MAJOR COURSES

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (HONS) IN BIOPROCESS

CLB11103 Biology of Cell
CBB20003 Principles of Microbiology
CBB20303 Biochemistry
CBB20503 Principles of Bioprocess Technology
CBB20104 Principles of Bioprocess Engineering Technology
CBB30204 Bioseparations Engineering Technology
CBB30303 Biomolecular Techniques
CSB30603 QA & QC in Bio Products
CBB31003 Bioplant Design Project 1
CBB31104 Bioprocess Development & Equipment
CBB40104 Bioplant Design Project 2

CLB11103 Biology of Cell

Rationale for inclusion of the course in the program:

This is an introductory course aimed at providing students with the fundamental concepts of biology of cells components which form the foundation for their study in later years. These concepts are essential since the students will encounter these knowledge in others high level courses.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Describe the structure and functions of prokaryotes and eukaryotes cells and explain theoretical aspect of plant, animal, genetic and ecology including the importance of biodiversity element.
2. Perform biology laboratory procedures.
3. Collaborate with team members in planning and performing scientific investigation.

CBB20003 Principles of Microbiology

Rationale for inclusion of the course in the program:

To introduce the principles of structure, diversity and characterization of microorganisms and the application of microorganisms in industries.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Identify the classification and characteristics of microorganisms, and their applications in various industries.
2. Explain microbiological concepts clearly, both verbally and in writing.
3. Report microbiological experimental results concisely, including accurately reporting observations and analysis.
4. Display competency in routine and specialized microbiological laboratory skills

CBB20303 Biochemistry

Rationale for inclusion of the course in the program:

To introduce biochemistry to the students by exposing them to the structure and functions of biomolecules, enzyme characteristics and reactions, metabolism and bioenergetics, and biological information flow.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Identify the fundamental structure and dynamic of biomolecules, enzymes characteristics and reactions, metabolism and bioenergetics.
2. Perform Biochemistry laboratory with accurate and highly coordinated skills.
3. Integrate team work ability in practical work or mini project either as a leader or an ordinary member.
4. Apply Biochemistry related practical skills to solve given bioengineering issues.

CBB20503 Principles of Bioprocess Technology

Rationale for inclusion of the course in the program:

This course will provide students with knowledge and hands on skill in bioprocess technology in order to exploit microbial, plant and animal cell systems as products of valuable commodities.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Describe the principles of bioprocess engineering technology.
2. Demonstrate ability to work in team either as a leader or ordinary member.
3. Execute experimental activities associate with bioprocess engineering technology
4. Perform purification process with appropriate equipment and techniques.

CBB30204 Bioseparations Engineering Technology

Rationale for inclusion of the course in the program:

The students should be able to define and apply various techniques in bioproduct recovery technology.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Justify the appropriate techniques in bioproduct recovery stages.
2. Perform the operation in downstream processing.
3. Organize work in team either as a leader or ordinary member.
4. Perform the common unit operation involved in bioseparation to solve problems using data from relevant source

CBB30303 Biomolecular Techniques

Rationale for inclusion of the course in the program:

This is an intermediate level course aimed at providing and emphasis on cell and molecular biology concepts. These concepts are essential since the students will encounter these at higher level. This is to produce capable graduates equipped with both knowledge and skills in molecular biology.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Infer the fundamental and advance knowledge in biomolecular techniques.
2. Perform biomolecular techniques and methodologies based on the theory learned.
3. Demonstrate competency in presenting information in verbal and written forms which encompasses a critical analysis of findings.
4. Perform the common unit operation involved in bioseparation to solve problems using data from relevant source

CBB30603 QA & QC in Bio Products

Rationale for inclusion of the course in the program:

This course will provide students with knowledge and hands on skill in imparting the knowledge on quality assurance in processing, end product as well as standardization methods involved together with regulations.

Learning Outcomes:

Upon completion of this course students should be able to:

5. Analyse the quality characteristics of bio products and quality management systems implementation in bio products manufacturing process
6. Perform the quality control analysis by applying selected quality management process and tools to maintain the quality of bio products.
7. Justify the importance of quality assurance towards ethical production of bio products.

