

CURICULUM STRUCTURE 2016-2020					
BACHELOR OF CHEMICAL ENGINEERING					
Department of Chemical and Environmental Engineering					
Faculty of Engineering, Universiti Putra Malaysia					
SEMESTER I			SEMESTER 2		
CODE	COURSE NAME	CREDIT	CODE	COURSE NAME	CREDIT
<b>YEAR 1</b>					
ECH3101	Material Science	3(3+0)	ECH3115	Energy Balance	3(2+1)
ECH3114	Material Balances	3(2+1)	ECC3002	Engineering Mathematics II	3(3+0)
ECC3001	Engineering Mathematics I	3(3+0)	EMM3305	Fluid Mechanics	3(3+0)
CHM3010	Physical and Inorganic Chemistry	4(3+1)	CHM3201	Organic Chemistry I	4(3+1)
SKP2101	Malaysian Nationhood	3(3+0)	BBI2423	Academic Interaction and Presentation	3(2+1)
QXXXXXX	Co-curriculum with credit	1(0+1)	QXXXXXX	Co-curriculum with credit	1(0+1)
<b>TOTAL</b>		<b>17</b>	<b>TOTAL</b>		<b>17</b>
<b>YEAR 2</b>					
ECH3116	Heat and Mass Transfer Processes	4(4+0)	ECH3108	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)
EMM3213	Thermodynamics I	3(3+0)	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)	ECC3004	Engineering Statistics	3(3+0)
			BBI2424	Academic Writing	3(2+1)
<b>TOTAL</b>		<b>16</b>	<b>TOTAL</b>		<b>17</b>
<b>YEAR 3</b>					
ECH3112	Process Control and Instrumentation	4(3+1)	ECH3602	Safety and Risk Assessment	3(3+0)
ECH3118	Separation Processes	3(3+0)	ECH3702	Process and Plant Design	4(2+2)
ECH3201	Biochemical Engineering	3(2+1)	ECH3905	Chemical Engineering Laboratory III	1(0+1)
ECH3603	Project Development and Management	3(3+0)	ECH3501	Pollution Control Engineering	3(3+0)
ECH3704	Reaction Kinetics and Reactor Design	3(3+0)	ECV3001	Engineers and Society	3(2+1)
ECH3903	Material Engineering Laboratory	1(0+1)	SKP2203	Islamic Civilization and Asian Civilization	2(2+0)
<b>TOTAL</b>		<b>17</b>	<b>TOTAL</b>		<b>16</b>
<b>YEAR 4</b>					
ECH4901	Industrial Training *	5(0+5)	ECH4949B	Bachelor Project	4(0+4)
ECH4949A	Bachelor Project	2(0+2)	EXX4XXX	Elective I	3(3+0)
ECH3604	Hazard Analysis and Operability Studies	3(3+0)	EXX4XXX	Elective II	3(3+0)
ECH3703	Plant Design Project	4(0+4)	EXX4XXX	Elective III	3(3+0)
PRT2008	Agriculture and Man	2(2+0)			
<b>TOTAL</b>		<b>16</b>	<b>TOTAL</b>		<b>13</b>
<b>TOTAL CREDIT</b>					<b>129</b>

\* ECH4901 Industrial Training is conducted for 10 weeks during holiday after the end of second semester of the 3<sup>rd</sup> year

## ELECTIVE COURSES OPTIONS

Students must choose one of the four options offered and only take three (3) elective courses from the same option group. Suggestion of the courses are as follows:

KOD	KURSUS	KREDIT
<b>OPSYEN KEJURUTERAAN PROSES</b>		
ECH4202	Bioreactor Engineering Design	3(3+0)
ECH4303	Oil and 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)
EPP4608	Palm Oil Processing	3(3+0)
<b>OPSYEN KEJURUTERAAN ALAM SEKITAR</b>		
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)
<b>OPSYEN KEJURUTERAAN BIODIVERSITI</b>		
ECH4201	Recovery Processes	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)
<b>OPSYEN KEJURUTERAAN DAN SAINS BAHAN</b>		
ECH4401	Polymer Engineering	3(3+0)
ECH4402	Particle Technology	3(3+0)
ECH4404	Nanomaterial Processing	3(3+0)
ECH4405	Kejuruteraan Elektrokimia	3(3+0)
ECH4406	Material Analysis	3(3+0)
EMM4404	Fabrication and Characterisation of Composite Material	3(3+0)

