

## **Chemical Engineering BSc guidance plan**

### **Introductory Statement**

Chemical engineering BSc course is five years course, and then this course leading to the award of BSc. It includes all the core course units, as well as developing skills such as problem-solving, communication and working in teams. All the chemical engineering subjects that employers will be looking for are covered.

### **Chemical engineering vision/aims**

Chemical engineering addresses many of the world's greatest challenges faced by society in areas such as energy, environment, health, water and food. Our team of academics is at the forefront of their fields and will educate you in core chemical engineering subjects, along with chemical engineering practice and design.

Student will have the chance to learn advanced chemical engineering topics such as design, processes and product formulation. Studying a chemical engineering degree at Mutah will provide students with the fundamental concepts and new skills used by the modern chemical engineer.

Studying at Mutah will give the student the knowledge and experience need to begin his/her career in this highly valued profession and make a real impact in the field of chemical engineering.

### **Goals/Aims**

The aim of the Chemical Engineering BSc program is to train professional chemical engineers. Relying on engineer and process control base; the graduates of the program will able to understand the natural, environmental, technical and social phenomena and to develop applied science-based solutions.

Students enrolled in the chemical engineering program will study total of 163 credit hours as a minimum limit to fulfil the requirements of a BSc. degree in chemical engineering.

The student will acquire knowledge of

- Mathematical and scientific background to understand processes in chemical and chemistry related industries.
- The properties of the most important chemicals, their productions and applications.
- The basic principles, planning and controlling options in chemical processes and industrial tasks.
- The principles of instruments used in chemical industries and technologies.
- The chemical methods used in measurements and analysis.
- The chemistry and chemical technology beside economic, management environmental safety, quality assurance, informatics and intellectual property rules and laws.

**The student will acquire the ability of**

- Applying the learned methods, models and planning's of chemical technology and chemical processes through calculations.
- Describing the elements of industrial and technological units, their operations including the connectivity options.
- Applying directives that are necessary to operate instruments and control processes in a safe way and avoid any problems.
- Controlling chemical processes and other technological steps concerning quality management and quality control.
- Recognizing possible error and propose a solution based on the results.
- Documenting data related to the field.
- Treating new or unknown systems based on the previous studies and experiences.
- Running measurements on laboratory and scaled up systems, and evaluate the derived data at all steps in the development.
- Conducting basic chemical engineering tasks.

**To help all students in the department of chemical engineering in**

- Covering different courses related to chemical engineering.
- Developing an awareness and acceptance of their abilities.
- Identifying and exploring opportunities.
- Growing in independence and take responsibility for themselves.
- Attending field trips related to the courses covered through their study.

## **Learning Outcomes**

- Discuss the basic concepts of chemical engineering including mass and energy balances and the concept of unit operations.
- Explain the basics of fluid flow through pipes and channels.
- Explain the basics of distillation, absorption, adsorption, filtration and drying processes and equipment choices for these unit operations.
- Calculate basic stoichiometry and unit conversions.
- Discuss the basics of process scale up and economics, solids handling, characterization, transfer and storage.
- Explain the basics of process control and the basis for choosing the type of process control.
- Apply computer module through the course in solving different problems.
- Describe basic safety regulations and procedures and the basics of reactive chemical analysis.

## **Roles and Responsibilities**

The student will gain responsibility in

- Keeping chemical engineering knowledge updated related to the student professional goals.
- Accepting environmentally efficient technologies, and the application of new technologies.
- Improving and applying the practical methods with new results and experiences.
- Being committed to apply the quality concerns including the new assurances.
- Working in a team with other students and discuss their opinions in problem solving processes before making new decisions.
- Following directions.
- Working without supervision considering all quality and safety rules.
- Establishing new solutions and technologies.
- Managing work and worker resources, follow, and control the instruments and measuring units.
- Evaluating the work of other people and make decisions based on the outcome.
- Sharing experiences with others to help them.
- Making decisions according to his/her positions.