CBB31003 Bioplant Design Project 1

Rationale for inclusion of the course in the program:

To impart the design concepts in bioprocess plant and develop students knowledge of contemporary issues related to bioproduct processing and process design.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Determine the fundamental knowledge and skills of bioprocess engineering in designing bioproduct plant during preliminary stage.
2. Calculate the mass and energy balances to design a bioprocess plant in order to produce a high profitable product.
3. Organize in teams by work effectively in problem solving and participate in regular project status meetings.

CBB31104 Bioprocess Plant & Equipment Design

Rationale for inclusion of the course in the program:

This course is aimed to provide students with the knowledge on the principles of bioproduct and bioprocess development which will enable them to work effectively in bioengineering as well as chemical and field.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Discuss the stages and equipment used in bioprocess development
2. Conduct the lab scale production of bioproduct by operating bioprocess equipment and utilities
3. Collaborate with team members effectively as an individual, and as a member and/or leader in conducting lab work and completing mini projects.
4. Recognize the importance of sustainability and economic assessment in bioproduct and bioprocess development by considering the presence of limitation

CBB20104 Principles of Bioprocess Engineering Technology

Rationale for inclusion of the course in the program:

This course will provide students with knowledge and hands on skill in bioprocess technology in order to exploit microbial, plant and animal cell systems as products of valuable commodities.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Infer principle of bioprocess engineering technology.
2. Generalized bioprocess reaction kinetics.
3. Perform bioprocess reaction activity / downstream processing including elements in separation and purification process.
4. Demonstrate ability to work in team either as a leader or ordinary member.

CBB40104 Biopant Design Project 2

Rationale for inclusion of the course in the program:

To impart the design concepts in bioprocess plant and develop students knowledge of contemporary issues related to bioproduct processing and process design.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Construct the conceptual design equipment for bioprocess plant design that solves the safety and environmental issues.
2. Construct the design using computational tools (software) which is simulation program.
3. Determine the profitability analysis and prepare a bioprocess design report that covers the professional oral and written communication skills.
4. Demonstrate ability to work in team either as a leader or ordinary member by work effectively in problem-solving and participate in regular project status meetings

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (HONS) IN FOOD

1. **Program Structure**
2. **Major Courses**

PROGRAM STRUCTURE

- ***subject to amendments***

YEAR 1: SEMESTER 1

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB19203	Mathematics 1	3	28	24	0	6	62	120
2	WBB20103	Technopreneurship	3	10	20	0	2	88	120
3	WEB20202	Professional English 1	2	10	16	0	5	49	80
4	MPU3123/ MPU3143	Tamadun Islam & Tamadun Asia (TITAS)/ Bahasa Melayu Komunikasi 2	3	10	0	0	46	64	120
5	WEB 10302	Fundamental English	2	10	16	0	4	50	80
		TOTAL	**13**	**68**	**76**	**0**	**63**	**313**	**520**

YEAR 1: SEMESTER 2

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB10402	Fundamental of Electric & Electronics	2	14	0	27	4	35	80
2	CLB10703	Physical Chemistry	3	17	14	37	6	46	120
3	CLB19303	Mathematics 2	3	28	24	0	6	62	120
4	CLB10903	Engineering Drawing & Computing	3	15	30	36	9	30	120
5	MPU3113/ MPU3173	Hubungan Etnik / Pengajian Malaysia 3	3	17	0	0	25	78	120
6	CLB12004	Chemical Process Principles	4	28	14	59	7	53	161
7	CLB11003	Fluid Mechanics	3	28	0	51	5	36	120
		TOTAL	**21**	**147**	**82**	**210**	**62**	**340**	**841**

YEAR 2: SEMESTER 3

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB 21403	Engineering Design	3	15	30	36	9	30	120
2	CLB 10803	Analytical & Organic Chemistry	3	30	0	38	7	45	120
3	CLB20403	Thermodynamics	3	17	18	37	6	42	120
4	CLB21204	Transport Process Principles	4	28	18	29	5	80	160
5	MPU34*2	Co-curriculum	2	16	6	2	6	30	60
6	MPU3333/ MPU3343	Isu-isu Kontemporari Muslim di Malaysia/Culture and Lifestyle in Malaysia	3	12	0	0	30	78	120
7	CFB20002	Introduction to Food Science and Technology	2	32	0	0	7	41	80
		TOTAL	**20**	**732**	**282**	**998**	**268**	**1600**	**3880**