No	Course Code	Course Name	Credit	Pre-requisites
1.	BBI2423	<i>Academic Interaction and Presentation</i>	3(2+1)	BBI2422/ CEL102
2.	BBI2424	<i>Academic Writing</i>	3(2+1)	BBI2423
3.	PRT2008	Agriculture and Man	2(2+0)	None
4.	SKP2101	Malaysian Nationhood	3(3+0)	None
5.	SKP2203	Islamic Civilization and Asian Civilization	2(2+0)	None
6	SKP2204	Ethnic Relations	2(2+0)	None
7.	CHM3010	Physical and Inorganic Chemistry	4(3+1)	None
8.	CHM3201	Organic Chemistry I	4(3+1)	Chemistry at STPM/ Matriculation/ equivalent
9.	ECC3001	Engineering Mathematics I	3(3+0)	None
10.	ECC3002	Engineering Mathematics II	3(3+0)	ECC3001
11.	ECC3004	Engineering Statistics	3(3+0)	None
12.	EMM3213	Thermodynamics I	3(3+0)	None
13.	EMM3305	Fluid Mechanics	3(3+0)	None
14.	EMM3103	Statics	3(3+0)	None
15.	ECV3001	Engineers and Society	3(2+1)	None
16.	ECH3114	Material Balances	3(2+1)	None
17.	ECH3115	Energy Balance	3(2+1)	ECH3114
18.	ECH3116	Heat and Mass Transfer Processes	4(4+0)	None
19.	ECH3117	Unit Operation	3(3+0)	ECH3114
20.	ECH3119	Numerical Method and Optimisation Process	3(2+1)	ECC3001
21.	ECH3604	Hazard Analysis and Operability Studies	3(3+0)	None
22.	ECH3704	Reaction Kinetics and Reactor Design	3(3+0)	ECH3114
23.	ECH3705	Integrated Project	1(0+1)	ECH3115
24.	ECH3907	Computer Aided Chemical Engineering Drawing	3(1+2)	None
25.	ECH3101	Material Science	3(3+0)	None
26.	ECH3108	Chemical Engineering Thermodynamics	3(3+0)	EMM3213
27.	ECH3112	Process Control and Instrumentation	4(3+1)	ECC3002
28.	ECH3118	Separation Processes	3(3+0)	None
29.	ECH3201	Biochemical Engineering	3(2+1)	None
30.	ECH3501	Pollution Control Engineering	3(3+0)	None
31.	ECH3602	Safety and Risk Assessment	3(3+0)	None
32.	ECH3603	Project Development and Management	3(3+0)	None
33.	ECH3702	Process and Plant Design	4(2+2)	ECH3117
34.	ECH3703	Plant Design Project	4(0+4)	ECH3702
35.	ECH3902	Chemical Engineering Laboratory I	1(0+1)	None
36.	ECH3903	Material Engineering Laboratory	1(0+1)	None
37.	ECH3904	Chemical Engineering Laboratory II	1(0+1)	ECH3902
38.	ECH3905	Chemical Engineering Laboratory III	1(0+1)	ECH3904
39.	ECH4901	Industrial Training	5(0+5)	The completion of 6 semesters
40.	ECH4949	Bachelor Project	6(0+6)	Final year students

41.	ECH4201	Recovery Processes	3(3+0)	None
42.	ECH4202	Bioreactor Engineering Design	3(3+0)	None
43.	ECH4203	Fermentation Technology	3(3+0)	None
44.	ECH4204	Pharmaceutical Engineering	3(3+0)	None
45.	ECH4205	Product Design and Safety	3(3+0)	None
46.	ECH4303	Oil and Gas Engineering	3(3+0)	None
47.	ECH4304	Advanced Fluid Mechanics for Chemical Engineers	3(3+0)	EMM3305
48.	ECH4305	Process Design and Integration	3(3+0)	ECH3116
49.	ECH4306	Process and Product Engineering	3(3+0)	None
50.	ECH4401	Polymer Engineering	3(3+0)	None
51.	ECH4402	Particle Technology	3(3+0)	None
52.	ECH4404	Nanomaterial Processing	3(3+0)	None
53.	ECH4405	Kejuruteraan Elektrokimia	3(3+0)	None
54.	ECH4406	Material Analysis	3(3+0)	None
55.	ECH4501	Management and Utilisation of Waste	3(3+0)	None
56.	ECH4503	Air Pollution Engineering	3(3+0)	None
57.	ECH4504	Solid Waste Engineering	3(3+0)	None
58.	ECH4505	Green Engineering	3(3+0)	None
59.	ECH4506	Renewable Energy	3(3+0)	None
60.	ECH4507	Water Engineering	3(2+1)	None
61.	ECH4508	Wastewater Engineering	3(3+0)	None
62.	ECH4509	Toxic and Hazardous Waste Management	3(3+0)	None
63.	EMM4404	Fabrication and Characterisation of Composite Material	3(3+0)	None
64.	EPF4608	Palm Oil Processing	3(3+0)	None