

# Curriculum for Associate Degree in Ground Electrical Systems Specialization

The curriculum of associate degree in “Ground Electrical Systems” 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>



The study plan of associate degree  
in  
Ground Electrical Systems

**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 follows:

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	-	-
<b>Total</b>		<b>17</b>	<b>10</b>	<b>18</b>	

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

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

Course No.	Course Title	Credit Hours	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
20301113	Electrical Circuits	3	3	0	21302111*
20301114	Electrical Circuits Lab.	1	0	3	20301113*
20301131	Engineering Software	1	0	3	21702101
20301121	Electrical Workshops	2	0	6	20201111
20304111	Electrical Machines	3	3	0	20301113
20304114	Electrical Machines Lab.	1	0	3	20304111 or 20304113
20301251	Building and Low Voltage Wiring	3	3	0	
20301252	Building and Low Voltage Wiring Lab.	1	0	3	20301251*
20304241	Protection and control Devices	2	2	0	
20304242	Protection and control Devices Lab.	1	0	3	20304241*
20301261	Industrial Wiring	3	3	0	20304111*
20301262	Industrial Wiring Laboratory	1	0	3	20301261*
20302121	Rewinding Electrical Machines Workshops	2	0	6	20304111*
20302131	Airport Lighting Systems 1	2	2	0	20301113
20302231	Airport Lighting Systems 2	2	2	0	20302131
20302232	Airport Lighting Systems Workshops	1	0	3	20302231*
20302241	Electrical Cables Workshops	1	0	3	
20403111	Electronics	3	3	0	20301113*
20403112	Electronics Lab.	1	0	3	20403111*
20302251	Diesel Engines Workshops	1	0	3	
20302233	Airport Power Supply Systems	2	2	0	
20302291	Training**	3	0	-	-
20302292	Project	3	0	-	-
<b>Total</b>		<b>43</b>	<b>23</b>	<b>42</b>	

\*-Co-Requisite

\*\* Equivalent to 280 training hours



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### Guiding Plan

First Year					
First Semester			Second Semester		
Course No.	Course Title	Credit Hours	Course No.	Course Title	Credit Hours
20301113	Electrical Circuits	3	22001101	Arabic Language	3
20301114	Electrical Circuits Lab.	1	20506111	Occupational Safety	2
22002101	English Language	3	21702111	Communication Skills and Technical Writing	3
21702101	Computer Skills	3	21901100	Islamic Culture	3
21302111	General Physics	3	20301131	Engineering Software	1
21302112	General Physics Lab.	1	20304111	Electrical Machines	3
21301111	General Mathematics	3	20304114	Electrical Machines Lab.	1
20201111	Engineering Workshops	1	20301121	Electrical Workshops	2
<b>Total</b>		<b>18</b>	<b>Total</b>		<b>18</b>

Second Year					
Third Semester			Fourth Semester		
Course No.	Course Title	Credit Hours	Course No.	Course Title	Credit Hours
20403111	Electronics	3	20302233	Airport Power Supply Systems	2
20403112	Electronics Laboratory	1	20301261	Industrial Wiring	3
20304241	Protection and Control Devices	2	20301262	Industrial Wiring Lab.	1
20304242	Protection and Control Devices Lab.	1	20302251	Diesel Engines Workshops	1
20301251	Building and Low Voltage Wiring	3	20302291	Training	3
20301252	Building and Low Voltage Wiring Lab.	1	20302292	Project	3
20302241	Electrical Cables Workshops	1	20302231	Airport Lighting Systems 2	2
20204111	AutoCAD	2	20302232	Airport Lighting Systems Workshops	1
20302131	Airport Lighting Systems 1	2	20302121	Rewinding Electrical Machines Workshops	2
20201121	Engineering Materials	2			
<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)
Arabic Language	22001101	3 (3,0)
<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 وتدوقها وتحليلها تحليلاً أدبياً؛ تنمية الذوق الجمالي لدى الطلاب الدارسين.</p>		
English Language	22002101	3 (3,0)
<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>		
Islamic Culture	21901100	3 (3,0)
<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>		
Computer Skills	21702101	3 (1-4)
<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>2020111</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>
In this course, the student performs thirteen experiments in mechanics and in electricity.		

### Specialization Requirements

<b>Electrical Circuits</b>	<b>20301113</b>	<b>3(3,0)</b>
Voltage, Current, and Resistance, Ohm's Law, Energy and Power, Series-Parallel Circuits, Introduction to Alternating Current and Voltage, Capacitors, Inductors, RLC Circuits and Resonance. Electrical Measurements.		
<b>Electrical Circuits Lab.</b>	<b>20301114</b>	<b>1(0,3)</b>
DC and AC circuits. Resonance. Measuring devices.		
<b>Engineering Software</b>	20301131	<b>1 (0-3)</b>
Automated electrical engineering drawing using computer graphic packages. Electrical block and wiring diagrams symbols of basic elements of electrical and electronic circuits, devices and machines. Block diagram of electrical & electronic systems. Schemes reading.		
<b>Electrical Workshop</b>	<b>20301121</b>	<b>2(0,6)</b>
Electric wiring for building ,such as lighting wiring systems ,alarm systems ,motor control systems and inspecting ,maintaining rewinding electrical transformers and machines ,Applying Safety and security means in electrical works ,Electronic circuits building and printed circuits Repair and maintenance techniques.		
<b>Electrical Machines</b>	<b>20304111</b>	<b>3(3,0)</b>
This course throws light on types of electrical machines ,transformers , motors,generators ,special Machines ,These machines which may face a diploma holder in his practical life ,He must be aware of many related things about these machines ,construction ,principles of operation, characteristics, applications, maintenance		
<b>Electrical Machines Lab.</b>	<b>20304114</b>	<b>1(0,3)</b>
This course focuses on, connections of various types of electrical machines, measurement of losses and efficiency; speed control and mechanical characteristics of all types of motors, external characteristics of generators.		
<b>Building and Low Voltage Wiring</b>	<b>20301251</b>	<b>3(3,0)</b>
Wiring for lighting and electrical power system in building and their calculations, Methods of selection, wiring, testing, measuring their coefficients, choosing their components and maintenance practices and included. Fire alarm and fire fighting system.		
<b>Building and Low Voltage Wiring Lab.</b>	<b>20301252</b>	<b>1(0,3)</b>
Controlling electrical pulps lighting, Wiring electrical bells. Wiring interphone. Wiring street lightings. Security doors wiring opening and closing control methods. Traffic lights systems. Earthing.		
<b>Protection And Control Devices</b>	<b>20304241</b>	<b>2(2,0)</b>
Basic concepts and definitions. Normal and up-normal operating conditions. Faults and their causes. Protection. Protection devices: classification, applications, basic structure and principle of operation, characteristics. Ratings of protection devices, troubleshooting and calibration. Selection of protection devices.		