YEAR 2: SEMESTER 3

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB 21403	Engineering Design	3	15	30	36	9	30	120
2	CLB 10803	Analytical & Organic Chemistry	3	30	0	38	7	45	120
3	CLB20403	Thermodynamics	3	17	18	37	6	42	120
4	CLB21204	Transport Process Principles	4	28	18	29	5	80	160
5	MPU34*2	Co-curriculum	2	16	6	2	6	30	60
6	MPU3333/ MPU3343	Isu-isu Kontemporari Muslim di Malaysia/Culture and Lifestyle in Malaysia	3	12	0	0	30	78	120
7	CFB20002	Introduction to Food Science and Technology	2	32	0	0	7	41	80
		TOTAL	**20**	**732**	**282**	**998**	**268**	**1600**	**3880**

YEAR 2: SEMESTER 4

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CLB21303	Process Instrumentation & Control	3	22	0	33	5	60	120
2	WEB 20302	Professional English 2	2	13	13	0	2	52	80
3	CEB20003	Introduction to Environmental Engineering Technology	3	22	0	43	9	46	120
4	WMD10101	Mandarin 1	1	21	0	0	4	25	50
5	CFB40503	Instrumental Food Analysis	3	27	0	44	6	43	120
6	CFB20703	Food Chemistry	3	28	0	42	5	45	120
7	CFB20303	Food Microbiology	3	28	0	42	7	43	120
		TOTAL	**18**	**161**	**13**	**204**	**38**	**314**	**730**

YEAR 3: SEMESTER 5

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CKB30103	Industrial Safety & Health	3	28	8	28	5	51	120
2	CLB20903	Engineering Statistics	3	28	28	0	8	56	120
3	CLB30003	Oil & Fat Process Technology	3	16	10	37	5	52	120
5	CFB31203	Chemical Food Analysis	3	26	0	39	13	42	120
6	CFB30103	Food Sensory and Evaluation	3	28	0	42	5	45	120
7	CFB30203	Food Packaging Technology	3	28	0	42	7	46	123
		TOTAL	**18**	**154**	**46**	**188**	**43**	**292**	**723**

YEAR 3: SEMESTER 6

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CFB31103	Food Process Engineering	3	19	18	21	7	55	120
2	MPU3242	Innovation Management	2	15	30	0	5	30	80
3	CFB31003	Food Quality & Safety Management System	3	47	0	6	8	59	120
4	CFB30104	Food Processing and Innovation	4	30	0	54	8	68	160
5	WPB49804	Final Year Project 1	4	5	0	110	1	44	160
6		Elective 1	3						0
		TOTAL	**19**	**116**	**48**	**191**	**29**	**256**	**640**

YEAR 4: SEMESTER 7

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	WPB49906	Final Year Project 2	6	5	0	205	1	29	240
2	CFB40104	Food Plant Design	4	36	0	45	8	73	162
3	WMD 10201	Mandarin 2	1	21	0	0	4	25	50
4	CFB30803	Halal Technology	3	28	0	42	7	43	120
5	CLB40002	Engineering Technologist in Society	2	14	0	23	5	38	80
6		Elective 2	3						
7		Elective 3	3	34	17	0	4	65	120
		TOTAL	**22**	**138**	**17**	**315**	**29**	**273**	**772**

YEAR 4: SEMESTER 8

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	WIB39909	Industrial Training	9	0	0	320	4	36	360
		TOTAL	**9**	**0**	**0**	**320**	**4**	**36**	**360**

