



## Curriculum for Associate Degree in Chemical Industries Technology Specialization

The curriculum of associate degree in “Chemical Industries Technology” specialization consists of (72 credit hours) as follows:

Serial No.	Requirements	Credit Hours
First	University Requirements	12
Second	Engineering Program Requirements	17
Third	Specialization Requirements	43
<b>Total</b>		<b>72</b>



## Curriculum for the Associate Degree in Chemical Industries Technology

**First:** University requirements (12 credit hours) as follows:

Course No.	Course Title	Credit Hours	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
22001101	Arabic Language	3	3	-	
22002101	English Language	3	3	-	
21901100	Islamic Culture	3	3	-	
21702101	Computer Skills	3	1	4	
<b>Total</b>		<b>12</b>	<b>10</b>	<b>4</b>	

**Second:** Engineering program requirements (17 credit hours) as follow:

Course No	Course Title	Credit Hours	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
20201111	Engineering Workshops	1	-	3	-
20204111	AutoCAD	2	-	6	-
20506111	Occupational Safety	2	2	-	-
21301111	General Mathematics	3	2	2	-
21302111	General Physics	3	2	2	-
21302112	General Physics Laboratory	1	-	3	21302111*
21702111	Communication Skills and Technical Writing	3	2	2	22002101
20201121	Engineering Materials	2	2	-	-
<b>Total</b>		<b>17</b>	<b>10</b>	<b>18</b>	

\* Co-requisite



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**Third: Specialization Requirements (43 credit hours) as follows:**

Course No.	Course Title	Credit Hours	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
20501111	General Chemistry	2	2	-	
20501112	General Chemistry Lab.	1	-	3	20501111*
20501115	Organic Chemistry	2	2	-	20501111
20501116	Organic Chemistry Lab	1	-	3	20501115*
20501113	Analytical Chemistry	2	2	-	20501111
20501114	Analytical Chemistry Lab	1	-	3	20501113*
20501181	Unit Operations 1	2	2	-	20501171
20501182	Unit Operations 1 Lab.	1	-	3	20501181*
20501285	Unit Operations 2	2	2	-	20501181
20501286	Unit Operations 2 Lab.	1	-	3	20501285
20501117	Measurements and Control	2	2	-	
20501218	Measurements and Control Lab.	1	-	3	20501117*
20501281	Chemical Reactions Engineering	2	2	-	20501115
20501282	Chemical Reactions Engineering Lab.	1	-	3	20501281*
20501118	Chemical Engineering Calculations	2	2	-	20501111
20501283	Chemical Technologies	2	2	-	20501285
20502251	Petroleum Refinery Engineering	3	3	-	20501285
20502252	Petroleum Refinery Engineering Lab.	1	-	3	20502251*
20207111	Fluids and Hydraulic Machines	3	3	-	
20207112	Fluids and Hydraulic Machines Lab.	1	-	3	20207111*
20209111	Thermal engineering	3	3	-	20207111
20209112	Thermal Engineering Lab	1	-	3	20209111*
20501291	Training**	3	-	-	-
20501292	Project	3	-	-	-
<b>TOTAL</b>		<b>43</b>	<b>27</b>	<b>30</b>	

\*-Co-requisite

\*\* Equivalent to 280 training hours

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### Guiding Plan

First Year					
First Semester			Second Semester		
Course ID	Course Name	Credit Hours	Course ID	Course Name	Credit Hours
22001101	Arabic Language	3	22002101	English Language	3
21302111	General Physics	3	20501113	Analytical Chemistry	2
21302112	General Physics Lab	1	20501114	Analytical Chemistry Lab	1
20501111	General Chemistry	2	21702101	Computer Skills	3
20501112	General Chemistry Lab	1	20506111	Occupational Safety	2
21301111	General Mathematics	3	20501115	Organic Chemistry	2
			20501116	Organic Chemistry Lab	1
20201121	Material Engineering	2	20201111	Engineering Workshops	1
21901100	Islamic Culture	3	20207111	Fluids and Hydraulic Machines	3
<b>Total</b>		<b>18</b>	<b>Total</b>		<b>18</b>

