Curriculum for Associate Degree Program in Metal Machining Technology Specialization

The curriculum of associate degree in **"Metal Machining 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
Total		**72**

❖ **تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008**

The curriculum of associate degree
in
Metal Machining Technology Specialization

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	
Total		**12**	**10**	**4**	

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	-
21702111	Communication Skills and Technical Writing	3	2	2	22002101
20201121	Engineering Materials	2	2	-	-
Total		**17**	**10**	**18**	

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

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

Course No.	Course Title	Credit Hours	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
20301111	Electricity and Electronics	2	2	0	21302111*
20301112	Electricity and electronics Laboratory	1	0	3	20301113*
20207121	Mechanics	3	3	0	21302111
20203121	Methods of Measurements	2	2	0	
20203122	Methods of Measurements Lab.	1	0	3	20203121*
20209111	Thermal Engineering	3	3	0	21302111*
20209112	Thermal Engineering Laboratory	1	0	3	20209111*
20204211	Mechanical Drawing	2	0	6	20204111
20202113	Manufacturing Processes	2	2	0	
20202114	Manufacturing Processes Workshops	1	0	3	20202113*
20202121	Machining Technology 1	2	2	0	
20202122	Machining Technology 1 Workshops	2	0	6	20202121*
20202221	Machining Technology 2	2	2	0	20202121
20202222	Machining Technology 2 Workshops	2	0	6	20202221*
20202231	Design and Manufacturing of Molds	3	3	0	20202221
20202232	Design and Manufacturing of Molds Workshops	2	0	6	20202231*
20203231	Forging and Welding Technology	2	2	0	
20203232	Forging and Welding Technology Workshops	1	0	3	20203231*
20201271	Metallurgical Heat Treatment	2	2	0	20209111
20201272	Metallurgical Heat Treatment Laboratory	1	0	3	20201271*
20202291	Training**	3	0	-	-
20202292	Project	3	0	-	-
Total		**43**	**25**	**42**	

*-Co-requisite

** Equivalent to 280 training hours

❖ **تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008**

Guiding Plan

First Year					
First Semester			Second Semester		
Course ID	Course Name	Credit Hours	Course ID	Course Name	Credit Hours
22001101	Arabic Language	3	20209111	Thermal engineering	3
21302111	General Physics	3	20209112	Thermal Engineering Lab	1
21302112	General Physics Lab	1	22002101	English Language	3
21702101	Computer Skills	3	20207121	Mechanics	3
21301111	General Mathematics	3	20204111	AutoCAD	2
20201121	Engineering Materials	2	20506111	Occupational Safety	2
21901100	Islamic Culture	3	20202111	Manufacturing Processes	2
			20202112	Manufacturing Processes Workshops	1
			20201111	Engineering Workshops	1
Total		18	Total		18

Second Year					
Third Semester			Fourth Semester		
Course ID	Course Name	Credit Hours	Course ID	Course Name	Credit Hours
20204211	Mechanical Drawing	2	20202231	Design and Manufacturing of Molds	3
20203121	Methods of Measurements	2	20202232	Design and Manufacturing of Molds Workshops	2
20202121	Machining Technology 1	2	20202291	Training	3
20203122	Methods of Measurements Lab.	1	20202292	Project	3
21702111	Communication Skills and Technical Writing	3	20202221	Machining Technology 2	2
20203231	Forging and Welding Technology	2	20202222	Machining Technology 2 Workshops	2
20203232	Forging and Welding Technology Workshops	1	20201271	Metallurgical Heat Treatment	2
20301111	Electricity and Electronics	2	20201272	Metallurgical Heat Treatment Lab.	1
20301112	Electricity and electronics Lab	1			
20202122	Machining Technology 1 Workshops	2			
Total		18	Total		18

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

Brief Course Description for Associate Degree in Engineering Program Specializations

University Requirements

Course Title	Course No	Credit Hours (Theoretical /Practical)
Arabic Language	**22001101**	**3 (3-0)**

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 وتذوقها وتحليلها تحليلا أدبيا؛ تنمية الذوق الجمالي لدى الطلاب الدارسين.