Total Credit to Graduate (TCG): 140 Credit Hours

Electives**

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	CJB40303	Management for Chemical Engineering Technologist	3	28	28	0	8	56	120
2	CJB40503	Marketing for Chemical Engineering Technologist	3	34	17	0	4	65	120
3	CJB40803	Chemical Engineering Technologist Organizational Behavior	3	34	17	0	5	64	120
4	CBB30703	Enzyme Technology	3	30	0	47	3	40	120
5	CJB40303	Phytopharmaceutical Technology	3	30	0	47	5	38	120
6	CJB30303	Aqua, Meat and Dairy Products	3	28	0	42	5	45	120
7	CRB40203	Rubber Engineering	3	28	0	45	9	38	120
8	CRB40503	Biopolymer	3	23	0	42	4	53	122
10	CEB30203	Environmental Impact Assessment	3	36	0	40	11	33	120
11	CEB30403	Air Pollution Control Technology	3	21	0	45	4	50	120
12	CEB30503	Wastewater Treatment Technology	3	32	0	53	3	32	120

Co-Curriculum*

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	MPU 3412	Career Guidance 2	2	17	6	2	4	51	80
2	MPU 3422	Community Service 2	2	17	0	0	12	51	80
3	MPU 3432	Culture 2	2	20	0	12	0	48	80
4	MPU 3442	Rakan Masjid 2	2	17	0	0	8	55	80
5	MPU 3452	Siswa-siswi Bomba & Penyelamat 2	2	17	0	20	0	43	80
6	MPU 3462	Siswa-siswi Pertahanan Awam 2	2	17	0	16	0	47	80
7	MPU 3472	Sports Management 2	2	17	0	16	0	47	80
8	MPU 3482	Personal Financial Management 2	2	17	0	18	3	42	80
9	MPU 3492	Askar Wataniah	2	17	0	23	0	40	80

Note :

1. ***Additional Module - MPU2213 Bahasa Kebangsaan A**
   a. For local students without credit in B. Melayu (SPM) only and the credit is not included in program Total Credit to Graduate (TCG).

2. **Legend :**
   a. (L) – For Local Students
   b. (I) - For International Students
   c. (L-M) – For Local Muslim Students
   d. (L-NM) – For Local Non-Muslim Students

3. **Passing mark for all MPU Compulsory subjects is 50 marks (C).**

MAJOR COURSES

BACHELOR OF CHEMICAL ENGINEERING TECHNOLOGY (HONS) IN FOOD

CFB20002 Introduction to Food Science and Technology
CFB20303 Food Microbiology
CFB20703 Food Chemistry
CFB20703 Food Chemistry
CFB40503 Instrumental Food Analysis
CFB30103 Food Sensory and Evaluation
CFB30203Food Packaging Technology
CFB30104Food Processing and Innovation
CFB20603Food Analysis 1
CFB30004 Food Processing and Preservation Technology
CFB31003 Food Quality & System Management System
CFB31103 Food Process Engineering
CFB30803 Halal Technology
CFB40104 Food Plant Design

CFB20002 Introduction To Food Science And Technology

Rationale for inclusion of the course in the program:

This course aimed to provide students the basic knowledge and understanding of food science and technology.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Discuss general principles and concepts in food science and technology.
2. Participate in class discussions on selected topics of food science and technology.
3. Collaborate with team members in planning and discussing the related issues of food science and technology.

CFB20303 Food Microbiology

Rationale for inclusion of the course in the program:

This course aimed to provide the students with understanding of the basic function, activity, classification of microorganisms, microbiological quality of food products and food safety. The student will also obtain a good understanding of laboratory practices in food microbiology.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Examine and explain the theories and concepts of microorganisms in relationship with the factors that influence microbial growth, microorganisms in foods, food spoilage and food borne diseases.
2. Observe, predict, conduct, interpret and analyzed results of analysis in food microbiology.
3. Collaborate with team members in planning and performing a scientific inquiry.

CFB20703 Food Chemistry

Rationale for inclusion of the course in the program:

This course aimed to provide students with the knowledge of food and biochemistry with emphasis on the structure, properties and functions of water, carbohydrates, lipids, proteins, enzymes, vitamins, mineral, pigments and other food additives as well as regulatory control.

Learning Outcomes:

Upon completion of this course students should be able to:

Upon completion of the course, students should be able to:

1. Discuss the structure, properties and functions of major food constituents such as water, food macromolecules, vitamins, mineral, pigments and other food additives.
2. Perform laboratory experiment related to food chemistry and biochemistry.
3. Organize problem given in a form of mini project leading to plausible solution.
4. Organize with team members in performing and reporting a scientific project and experimental report.

