

STUDY SCHEME 2016-2020					
BACHELOR OF CHEMICAL ENGINEERING					
Department of Chemical and Environmental Engineering					
Faculty of Engineering, Universiti Putra Malaysia					
FIRST SEMESTER			SECOND SEMESTER		
CODE	COURSE	CREDIT	CODE	COURSE	CREDIT
YEAR 1					
ECH3101	Material Science	3(3+0)	ECH3115	Energy Balance	3(2+1)
ECH3114	Material Balance	3(2+1)	ECC3012	Engineering Mathematics II	3(3+0)
ECC3011	Engineering Mathematics I	3(3+0)	EMM3213	Thermodynamics I	3(3+0)
EMM3305	Fluid Mechanics I	3(3+0)	CHM3010	Physical and Inorganic Chemistry	4(3+1)
SKP2101	Malaysian Nationhood	3(3+0)	LPE2301	Academic Interaction and Presentation	3(2+1)
QKXXXXXX	Co-curriculum with credit	1(0+1)	QKXXXXXX	Co-curriculum with credit	1(0+1)
TOTAL		17	TOTAL		17
YEAR 2					
ECH3116	Heat and Mass Transfer Processes	4(4+0)	ECH3120	Chemical Engineering Thermodynamics	3(3+0)
ECH3902	Chemical Engineering Laboratory I	1(0+1)	ECH3117	Unit Operation	3(3+0)
ECH3907	Computer Aided Chemical Engineering Drawing	3(1+2)	ECH3119	Numerical Method and Optimisation Process	3(2+1)
CHM3201	Organic Chemistry I	4(3+1)	ECH3705	Integrated Project	1(0+1)
EMM3103	Statics	3(3+0)	ECH3904	Chemical Engineering Laboratory II	1(0+1)
SKP2204	Ethnic Relations	2(2+0)	ECC3014	Engineering Statistics	3(3+0)
			LPE2501	Academic Writing	3(2+1)
TOTAL		16	TOTAL		17
YEAR 3					
ECH3121	Process Control and Instrumentation	4(3+1)	ECH3501	Pollution Control Engineering	3(3+0)
ECH3118	Physical Separation Processes	3(3+0)	ECH3602	Safety and Risk Assessment	3(3+0)
ECH3201	Biochemical Engineering	3(2+1)	ECH3706	Process and Plant Design	4(2+2)
ECH3603	Project Development and Management	3(3+0)	ECH3905	Chemical Engineering Laboratory III	1(0+1)
ECH3704	Chemical Engineering Reaction Kinetics	3(3+0)	ECV3011	Engineers and Society	3(2+1)
ECH3903	Material Engineering Laboratory	1(0+1)	ECH3604	Hazard and Operability Studies	3(3+0)
TOTAL		17	TOTAL		17
YEAR 4					
ECH4901	Industrial Training*	5(0+5)	ECH4949B	Bachelor's Project	4(0+4)
ECH4949A	Bachelor's Project	2(0+2)	ECH4305	Process and Product Engineering	3(3+0)
EXX4XXX	Elective I	3(3+0)	EXX4XXX	Elective II	3(3+0)
ECH4947	Plant Design Project	4(0+4)	EXX4XXX	Elective III	3(3+0)
SKP2203	Islamic Civilisation and Asian Civilisation	2(2+0)	PRT2008	Agriculture and Man	2(2+0)
ECH4306	Process Design and Integration	3(3+0)			
TOTAL		19	TOTAL		15
TOTAL CREDIT					135

*ECH4901 Industrial Training is conducted for 10 weeks during semester break of Second Semester, Year 3.

SELECTION OF ELECTIVE COURSES

Students must choose one out of the four options offered and required to take only three (3) elective courses from the selected option. The proposed selection of elective courses for each option are as follows:

CODE	COURSE	CREDIT
OPTION PROCESS ENGINEERING		
ECH4202	Bioreactor Engineering Design	3(3+0)
ECH4303	Petroleum and Natural Gas Engineering	3(3+0)
ECH4304	Advanced Fluid Mechanics for Chemical Engineers	3(3+0)
ECH4305	Process Design and Integration	3(3+0)
ECH4306	Process and Product Engineering	3(3+0)
EPF4608	Palm Oil Processing	3(3+0)
OPTION ENVIRONMENTAL ENGINEERING		
ECH4501	Management and Utilisation of Waste	3(3+0)
ECH4503	Air Pollution Engineering	3(3+0)
ECH4504	Solid Waste Engineering	3(3+0)
ECH4505	Green Engineering	3(3+0)
ECH4506	Renewable Energy	3(3+0)
ECH4507	Water Engineering	3(2+1)
ECH4508	Wastewater Engineering	3(3+0)
ECH4509	Toxic and Hazardous Waste Management	3(3+0)
OPTION BIOCHEMICAL ENGINEERING		
ECH4201	Recovery Process	3(3+0)
ECH4202	Bioreactor Engineering Design	3(3+0)
ECH4203	Fermentation Technology	3(3+0)
ECH4204	Pharmaceutical Engineering	3(3+0)
ECH4205	Product Design and Safety	3(3+0)
ECH4501	Management and Utilisation of Waste	3(3+0)
ECH4505	Green Engineering	3(3+0)
OPTION MATERIAL SCIENCE AND ENGINEERING		
ECH4401	Polymer Engineering	3(3+0)
ECH4402	Particle Technology	3(3+0)
ECH4404	Nanomaterials Processing	3(3+0)
ECH4405	Electrochemical Engineering	3(3+0)
ECH4406	Materials Analysis	3(3+0)
EMM4404	Fabrication and Characterization of Composite Materials	3(3+0)

