

STUDY SCHEME 2016-2020 BACHELOR OF CHEMICAL ENGINEERING WITH HONOURS					
Department of Chemical and Environmental Engineering					
Faculty of Engineering, Universiti Putra Malaysia					
FIRST SEMESTER			SECOND SEMESTER		
CODE	COURSE	CREDIT	CODE	COURSE	CREDIT
<b>YEAR 1 (2020 – 2021)</b>					
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)
<b>TOTAL</b>		<b>16</b>	<b>TOTAL</b>		<b>14</b>
<b>YEAR 2 (2021 – 2022)</b>					
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)
SKP3122	Internalization of Ethics and Civilization	2(2+0)	ECC3014	Engineering Statistics	3(3+0)
			LPE2501	Academic Writing	3(2+1)
<b>TOTAL</b>		<b>17</b>	<b>TOTAL</b>		<b>17</b>
<b>YEAR 3 (2022 – 2023)</b>					
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)	ECV3001	Engineers and Society	3(2+1)
ECH3903	Material Engineering Laboratory	1(0+1)	ECH3604	Hazard and Operability Studies	3(3+0)
<b>TOTAL</b>		<b>17</b>	<b>TOTAL</b>		<b>17</b>
<b>YEAR 4 (2023 – 2024)</b>					
ECH4901	Industrial Training*	5(0+5)	ECH4949B	Bachelor's Project	4(0+4)
ECH4949A	Bachelor's Project	2(0+2)	ECH4306	Process and Product Engineering	3(3+0)
SKP3112	Philosophy and Current Issues	2(2+0)	EXX4XXX	Elective II	3(3+0)
ECH4947	Plant Design Project	4(0+4)	EXX4XXX	Elective III	3(3+0)
EXX4XXX	Elective I	3(3+0)	PRT2009	Agriculture and Man	2(1+1)
ECH4305	Process Design and Integration	3(3+0)			
<b>TOTAL</b>		<b>19</b>	<b>TOTAL</b>		<b>15</b>
<b>TOTAL CREDIT</b>					<b>135</b>

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

List of Technical Elective Courses According to Options

CODE	COURSE	CREDIT
<b>OPTION PROCESS ENGINEERING</b>		
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)
ECH4308	Advanced Process Control	3(3+0)
EPF4608	Palm Oil Processing	3(3+0)
<b>OPTION ENVIRONMENTAL ENGINEERING</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>OPTION BIOCHEMICAL ENGINEERING</b>		
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)
<b>OPTION MATERIAL SCIENCE AND ENGINEERING</b>		
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)

**PRE REQUISITE**

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.	PRT2009	Agriculture and Man	2(1+1)	None
4.	SKP2101	Malaysian Nationhood	3(3+0)	None
5.	SKP3122	Internalization of Ethics and Civilization	2(2+0)	None
6.	SKP3112	Philosophy and Current Issues	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.	ECC3011	Engineering Mathematics I	3(3+0)	None
10.	ECC3012	Engineering Mathematics II	3(3+0)	ECC3011
11.	ECC3014	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 Balance	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)	ECC3011
21.	ECH3604	Hazard Analysis and Operability Studies	3(3+0)	None
22.	ECH3704	Chemical Engineering Reaction Kinetics	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.	ECH3120	Chemical Engineering Thermodynamics	3(3+0)	EMM3213
27.	ECH3121	Process Control and Instrumentation	4(3+1)	ECC3012
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.	ECH4947	Process and Plant Design	4(2+2)	ECH3117
34.	ECH3703	Plant Design Project	4(0+4)	ECH3706
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 ECH4949A – Sem 1 ECH4949B – Sem 2	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.	EPF4608	Palm Oil Processing	3(3+0)	None