CFB40503 Instrumental Food Analysis

Rationale for inclusion of the course in the program:

This course aimed to provide students the knowledge in modern laboratory management system, theory and application of instrumentation in testing of food materials.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Apply the principles and procedures for the laboratory management and instrumental analysis of food
2. Apply knowledge from this course when execute the actual analysis of food samples in the laboratory
3. Collaborate with team members in planning, performing and reporting a scientific inquiry/assignment related to instrumental analysis of food.

CFB30103 Food Sensory and Evaluation

Rationale for inclusion of the course in the program:

To provide students with the basic principles and requirements of sensory evaluation of food.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Explain the foundations of sensory function, threshold determination, colour and texture in evaluation of food.
2. Observe, conduct and discuss the appropriate techniques and methods that match the requirements of a sensory task including the use of sensory in marketing research.
3. Display the results of experiment by using appropriate statistical methods to guide product development and assure quality of food.
4. Discuss (in depth) with team members in planning and performing sensory test as a project.

CFB30104 Food Processing and Innovation

Rationale for inclusion of the course in the program:

To impart knowledge and technical skills in processing of various food products and to incorporate the technologies especially in development of new food products and simulated current test markets.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Explain the knowledge of principle of food processing techniques applied at low, ambient or high temperature and the effect of processing techniques towards food products/ingredients that important in developing new product.
2. Demonstrate the working principle of food processing equipment/machinery and the ability of handling and troubleshooting of the equipment/machinery.
3. Demonstrate with team members in planning, performing and reporting a scientific inquiry, practical and mini project in developing new food products.
4. Create the awareness of entrepreneurial resources and sustainability in develop a new food product.

CFB31003 Food Quality & Safety Management System

Rationale for inclusion of the course in the program:

To provide students with knowledge of quality assurance and quality control, requirement, implementation and audit in food industries as well as quality management system that commonly applied in food industries and provide students with the principles of food safety in food manufacturing as well as food legislations and standards.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Explain the importance of quality assurance and quality control in manufacturing of food products.
2. Relate international and national food law, food quality & hygiene standards and practices to the production of safe food products.
3. Demonstrate among team members the ability for self-directed learning and reflective practice in the work place through development of a model HACCP plan for a food industry.

CFB31103 Food Process Engineering

Rationale for inclusion of the course in the program:

To provide knowledge on the application of fluid mechanics, thermodynamics, heat and mass transfer, and chemical process principles to food processes. It incorporates the latest technologies and advances in a cohesive overview of all aspects of food process engineering and design of simple operations.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Evaluate the basic principles in food engineering processes such as heating, cooling, concentration, drying and etc. through given case studies or situation
2. Demonstrate the working principle of food processing engineering equipment/machinery and the ability of handling and troubleshooting of the equipment/machinery
3. Collaborate with team members in interpreting practical engineering problems associated with food process operations.
4. Perform an investigation of food processing engineering problems using data from relevant sources.

CFB30803 Halal Technology

Rationale for inclusion of the course in the program:

To provide students good understanding of Halal concept, implementation and monitoring by government agency, halal and current quality system and its integration. Exposed students with in-depth understanding to conduct analysis of certain non halal component in food.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Outline halal guidelines and its implementation according to Islamic law for food industry.
2. Perform analysis for the determination of non-halal substances with team members.
3. Discuss the current issues regarding halal as a system and practices in the food industry.

CFB40104 Food Plant Design

Rationale for inclusion of the course in the program:

To combine all experiences as an engineering technologist into a more coherent package and develop understanding of the engineering design process and the food industry. Sanitary principles will be introduced in the design process.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Describe the fundamentals engineering economics (i.e. time value of money, cash flow, return of investment), drafting and project budgeting.
2. Explain integrating design solutions for selection of food process operations and alternatives for a food processing plant.
3. Practice of ethical consequences in design aspect and ethical behaviour in line with professional code of conduct requirement.
4. Prepare a feasibility study or business plan on the food plant project.
5. Display the technical model for the selected food plant design professionally.