4. LIST OF COURSES AND PREREQUISITE

General Courses				
No.	Course Code	Course Name	Credit	Pre requisite
1.	LPE2301	Academic Interaction and Presentation	3(2+1)	BBI2422/ CEL102
2.	LPE2501	Academic Writing	3(2+1)	LPE2301
3.	PRT2008	Agriculture and Man	2(2+0)	-
4.	SKP2101	Malaysian Nationhood	3(3+0)	-
5.	SKP2203	Islamic Civilisation and Asian Civilisation	2(2+0)	-
6.	SKP2204	Ethnic Relations	2(2+0)	-
7.	ECC3011	Engineering Mathematics I	3(3+0)	-
8.	ECC3012	Engineering Mathematics II	3(3+0)	ECC3011
9.	ECC3014	Engineering Statistics	3(3+0)	-
10.	ECV3011	Engineers and Society	3(2+1)	-
11.	EMM3103	Statics	3(3+0)	-
12.	EMM3213	Thermodynamics I	3(3+0)	-
13.	EMM3305	Fluid Mechanics I	3(3+0)	-

Core Courses				
No.	Course Code	Course Name	Credit	Pre requisite
1.	ECH3101	Material Science	3(3+0)	-
2.	ECH3120	Chemical Engineering Thermodynamics	3(3+0)	EMM3213
3.	ECH3121	Process Control and Instrumentation	4(3+1)	ECC3012 and ECH3119
4.	ECH3114	Material Balance	3(2+1)	-
5.	ECH3115	Energy Balance	3(2+1)	ECH3114
6.	ECH3116	Heat and Mass Transfer Processes	4(4+0)	-
7.	ECH3117	Unit Operation	3(3+0)	ECH3114
8.	ECH3118	Physical Separation Processes	3(3+0)	-
9.	ECH3119	Numerical Method and Optimisation Process	3(2+1)	ECC3011
10.	ECH3201	Biochemical Engineering	3(2+1)	-
11.	ECH3501	Pollution Control Engineering	3(3+0)	-
12.	ECH3602	Safety and Risk Assessment	3(3+0)	-
13.	ECH3603	Project Development and Management	3(3+0)	-
14.	ECH3604	Hazard and Operability Studies	3(3+0)	-
15.	ECH3702	Process and Plant Design	4(2+2)	ECH3117
16.	ECH4947	Plant Design Project	4(0+4)	ECH3706
17.	ECH3704	Chemical Engineering Reaction Kinetics	3(3+0)	ECH3114
18.	ECH3705	Integrated Project	1(0+1)	ECH3115

19.	ECH3902	Chemical Engineering Laboratory I	1(0+1)	-
20.	ECH3903	Material Engineering Laboratory	1(0+1)	-
21.	ECH3904	Chemical Engineering Laboratory II	1(0+1)	ECH3902
22.	ECH3905	Chemical Engineering Laboratory III	1(0+1)	ECH3904
23.	ECH3907	Computer Aided Chemical Engineering Drawing	3(1+2)	-
24.	ECH4901	Industrial Training	5(0+5)	Student must complete 6 semesters of study
25	ECH4949	Bachelor's Project	6(0+6)	Final year student
26	CHM3010	Physical and Inorganic Chemistry	4(3+1)	-
27	CHM3201	Organic Chemistry I	4(3+1)	CHM2000

Elective Courses				
No.	Course Code	Course Name	Credit	Pre requisite
1.	ECH4201	Recovery Process	3(3+0)	-
2.	ECH4202	Bioreactor Engineering Design	3(3+0)	-
3.	ECH4203	Fermentation Technology	3(3+0)	-
4.	ECH4204	Pharmaceutical Engineering	3(3+0)	-
5.	ECH4205	Product Design and Safety	3(3+0)	-
6.	ECH4303	Petroleum and Natural Gas Engineering	3(3+0)	-
7.	ECH4304	Advanced Fluid Mechanics for Chemical Engineers	3(3+0)	EMM3305
8.	ECH4305	Process Design and Integration	3(3+0)	ECH3116
9.	ECH4306	Process and Product Engineering	3(3+0)	-
10.	ECH4401	Polymer Engineering	3(3+0)	-
11.	ECH4402	Particle Technology	3(3+0)	-
12.	ECH4404	Nanomaterials Processing	3(3+0)	-
13.	ECH4405	Electrochemical Engineering	3(3+0)	-
14.	ECH4406	Materials Analysis	3(3+0)	-
15.	ECH4501	Management and Utilisation of Waste	3(3+0)	-
16.	ECH4503	Air Pollution Engineering	3(3+0)	-
17.	ECH4504	Solid Waste Engineering	3(3+0)	-
18.	ECH4505	Green Engineering	3(3+0)	-
19.	ECH4506	Renewable Energy	3(3+0)	-
20.	ECH4507	Water Engineering	3(2+1)	-

21.	ECH4508	Wastewater Engineering	3(3+0)	-
22.	ECH4509	Toxic and Hazardous Waste Management	3(3+0)	-
23.	EMM4404	Fabrication and Characterization of Composite Materials	3(3+0)	-
24.	EPF4608	Palm Oil Processing	3(3+0)	-