English Language	**22002101**	**3 (3-0)**

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.

Islamic Culture	**21901100**	**3 (3-0)**

1. تعريف الثقافة الإسلامية وبيان معانيها وموضوعاتها والنظم المتعلقة بها – وظائفها وأهدافها.
2. مصادر ومقومات الثقافة الإسلامية والأركان والأسس التي تقوم عليها.
3. خصائص الثقافة الإسلامية.
4. الإسلام والعلم، والعلاقة بين العلم والإيمان
5. التحديات التي تواجه الثقافة الإسلامية.
6. رد الشبهات التي تثار حول الإسلام.
7. الأخلاق الإسلامية والآداب الشرعية في إطار الثقافة الإسلامية.
8. النظم الإسلامية.

Computer Skills	**21702101**	**3 (1-4)**

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.

Engineering Program requirements

Engineering Workshops	**20201111**	**1 (0-3)**
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.		
AutoCAD	**20204111**	**2 (0-6)**
Introduction to AutoCAD, application of AutoCAD, commands, geometric entities. Geometric construction. Dimensioning, free –hand sketching, object representation, orthographic drawing and projections.		
Occupational safety	**20506111**	**2 (2-0)**
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.		
Communication Skills and Technical Writing	**21702111**	**3 (2-2)**
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.		
Engineering Materials	**20201121**	**2 (2-0)**
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.		
General Mathematics	**21301111**	**3 (2-2)**
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: Rolls Theorem and Mean-Value Theorem, Integration (by substitution, definite integral, fundamental theorem of Calculus). Application of definite integral (area between two curves, volumes)		
General Physics	**21302111**	**3 (2-2)**
The physical concepts to be studied includes: vectors, motion in one dimension, motion in two dimensions, the laws of motion, applications of Newton's laws, circular motion, energy and energy transfer, potential energy, linear momentum, electricity, electrical potential, capacitance, current and resistance .		
General Physics lab	**21302112**	**1 (0-3)**
In this course, the student performs thirteen experiments in mechanics and in electricity.		

Specialization Requirements

Electricity and Electronics	**20301111**	**2 (2-0)**
Concepts and definitions, electrical circuit elements, voltage, current, resistance, capacitance and inductance, ohms law and dc circuit Calculations. Ac Circuits. Three phase circuits, transformers, and electrical machines. Basic electronic devices and circuits. Introduction to electrical protection.		
Electricity and Electronics Lab.	**20301112**	**1 (0-3)**
DC and AC circuits. Current and voltage measurements. Simple electronic circuits. DC and AC machines. Single-phase transformers. Protection devices and circuits.		
Mechanics	**20207121**	**3 (3-0)**
Basic definitions and concepts. SI units. Equilibrium. Free body diagrams. Simple structural analysis. Internal forces. Friction. Moment of inertia. Kinematics of particles.		
Methods of Measurements	**20203121**	**2 (2-0)**
Basic concepts of automatic and process control Open – loop and closed – loop systems .Errors and system response. System representation. Control system components. Measuring Elements. Examples of Mechanical and process measuring devices introduction to quality control system.		
Methods of Measurements Lab.	**20203122**	**1 (0-3)**
Analyzing open – loop and closed – loop control system. Input / output characteristics, errors.		
Thermal Engineering	**20209111**	**3 (3-0)**
Concepts and definitions, Properties of a pure substance, Work and heat, the first law of thermodynamics, the second law of thermodynamics, Principles of heat transfer Steady state conduction, Radiation, Heat exchangers		
Thermal Engineering Lab.	**20209112**	**1 (0-3)**
Pressure – Temperature relation in the saturation region; Compressor cycles and analyses; Heat pump performance; Conduction heat transfer; Radiation heat transfer; and Heat exchanger performance		
Mechanical Drawing	**20204211**	2 (0-6)
The course is designed to develop the technical sense for the student and enable him to create and analyze the different mechanical parts, pipes and ducts, mechanical and HVAC symbols . Assembly and detailed drawings for technical arrangements. Applications for CAD and Solid		

Works modeling.