Co-Curriculum*

NO	COURSE CODE	COURSE	CREDIT	F2F				NON F2F	TOTAL SLT
				L	T	P	O		
1	MPU 3412	Career Guidance 2	2	17	6	2	4	51	80
2	MPU 3422	Community Service 2	2	17	0	0	12	51	80
3	MPU 3432	Culture 2	2	20	0	12	0	48	80
4	MPU 3442	Rakan Masjid 2	2	17	0	0	8	55	80
5	MPU 3452	Siswa-siswi Bomba & Penyelamat 2	2	17	0	20	0	43	80
6	MPU 3462	Siswa-siswi Pertahanan Awam 2	2	17	0	16	0	47	80
7	MPU 3472	Sports Management 2	2	17	0	16	0	47	80
8	MPU 3482	Personal Financial Management 2	2	17	0	18	3	42	80
9	MPU 3492	Askar Wataniah	2	17	0	23	0	40	80

Note :

1. ***Additional Module - MPU2213 Bahasa Kebangsaan A**
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ELECTIVE COURSES

CSB31103 Oil Palm Biomass Products
CJB30003 Palm Oil Technology 1
CJB40003 Palm Oil Technology 2
CJB30403 Product Formulation & Dosage Form
CJB30503 Product Development Process
CJB40203 Validation & Regulation of Pharmaceutical Product
CJB40303 Phytopharmaceutical Technology
CBB20503 Principles of Bioprocess Technology
CBB30303 Biomolecular Techniques
CBB30703 Enzyme Technology
CEB 31003 Environmental Microbiology
CJB30303 Aqua, Meat and Dairy Products

CEB31503 Environmental Toxicology and Public Health
CEB30203 Environmental Impact Assessment
CEB40603 Introduction to Renewable Energy

CJB40403 Management for Chemical Engineering Technologist
CJB40503 Marketing for Chemical Engineering Technologist
CJB40803 Chemical Engineering Technologist Organizational Behaviour

CRB40203 Rubber Engineering
CRB40503 Bio-Polymer

CSB31103 Oil Palm Biomass Products

Rationale for inclusion of the course in the program:

Provide students with knowledge and hands on skill in utilization of oil palm biomass to produce value added products such as biofuels and biobased chemicals by using thermochemical and biological conversion technologies.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Discuss the types of oil palm biomass, logistics and the processing technologies involved in the production of products.
2. Appraise various methods of oil palm biomass utilization for the production of value-added products.
3. Relate the overall oil palm biomass exploitation with sustainable development.

CJB30003 Palm Oil Technology 1

Rationale for inclusion of the course in the program:

To impart knowledge on the oil palm upstream activities consists of crop production, crude palm oil and palm kernel production.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Discuss the upstream processing technology in palm oil industry from nursery, plantations and palm oil mills.
2. Execute experimental activities associate with palm oil technology with correct techniques.
3. Develop potential products or modification process as entrepreneurship projects.

CJB 40003 Palm Oil Technology 2

Rationale for inclusion of the course in the program:

To impart knowledge on the palm oil refinery processes consists of properties of edible oils, common methods of extraction, refining, modification, usage and nutritional perspective. Furthermore, Malaysia is one of the major producer of palm oil which contributes half of global oils and fats market.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Discuss the properties of palm oil and its derivatives and refinery processing technology.
2. Execute experimental activities associate with refinery process of palm oil with correct techniques
3. Relate the overall oil palm industries with the need of sustainable development.

CJB30403 Product Formulation & Dosage Form

Rationale for inclusion of the course in the program:

This course will provide students with knowledge and hands on skill in formulating and designing different dosage forms of phytopharmaceutical products.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Decide the suitable product formulation and dosage forms based on physicochemical characteristics and biopharmaceutical information of the drug compound
2. Identify the product formulation and dosage forms that meets the requirements by the society
3. Perform the analytical and experimental skills to come out with the appropriate formulation and dosage forms

CJB 30503 Product Development Process

Rationale for inclusion of the course in the program:

This course will provide students with knowledge and hands on skill in developing and producing of phytopharmaceutical products.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Discuss the product development process, its quality and stability attributes and relevant standards and regulations.
2. Conduct experiment related to pharmaceutical product development and its relevant analysis.
3. Formulate new product development of high value herbal product.

