

**CURRICULUM STRUCTURE 2011-2015
BACHELOR OF ENGINEERING (CHEMICAL)**

**Department of Chemical and Environmental Engineering
Faculty of Engineering, Universiti Putra Malaysia**

C - Credit, L -Lecture, P - Practical

Semester I					Semester II				
CODE	COURSE NAME	C	L	P	CODE	COURSE NAME	C	L	P
Year 1									
ECH 3101	Materials Science	3	3	0	ECH 3103	Fluid Mechanics for Chemical Engineers	3	3	0
ECH 3102	Chemical Process Principles	3	3	0	ECH 3107	Thermodynamics	3	3	0
ECC 3001	Engineering Mathematics I	3	3	0	ECC 3002	Engineering Mathematics II	3	3	0
BBI 2420	Oral Interaction Skills	3	2	1	CHM 3201	Organic Chemistry I	4	3	1
CHM 3010	Physical and Inorganic Chemistry	4	3	1	EMM 3102	Statics	2	2	0
Q** ***1	Co-curriculum with credit	1	0	1	SKP 2203	Islamic Civilization and Asian Civilization	2	2	0
Credit		17	14	3	Credit		17	16	1
Year 2									
BBI 2421	General Writing Skills	3	2	1	ECH 3701	Reaction Kinetics and Reactor Design	4	4	0
ECH 3113	Heat Transfer Processes	3	3	0	ECH 3110	Unit Operation II	3	3	0
ECH 3109	Unit Operation I	3	3	0	ECH 3904	Chemical Engineering Laboratory II	1	0	1
ECH 3902	Chemical Engineering Laboratory I	1	0	1	EEE 3100	Electrical and Electronic Technology	3	2	1
ECH 3906	Computer Aided Chemical Engineering	2	0	2	ECH 3111	Process Optimization and Simulation	4	3	1
ECH 3108	Chemical Engineering Thermodynamics	3	3	0	SKP2101	Malaysian Nationhood	3	3	0
SKP 2204	Ethnic Relations	2	2	0					
Credit		17	13	4	Credit		18	15	3
Year 3									
ECH 3112	Process Control and Instrumentation	4	3	1	ECC 3004	Engineering Statistics	3	3	0
ECH 3201	Biochemical Engineering	3	2	1	ECH 3602	Safety and Risk Assessment	3	3	0
ECH 3603	Project Development and Management	3	3	0	ECH 3903	Material Engineering Laboratory	1	0	1
ECH 3905	Chemical Engineering Laboratory III	1	0	1	ECH 3702	Process and Plant Design	4	2	2
ECH 4402	Particle Technology	3	3	0	ECH 3501	Pollution Control Engineering	3	3	0
PRT 2008	Agriculture and Man	2	2	0	ECV 3001	Engineers and Society	3	2	1
Credit		16	13	3	Credit		17	13	4
Year 4									
ECH 3703	Plant Design Project	4	0	4	MGM 3180	Basic Entrepreneurship	3	3	0
ECH 4999	Final Year Academic Project	2	0	2	ECH 4999	Final Year Academic Project	4	0	4
ECH 49012	Industrial Training 2	5	0	5	E** 4***3	Technical Elective III	3	3	0
E** 4***3	Technical Elective I	3	3	0	E** 4***3	Technical Elective IV	3	3	0
E** 4***3	Technical Elective II	3	3	0	Q** ***1	Co-curriculum with credit	1	0	1
Credit		17	6	11	Credit		14	9	5

NOTE :

- ¹ Credit co-curriculum courses to be taken any time during the 4-year program.
- ² ECH 4901 (Industrial Training) conducted for 10 weeks during holiday after the end of the second semester of the 3rd year.
- ³ ECH 4*** (Technical Elective) based on the Option chosen. Which Options or elective courses are offered is dependent of the needs of the moment.

Total Credit (Course)	128
Industrial Training	5
Total Credit ³	133

OPTION COURSES BACHELOR OF ENGINEERING (CHEMICAL)

Option courses are designed to meet programme objective objectives of the program number 3 and 4 which are to provide graduate that can competes and work in international standard industry or in research institution and development. Students choose this course offered by the option. This option was offered on the areas of focus (niche area) that identified as potential in the chemical engineering industry.

Student need to choose one from four options and only take technical elective course that offering in the option structure such as that listed in following table:

A. PROCESS ENGINEERING OPTION

Semester I					Semester II				
CODE	COURSE NAME	C	L	P	CODE	COURSE NAME	C	L	P
ECH 4202	Bioreactor Engineering Design	3	3	0	ECH 4306	Process and Product Engineering	3	3	0
ECH 4304	Advanced Fluid Mechanics for Chemical Engineers	3	3	0	ECH 4303	Oil and Gas Engineering	3	3	0
ECH 4305	Process Design and Integration	3	3	0	EPF 4707	Palm Oil Processing	3	3	0

B. ENVIRONMENTAL ENGINEERING OPTION

Semester I					Semester II				
CODE	COURSE NAME	C	L	P	CODE	COURSE NAME	C	L	P
ECH 4501	Management and Utilization of Waste	3	3	0	ECH 4504	Solid Waste Engineering	3	3	0
ECH 4507	Water Engineering	3	2	1	ECH 4505	Green Engineering	3	3	0
ECH 4503	Air Pollution Engineering	3	3	0	ECH 4506	Renewable Energy	3	3	0
ECH 4509	Toxic and Hazardous Waste Management	3	3	0	ECH 4508	Wastewater Engineering	3	3	0

C. BIOCHEMICAL ENGINEERING OPTION

Semester I					Semester II				
CODE	COURSE NAME	C	L	P	CODE	COURSE NAME	C	L	P
ECH 4203	Fermentation Technology	3	3	0	ECH 4202	Bioreactor Engineering Design	3	3	0
ECH 4501	Management and Utilization of Waste	3	3	0	ECH 4201	Recovery Processes	3	3	0
ECH 4505	Green Engineering	3	3	0	ECH 4205	Product Design and Safety	3	3	0
ECH 4204	Pharmaceutical Engineering	3	3	0					

D. MATERIAL SCIENCE AND ENGINEERING OPTION

Semester I					Semester II				
CODE	COURSE NAME	C	L	P	CODE	COURSE NAME	C	L	P
ECH 4404	Nanomaterials Processing	3	3	0	ECH 4405	Electrochemical Engineering	3	3	0
ECH 4401	Polymer Engineering	3	3	0	ECH 4406	Materials Analysis	3	3	0
EMM 4404	Fabrication and Characterization of Composite Materials	3	3	0	EMM 4302	Tribology	3	3	0