<b>Protection And Control Devices Lab.</b>	<b>20304242</b>	<b>1(0,3)</b>
The course aims at giving the students practical skills in order to select ,wire troubleshoot and maintain the most common control and protection devices like fuses ,circuit breakers , relays ,contactors ,timers ,switches ,and measuring transformers.		
<b>Rewinding Electrical Machines Workshops</b>	<b>20302121</b>	<b>2(0,6)</b>
Capacitor motors, Rewinding the capacitor, Start motor, taking data, how to recognize a connection, making connection, testing, baking and varnishing. Repulsion-type motors, construction, troubleshooting and repair. Three phase motors, construction, rewinding, recording data, placing the coils in the slots, testing, baking and varnishing.		
<b>Airport Lighting Systems 1</b>	<b>20302131</b>	<b>2(2,0)</b>
Introduction to airfield lighting systems. Approach lighting systems. Runway lighting systems. Taxiway lighting systems. Beacon lighting systems. Sign and markers. Wind cone system. Obstruction lighting system. Heliport lighting system.		
<b>Airport Lighting Systems 2</b>	<b>20302231</b>	<b>2(2,0)</b>
Precision approach path indicator systems. Runway and identifier lighting system. Constant current regulator. Cables. Isolating unit transformers. Flashers. Remote control systems. Visual Approach Slope Indicator (V.A.S.I).		
<b>Airport Lighting Systems Workshops</b>	<b>20302232</b>	<b>1(0,3)</b>
Location of loop components, Input & output voltage and current of the Constant current regulator. Loop fault insulation, Visual Approach Slope Indicator (V.A.S.I).		
<b>Electrical Cables Workshops</b>	<b>20302241</b>	<b>1(0,3)</b>
Laying three - core cable high voltage. Four - core cable low voltage. Stranded cables conductors. Jointing cables, high voltage joint, low voltage joint. Pulling cables into conduit and ducts, pulling three – core cable, pulling four – core cable. Overhead lines, making overhead lines three – phase and neutral. Making an electric connection on the overhead lines.		
<b>Electronics</b>	<b>20403111</b>	<b>3(3,0)</b>
This course covers the basic subjects in electronics and you will study: Semiconductor theory, the diode ,special purpose diodes, diode applications ,bipolar junction transistor (BJT) ,field effect transistor (FET) ,operational amplifiers ,thyristors and other devices.		
<b>Electronics Lab.</b>	<b>20403112</b>	<b>1(0,3)</b>
Lab in support of the basic electronics course, experiments in basic electronics have to cover all electronic devices ( diode, zener diode, diode applications, BJT, FET, op-amp, oscillator, SCR).		
<b>Diesel Engine Workshops</b>	<b>20302251</b>	<b>1(0,3)</b>
Diesel engine diagnosis, diesel exhaust smoke, excessive diesel knock, diesel injection maintenance, testing diesel injection operation. Diesel injection clean lines, diesel injection nozzle service, glow plug service, injection pump service. Injection pump speed and adjustments.		



<b>Airport Power Supply Systems</b>	<b>20302233</b>	<b>2(2,0)</b>
Power supplies installations. Diesel power stations. UPS. Batteries. Transmission and distribution systems. Distribution substations. Airfield lighting distribution system protection.		
<b>Industrial Wiring</b>	<b>20301261</b>	<b>3(3,0)</b>
Electrical drawing in factories ,Symbols ,Feeding systems ,Electrical wiring methods ,Main and subsidiary panel boards, Distribution boards ,Cross section and drop voltage calculations , Electrical motors and their control devices ,Starters ,Starting methods protections ,Power systems and wiring systems protection (Selective protection ) ,Air conditioning and ventilation devices and their connections.		
<b>Industrial Wiring Lab.</b>	<b>20301262</b>	<b>3(3,0)</b>
Motor wiring circuit, DC and AC motors, Starting and controllers, Industrial loads, Selection of components and cables.		
<b>Training</b>	<b>20302291</b>	<b>3 (280 training hours)</b>
Equivalent to 8 week of field training targeted to emphasize the ability of students to apply the theories in the world of the profession.		
<b>Project</b>	<b>20302292</b>	<b>3</b>
An integrated design project to practice the principles of analysis and design acquired throughout the course of the student's study.		