CJB 40203 Validation & Regulation of Pharmaceutical Product

Rationale for inclusion of the course in the program:

This course will provide students with knowledge and hands on skill in preparing protocols and validating of pharmaceutical process.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Evaluate the validation process and compliance with regulations to decide the validity of pharmaceutical manufacturing process.
2. Performs the analysis for validation and compliance of the manufacturing process with regulations.
3. Prepare relevant documents to support validation and inspection process.

CJB40303 Phytopharmaceutical Technology

Rationale for inclusion of the course in the program:

The rationale is to impart knowledge on various types and form of phytopharmaceutical including product processing and quality control.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Design production line consisting of processing steps of phytopharmaceutical product and its quality assurance determination.
2. Perform selected product processing of phytopharmaceuticals including operating machineries involved in phytopharmaceuticals production.
3. Demonstrate the accomodation of knowledge and skill of phytopharmaceutical technology in solving certain industrial demand.

CBB20503 Principles of Bioprocess Technology

Rationale for inclusion of the course in the program:

This course will provide students with knowledge and hands on skill in bioprocess technology in order to exploit microbial, plant and animal cell systems as products of valuable commodities.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Describe the principles of bioprocess engineering technology.
2. Demonstrate ability to work in team either as a leader or ordinary member.
3. Execute experimental activities associate with bioprocess engineering technology.
4. Perform purification process with appropriate equipment and techniques.

CBB30303 Biomolecular Techniques

Rationale for inclusion of the course in the program:

This is an intermediate level course aimed at providing and emphasis on cell and molecular biology concepts. These concepts are essential since the students will encounter these at higher level. This is to produce capable graduates equipped with both knowledge and skills in molecular biology.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Infer the fundamental and advance knowledge in biomolecular techniques.
2. Perform biomolecular techniques and methodologies based on the theory learned.
3. Demonstrate competency in presenting information in verbal and written forms which encompasses a critical analysis of findings (CTPS).
   .

CBB30703 Enzyme Technology

Rationale for inclusion of the course in the program:

This course will provide relevant principle or theory of enzymology and techniques use in enzyme application.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Develop an understanding of enzyme fundamentals and attribute these knowledge in the applications of enzymes.
2. Conduct the experimental work on enzymatic activity assay, enzyme production and purification as well as carry out immobilization of an enzyme.
3. Discuss the applications of enzyme technology towards production high value products.

CEB31003 Environmental Microbiology

Rationale for inclusion of the course in the program:

This course will provide an overview of the important microbes involved in environmental microbiology including the detection and monitoring approach.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Interpret the principles and characteristics on microorganisms in environment.
2. Perform the methods used in screening and identification of environmental microorganisms.
3. Demonstrate understanding on the impact of environmental microbiology towards sustainable development.

CJB30303 Aqua, Meat and Dairy Products

Rationale for inclusion of the course in the program:

The rationale is to impart knowledge on various types and form of phytopharmaceutical including product processing, machinery and equipment and quality control.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Discuss the technology used in aquaculture, meat and poultry, and dairy products.
2. Perform the handling, dressing and storage of poultry as well as the milk processing techniques and dairy products.
3. Demonstrate the knowledge to solve problem or improve technology in manufacturing product sustainability.

CEB31503 Environmental Toxicology and Public Health

Rationale for inclusion of the course in the program:

The goals of this course is to develop an understanding of toxicological principles and their application to both human and ecological risk assessment as they pertain to environmental cleanup. The principle and methodologies for risk assessment will be presented within the context of state and federal environmental regulation.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Develop the concepts and components of toxicology and types of environmental risk and analysis.
2. Relate the concept and components of toxicology and risk assessment to real-life example.
3. Demonstrate the ability to work in a team.