Second Year					
First Semester			Second Semester		
Course ID	Course Name	Credit Hours	Course ID	Course Name	Credit Hours
20204111	Auto CAD	2	20209112	Thermal Engineering Lab	1
20501283	Chemical Technologies	2	20501286	Unit Operations 2 Lab	1
20502251	Petroleum Refinery Engineering	3	20502252	Petroleum Refinery Engineering Lab.	1
		1	20501282	Chemical Reactions Engineering Lab.	1
20207112	Fluids and Hydraulic Machines Lab.	1	21702111	Communication Skills and Technical Writing	3
20501281	Chemical Reactions Engineering	2	20501291	Training	3
20501118	Chemical Engineering Calculations	2	20501117	Measurements and Control	2
20501181	Unit Operations 1	2	20501218	Measurements and Control Lab.	1
20501182	Unit Operations 1 lab	1	20501285	Unit Operations 2	2
20209111	Thermal Engineering	3	20501292	Project	3
<b>Total</b>		<b>18</b>	<b>Total</b>		<b>18</b>

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### Brief Course Description

#### University Requirements

Course Title	Course No	Credit Hours ( Theoretical /Practical)
<b>Arabic Language</b>	<b>22001101</b>	<b>3 (3-0)</b>
<p>تتضمن هذه المادة مجموعة من المهارات اللغوية بمستوياتها وأنظمتها المختلفة: الصوتية، والصرفية، والنحوية، والبلاغية، والمعجمية، والتعبيرية، وتشتمل نماذج من النصوص المشرقة: قرآنية، وشعرية، وقصصية، من بينها نماذج من الأدب الأردني؛ يتوخى من قراءتها وتدقيقها وتحليلها تحليلاً أدبياً؛ تنمية الذوق الجمالي لدى الطلاب الدارسين.</p>		
<b>English Language</b>	<b>22002101</b>	<b>3 (3-0)</b>
<p>English 1 is a general course. It covers the syllabuses of listening, speaking, reading, writing, pronunciation and grammar, which are provided in a communicative context. The course is designed for foreign learners of the English language, who have had more than one year of English language study. The extension part would be dealt with in the class situation following the individual differences.</p>		
<b>Islamic Culture</b>	<b>21901100</b>	<b>3 (3-0)</b>
<ol style="list-style-type: none"><li>1. تعريف الثقافة الإسلامية وبيان معانيها وموضوعاتها والنظم المتعلقة بها - وظائفها وأهدافها.</li><li>2. مصادر ومقومات الثقافة الإسلامية والأركان والأسس التي تقوم عليها.</li><li>3. خصائص الثقافة الإسلامية.</li><li>4. الإسلام والعلم، والعلاقة بين العلم والإيمان</li><li>5. التحديات التي تواجه الثقافة الإسلامية.</li><li>6. رد الشبهات التي تثار حول الإسلام.</li><li>7. الأخلاق الإسلامية والآداب الشرعية في إطار الثقافة الإسلامية.</li><li>8. النظم الإسلامية.</li></ol>		
<b>Computer Skills</b>	<b>21702101</b>	<b>3 (1-4)</b>
<p>An introduction to computing and the broad field of information technology is given. Topics covered include the basic structure of digital computer system, microcomputer, operating systems, application software, data communication and networks, and the internet. Hands-on learning emphasizes Windows xp, MS-office2000, and the internet.</p>		