Manufacturing Processes	**20202113**	**2 (2-0)**

Forming processes used in manufacturing. Casting, extrusion, rolling, forging, sheet metal forming and wire and pipe drawing. Welding systems and welding inspection, including gas and arc welding, welding rods.

Manufacturing Processes Workshops	**20202114**	**1 (0-3)**

Practicing forming processes and analyzing structure and properties of metals and alloys, providing casting processes, cold rolling, pressing bending, and shearing process. Application of welding techniques. Including safety, shop practicing for different welding methods, inspections of welding defects

Machining Technology 1	**20202121**	**2 (2-0)**

Principles of metal cutting operations, workpiece marking, Drilling, Lathe Machines (turning), Taper machining. Threading, Sawing, Shapers and surface planning machines, Milling.

Machining Technology 1 Workshops	**20202122**	**2 (0-6)**

Work piece and holes marking, Drilling processes including whole drilling, reaming, tapping and boring. Turning operations using 3-jaw, 4-jaw, chucks. Turning between two centers, and collect chuck turning. Taper and thread cutting. Turret and vertical operations. Sawing operations. Shaping and planning (horizontally and vertically). Vertical and horizontal milling.

Machining Technology 2	**20202221**	**2 (2-0)**

Indexing operation and gear milling, grinding machines and grinding wheels, surface grinding.

External and Internal cylindrical grinding, CNC machines, CAM software.

Machining Technology 2 Workshops	**20202222**	**2 (0-6)**

Helical, spur and bevel gear cutting. Cam milling. Grinding wheels classification, structure and dressing. Surface grinding operation. Internal and external grinding operation. Using CNC machines, using CAM software.

Design and Manufacturing of Molds	**20202231**	**3 (3-0)**

Introduction to mold design, metal forming process. Classification of iron alloys used for molds. Working characteristic at a given mass and shape of parts. Detailed design. Molding process and materials, allowances and tolerance. Design of shearing and bending dies. Design of cores, complex shape.

Design and Manufacturing of Molds Workshops	**20202232**	**2 (0-6)**
Hand forging processes. Sheet metal work. Rolling, Bending and Drawing. Metal arc welding, oxy- acetylene welding, brazened, soldering and metal cutting. MIG and TIG welding, Equipment and Operations.		
Forging and Welding Technology	**20203231**	**2 (2-0)**
Hand forging processes. Sheet metal work. Rolling, Bending and Drawing. Metal arc welding, oxy- acetylene welding, brazened, soldering and metal cutting. MIG and TIG welding, Equipment and Operations.		
Forging and Welding Technology Workshops	**20203232**	**1 (0-3)**
Vertical and overhead welding positions. Oxy-acetylene welding including joints preparation, wire selection. Electrical arc welding process and applications. Metal inert gas welding.		
Metallurgical Heat Treatment	**20201271**	**2 (2-0)**
Property change due to heat treatment. Iron-carbon system. Surface hardening. Powder metallurgy, metal surface treatment. Composite materials. Electro plating. Chemical and mechanical treatment of ferrous materials and alloys. Destructive and non-destructive evaluation.		
Metallurgical Heat Treatment Lab.	**20201272**	**1 (0-3)**
Preparation of specimen: Microscopic inspection, Cooling curves and phase diagrams, Corrosion rate measurement. Materials structure analysis. Surface-hardening. Electro plating processes. Iron-carbon system. Heat treatment and tests. Preparation and using of powders and composites.		
Training	**20202291**	**3 (280 training hours)**
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.		
Project	**20202292**	**3**
An integrated assembly/design practical work related to the major fields of study.		