CEB30203 Environmental Impact Assessment

Rationale for inclusion of the course in the program:

To provide students with the knowledge of the current practices and policies pertaining to the development, implementation and maintenance of environmental management system (EMS) in an organization. ISO standards will be examined and case studies will be used to highlight the key factors involved with EMS implementation. The process of assessing environmental impacts and aspects and implementing continuous improvement measured will be addressed. Comparable Environmental Quality Act (EQA) 1974 will be examined to reinforce management system concepts.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Analyze the concept, application and legislation of environmental impact assessment
2. Perform an environmental impact assessment report in accordance to the standard requirement
3. Measure the environmental impacts due to differing types of development projects
4. Analyze and make decision with problem regarding on environmental impact.

CEB40603 Introduction to Renewable Energy

Rationale for inclusion of the course in the program:

This is an introductory course aiming to provide students with a basic understanding of renewable energy technology, the current and forecasted energy requirement scenarios and the roles of renewable energies in Malaysia.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Analyse the sources of renewable energy and the means by which the sources can be exploited for energy generation.
2. Demonstrate the ability to work in team and communicate effectively.
3. Deliver their opinions on issues relating the renewable energy based on oral or written.

CJB40403 Management for Chemical Engineering Technologist

Rationale for inclusion of the course in the program:

This course is aimed at providing students with the knowledge for the student to use in workplace. Management is the process of managing several related projects, often with the intention of improving an organization's performance. In practice and in its aims it is often closely related to systems engineering. In today's global and fast paced business environment, success on complex projects cannot be guaranteed by technical competence alone. These environments require reality based project management skills and expertise. Budget constrained, schedule critical chemical engineering projects, often executed by virtual teams operating from different parts of the world, require team based project planning to guarantee success.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Explain the basic management functions and process, as well as the management terms and concepts.
2. Discuss the managerial decision process globally and culturally.
3. Justify the interactions among communications and management practice.
4. Practise the applications of management in the workplace of chemical engineering technology and society.

CJB40503 Marketing for Chemical Engineering Technologist

Rationale for inclusion of the course in the program:

This is an introductory course in marketing for chemical engineers which covers the basic principles of marketing. This course provides knowledge for the student to examine the role and practice of marketing.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Explain the social functions of marketing, market role in product design and consumers' decision.
2. Compare the difference between sales and market orientation and their importance for marketing performance.
3. Analyze the need market segmentation, market targeting, market positioning, product distribution through various channels.
4. Recognize pricing strategies and best practice in promotion strategies.

CJB40803 Chemical Engineering Technologist Organizational Behaviour

Rationale for inclusion of the course in the program:

This course serves as an introduction to the field of organizational behaviour. It is designed to expose students to the fundamental principles with which to understand human behaviour inside public organizations. The course examines various theories developed in an attempt to explain and predict employee behaviour in an organizational context.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Demonstrate the knowledge of behavioural aspects in management, concept of an organization's corporate culture and its effects on the behavior of individuals and groups in organizations.
2. Demonstrate the abilities to develop reasonable solutions to organizational behavior problems using appropriate facts, concepts, principles, analytic techniques, and theories from this organizational behavior course.
3. Demonstrate the understanding of relation between behavioural aspects in management towards management, business practices and technopreneurial competencies.

CRB40203 Rubber Engineering

Rationale for inclusion of the course in the program:

This course aimed to provide students information of rubber applications; included the mathematical concept in rubber engineering. Force deformation and dynamic mechanical behaviour of rubbers will also be covered.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Calculate rubber performance using suitable mathematical equations
2. Summarize bulk properties, effect of shape factor, lamination, static and dynamic force deformations of rubber
3. Correlate applications of rubber to its bulk properties and force deformation
4. Demonstrate ability to work in a team in completing assignment in the area of rubber engineering.

CRB 40503 Bio-polymer

Rationale for inclusion of the course in the program:

This course is aimed at introducing students to the advantages and applications of biopolymer in the bio system industry. An advanced introduction to the importance of bio based plastics in pharmaceutical and biomedical application will be imparted during the course.

Learning Outcomes:

Upon completion of this course students should be able to:

1. Appraise between polymeric, bio-polymeric materials and the functions of additives in products.
2. Summarize the functions of bio-polymer materials in pharmaceutical and biomedical applications.
3. Organize suitable preparation of various laboratory works in safely manner.
4. Work effectively as individuals and team member.