**Engineering Program requirements**

<b>Engineering Workshops</b>	<b>20201111</b>	<b>1 (0-3)</b>
Development of basic manual skills in Mechanical and Electrical works. Use of manual tools and measuring devices. Hand filing, welding, metal cutting and forming. Electrical wiring.		
<b>AutoCAD</b>	<b>20204111</b>	<b>2 (0-6)</b>
Introduction to AutoCAD, application of AutoCAD, commands, geometric entities. Geometric construction. Dimensioning, free –hand sketching, object representation, orthographic drawing and projections.		
<b>Occupational safety</b>	<b>20506111</b>	<b>2 (2-0)</b>
Role of technicians in economic development First aid accident prevention. Protective devices and equipment. Industrial safety standards. Nature of fire hazards. Sand fire regulations. Physiological effects of electrical shock on human body. First aid and treatment for the effects of electric shock. Rules of spare and chemicals storage and handing.		
<b>Communication Skills and Technical Writing</b>	<b>21702111</b>	<b>3 (2-2)</b>
The main goal of this course is to equip the students with the necessary communication skills in everyday life & work situations and improve their abilities in technical writing to meet market needs. For this course, the English language is the language of teaching & the means of communication for all classroom situations.		
<b>Engineering Materials</b>	<b>20201121</b>	<b>2 (2-0)</b>
Definition of engineering materials. Classification of materials and their properties. Metallic and non-metallic materials. Metals, alloys and composite materials. Conductors, insulators and semiconductors. Mechanical, Magnetic, Thermal and electrical characteristics of materials. Industrial applications of different types of materials.		
<b>General Mathematics</b>	<b>21301111</b>	<b>3 (2-2)</b>
Real numbers coordinate planes, lines, distance and circles. Functions: (operations and graphs on functions), limits, continuity, limits and continuity of trigonometric functions. Exponential and logarithmic functions. Differentiation (techniques of differentiation, chain rule, implicit differentiation). Application of differentiation (increase, decrease, concavity). Graphs of polynomials. Applications: Rolle's Theorem and Mean-Value Theorem, Integration (by substitution, definite integral, fundamental theorem of Calculus). Application of definite integral (area between two curves, volumes)		
<b>General Physics</b>	<b>21302111</b>	<b>3 (2-2)</b>
Physics and measurement, motion in one dimension, vectors, laws of motion, circular motion, energy and energy transfer, potential energy, linear momentum and collisions, electric fields, Gauss's law, electric potential, capacitance and dielectrics, current and resistance, direct current circuits, magnetic fields, sources of the magnetic field, and Faraday's law of electromagnetic induction.		
<b>General Physics lab</b>	<b>21302112</b>	<b>1 (0-3)</b>
This lab. course, the student performs thirteen experiments in mechanics and in electricity.		

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**Specialization Requirements**

<b>General Chemistry</b>	<b>20501111</b>	<b>2 (2-0)</b>
This course provides students with a working knowledge of the basic concepts of general chemistry needed for creative problem solving, as well as a background for advance chemistry and related science courses, and for laboratory applications.		
<b>General Chemistry Lab</b>	<b>20501112</b>	<b>1 (0-3)</b>
This course covers theoretical concept studied in the general chemistry course. Practical experiments are carried out on following topics: physical and chemical properties of various substances, preparation and standardization of solutions, oxidation and reduction, acid-base titration, heat of reaction.		
<b>Organic Chemistry</b>	<b>20501115</b>	<b>2 (2-0)</b>
Principles of organic chemistry; classification of organic compounds; features of Carbon and other basic elements; basic compounds and their derivatives; methods to prepare these compounds with their reactions and importance.		
<b>Organic Chemistry Lab</b>	<b>20501116</b>	<b>1 (0-3)</b>
This laboratory course gives the students an opportunity to apply the theory gained within the Organic chemistry course through practical experimentation.		
<b>Analytical Chemistry</b>	<b>20501113</b>	<b>2 (2-0)</b>
This course provides the students with an introduction to analytical chemistry, and discusses the importance of analytical chemistry and chemical analysis.		
<b>Analytical Chemistry Lab</b>	<b>20501114</b>	<b>1 (0-3)</b>
This laboratory course gives the students an opportunity to apply the theory gained within the Analytical Chemistry course through practical experimentation. Solvent preparation; Analysis of Acid – Base mixtures. Determination of Chloride, Sulphate, Silver, Copper, Antimony percentage.		
<b>Unit Operations I</b>	<b>20501181</b>	<b>2 (2-0)</b>
This course covers the following: Properties of solid particles, physical treatment, reduction, drying, screening filtration, sedimentation mixing and crystallizations, Technology used in physical treatment.		
<b>Unit Operations 1 Lab</b>	<b>20501182</b>	<b>1 (0-3)</b>
This laboratory course gives the students an opportunity to apply the theory gained within the unit operations 1 course through practical experimentation.		
<b>Unit Operations 2</b>	<b>20501285</b>	<b>2 (2-0)</b>
This course covers distillation, gas absorption, adsorption, extraction, and evaporation and technology used for these processes.		