## BSc Chemical Engineering Curriculum guide line

First year	First semester			Second semester		
	Course number	Course name	Credit hours	Course number	Course name	Credit hours
	0301101	Calculus 1	3	0301102	Calculus 2	3
	0302101	General Physics 1	3	0302102	General Physics 2	3
	0303101	General Chemistry 1	3	0303102	General Chemistry 2	3
	1802103	English language & Communication skills	3	0302111	General Physics Lab 1	1
	1801102	Arabic language & Communication skills	3	0101173	Military Sciences	3
				0405112	Computer Programming for Engineers	3
				0303107	General Chemistry Lab	1
Total credit hours			15	Total credit hours		17

Second year	First semester			Second semester		
	Course number	Course name	Credit hours	Course number	Course name	Credit hours
	0403198	Engineering Drawing	2	0404204	Experimental Design	3
	0303231	Organic Chemistry (1)	3	0404208	Principles of Chemical Engineering 2	3
	0301201	Calculus 3	3	0404212	Fluid Mechanics	3
	0402226	Engineering Mechanics	3	0303235	Organic Chemistry Lab 1	1
	0404207	Principles of Chemical Engineering 1	3	0303241	Physical Chemistry 1	3
	1600106	National Education & Social Responsibility	3	0402110	Engineering Workshop	1
	0302112	General Physics Lab 2	1	0301203	Ordinary Differential Equations 1	3
			0404200	Communication Skills	1	
Total credit hours			18	Total credit hours		18

Third year	First semester			Second semester		
	Course number	Course name	Credit hours	Course number	Course name	Credit hours
	0404317	Heat Transfer	3	0404326	Thermodynamics for Chemical Engineering 2	3
	0404325	Thermodynamics for Chemical Engineering 1	3	0404318	Mass Transfer	3
	0404315	Fluid Mechanics Lab	1	0404328	Chemical Reaction Engineering 1	3
	0403302	Engineering Economy	3	0404346	Unit Operation 1	1
	0404327	Materials Science and Engineering	3	0404306	Computer Application in Chemical Engineering 1	3
	0403209	Computer-aided Engineering Drawing	1	0809103	Life Skills	3
	0402307	Numerical Analysis	3			
	Total credit hours			17	Total credit hours	

Fourth year	First semester			Second semester			Summer semester		
	Course number	Course name	Credit hours	Course number	Course name	Credit hours	Course number	Course name	Credit hours
	0404433	Unit Operation 2	3	0404472	Principles of Instrumental Analysis	3	0404400	Practical training	3
	0404423	Heat Transfer and Thermodynamics lab	3	0404477	Environmental Engineering Management	3	-	-	-
	0404421	Chemical Reaction Engineering 2	3	0404422	Chemical Reaction Engineering lab	1	-	-	-
	0404405	Creative Solutions to Engineering Problems	1	0404457	Equipment Design and Plant Economics	3	-	-	-
	2100102	Entrepreneurship and Innovation	3	0404408	Computer Application in Chemical Engineering 2	1	-	-	-
	0404407	Analysis, Modeling and Simulation of Chem. Processes	3	-	Elective University Course	3	-	-	-
	-	Elective Department Course	3	-	Elective Department Course	3	-	-	-
	Total credit hours		17	Total credit hours		17	Total credit hours		3

Fifth year	First semester			Second semester		
	Course number	Course name	Credit hours	Course number	Course name	Credit hours
	0404533	Unit Operation lab	1	0404542	Process Dynamics and Control lab	1
	0404556	Chemical Industries Technologies	2	-	Elective University Course	3
0404541	Process Dynamics and Control	3	-	Elective Department Course	3	

	0404557	Plant Design	3	0404558	Industrial Safety Engineering	3
	0404559	Graduation Project 1	0	0404569	Graduation Project 2	3
	-	Elective University Course	3			
	Total credit hours		12			13