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<b>Unit Operations 2 Lab</b>	<b>20501286</b>	<b>1 (0-3)</b>
This laboratory course gives the students an opportunity to apply the theory gained within the unit operations 2 course through practical experimentation.		
<b>Chemical Reactions Engineering</b>	<b>20501281</b>	<b>2 (2-0)</b>
Principles of chemical reactions; Chemical kinetics; Rate of reactions; Various types of chemical reactors with their specifications and industrial applications.		
<b>Chemical Reactions Engineering Lab</b>	<b>20501282</b>	<b>1 (0-3)</b>
This laboratory course gives the students an opportunity to apply the theory gained within the chemical reaction engineering course through practical experimentation.		
<b>Measurements and Control</b>	<b>20501117</b>	<b>2 (2-0)</b>
This course is divided into two parts, the first one includes the measurements and instrumentations existed in any chemical industry such as temperature, humidity, level and concentration. The second part contains the principles of automatic control, control systems and applications from chemical engineering field, typical practical process control systems of temperature, pressure, level, control system performance and physical components.		
<b>Measurements and Control Lab</b>	<b>20501218</b>	<b>1 (0-3)</b>
This laboratory course gives the student an opportunity to apply the gained theory within the instrumentation and chemical process control course.		
<b>Chemical Engineering Calculations</b>	<b>20501118</b>	<b>2 (2-0)</b>
This course covers the International System of Units used in chemistry and chemical engineering, conversion of units, Material and Energy Balances in chemical systems and physical operations, and analysis of combustion process.		
<b>Chemical Technologies</b>	<b>20501283</b>	<b>2 (2-0)</b>
This course presents various chemical technologies both organic and non organic industries such as: Cement, Potash, Phosphate, fertilizers, Acids, Soap, Detergents, Paints, Paper, Fats.		
<b>Petroleum Refinery Engineering</b>	<b>20502251</b>	<b>3 (3-0)</b>
This course covers the primary and secondary crude oil refining processes (such as atmospheric and vacuum distillation), Conversion operations (such as catalytic cracking, plat forming and hydro-cracking) Production and purification of lube oils.		

<b>Petroleum Refinery Engineering Lab</b>	<b>20502252</b>	<b>1 (0-3)</b>
<p>This laboratory course gives the student an opportunity to apply the theory gained within the petroleum Refinery Engineering course through practical experimentation.</p>		
<b>Thermal Engineering</b>	<b>20209111</b>	<b>3 (3-0)</b>
<p>Concepts and definitions, Properties of a pure substance, Work and heat, the first law of thermodynamics, the second law of thermodynamics, liquid-vapor equilibrium. Principles of heat transfer, Steady state conduction, Convection, Radiation, Heat exchangers</p>		
<b>Thermal Engineering Lab.</b>	<b>20209112</b>	<b>1 (0-3)</b>
<p>Pressure – Temperature relation in the saturation region; Compressor cycles and analyses; Heat pump performance; Conduction heat transfer; Radiation heat transfer; and Heat exchanger performance</p>		
<b>Fluids and Hydraulic Machines</b>	<b>20207111</b>	<b>3 (3-0)</b>
<p>Fluid properties, fluid static's, fluid motion, continuity equation, momentum principle, energy principle, Fluid flow in pipes, pipe friction, introduction to Pumps, Types, Selection and application of pumps.</p>		
<b>Fluids and Hydraulic Machines Lab</b>	<b>20207112</b>	<b>1 (0-3)</b>
<p>Measuring of physical properties of fluids, force on immersed plate, Jet force on plate, Bernoullis equation, Reynolds experiments, flow through orifices, and nozzle venture friction factor.</p>		
<b>Project</b>	<b>20501292</b>	<b>3</b>
<p>An integrated design project to practice the principles of analysis and design acquired throughout the course of the student's study.</p>		
<b>Training</b>	<b>20501291</b>	<b>3 (280 Training hours)</b>
<p>Equivalent to 280 hours of field training targeted to emphasize the ability of students to apply the theories in the real world of the profession</p>		

