

Curriculum for Associate Degree in Industrial Automation Specialization

The curriculum of associate degree in “Industrial Automation” 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 study plan of a diploma degree in
Industrial Automation***

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 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	-	-
Total		17	10	18	



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

Course No.	Course Title	Credit Hours	Weekly Contact Hours		Prerequisite
			Theoretical	Practical	
20301113	Electrical Circuits	3	3	-	21302111*
20301114	Electrical Circuits lab	1	-	3	203011138
20403111	Electronics	3	3	-	20301113*
20403112	Electronics Lab	1	-	3	20403111*
20404121	Digital Fundamentals	2	2	-	20403111
20404122	Digital Fundamentals Laboratory	1	-	3	20404121*
20401111	Power Electronics	3	3	-	20403111
20401112	Power Electronics Lab	1	-	3	20401111*
20304111	Electrical Machines	3	3	-	20301113
20304112	Electrical Machines Lab	1	-	3	20304111*
20307211	Control Technology	2	2	-	-
20307212	Control Technology Laboratory	1	-	3	20307211*
20307231	Electrical Motor Drive Systems	3	3	-	20304111
20307232	Electrical Motor Drive Systems lab	1	-	3	20307231*
20404211	Microprocessors	3	3	-	20404121
20404212	Microprocessors Laboratory	1	-	3	20404211*
20307221	Programmable Logic Controllers	3	3	-	20404121
20307222	Programmable Logic Controllers Laboratory	1	-	3	20307221*
20304241	Protection and Control Devices	2	2	-	-
20304242	Protection and Control Devices Lab.	1	-	3	20304241*
20307291	Training**	3	-	-	-
20307292	Project	3	-	-	-
Total		43	27	30	-

* 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
22002101	English Language	3	22001101	Arabic Language	3
21702101	Computer Skills	3	20204111	AutoCAD	2
20201121	Engineering Materials	2	20506111	Occupational Safety	2
21901100	Islamic Culture	3	20201111	Engineering Workshops	1
21301111	General Mathematics	3	20404121	Digital Fundamentals	2
20403111	Electronics	3	20301113	Electrical Circuits	3
20403112	Electronics Lab.	1	20301114	Electrical circuits Lab.	1
			21302111	General Physics	3
			21302112	General Physics Lab.	1
Total		18	Total		18

Second Year					
Third Semester			Fourth Semester		
Course ID	Course Name	Credit Hours	Course ID	Course Name	Credit Hours
20401112	Power Electronics Lab.	1	20307221	PLCs	3
20304241	Protection and Control Devices	2	20307222	PLCs Lab.	1
20304242	Protection and Control Devices Lab.	1	20307291	Training	3
20404122	Digital fundamentals Lab.	1	20307292	Project	3
20304111	Electrical Machines	3	20307231	Electrical Motor Drive Systems	3
20307211	Control Technology	2	20307232	Electrical Motor Drive Systems Lab.	1
20307212	Control Technology Lab.	1	20404211	Microprocessors	3
20304114	Electrical Machines Lab.	1	20404212	Microprocessors Lab.	1
20401111	Power Electronics	3			
21702111	Communication Skills and Technical writing	3			
Total		18	Total		18

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Brief Description for Associate Degree in Engineering Program Specializations 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 المشرفة: قرآنية، وشعرية، وقصصية، من بينها نماذج من الأدب الأردني؛ يتوخى من قراءتها وتدوقها وتحليلها تحليلًا أدبيًا؛ 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"> 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)
<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>		

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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: 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)		
General Physics	21302111	3 (2-2)
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.		
General Physics lab	21302112	1 (0-3)
In this course, the student performs thirteen experiments in mechanics and in electricity.		

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Specialization Requirements

Electrical Circuits	20301113	3 (3-0)
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.		
Electrical Circuits Lab.	20301112	1 (0-3)
DC and AC circuits. Resonance. Measuring devices.		
Electronics	20403111	3 (3-0)
Semiconductor devices. Diodes: classification, characteristics and applications. Transistors: classification, characteristics and applications. Amplifiers. Oscillators. Logic gates and Integrated circuits: Basic functions, symbols and applications. Introduction to electronic measurements: Oscilloscope applications.		
Electronics Lab.	20403112	1 (0-3)
Use of oscilloscope in measurements. Investigation of characteristics of semiconductor devices. Construction and study of electronic circuits. Experiments in electronics have to cover the main electronic devices (diode, zener diode, diode applications, BJT, FET, op – amp, oscillator, SCR).		
Digital Fundamentals	20404121	2 (2-0)
Study of numerical systems, theory of Boolean algebra and logic circuits, applications to different types of circuits, study of flip-flops, counters, registers and accumulators, digital system memory including ROM, RAM, and EPROM.		
Digital Fundamentals Lab.	20404122	1 (0-3)
Testing and troubleshooting instruments, Logic circuits, adders, comparators, encoders and decoders, flip-flops, counters, registers, memories RAM, ROM, EPROM.		
Power Electronics	20401111	3 (3-0)
Principles and Methods of Electric Power Conversion. Complementary Components and Systems. AC-to-DC Converters. AC-to-AC Converters. DC-to-DC Converters. DC-to-AC Converters. Switching Power Supplies. Power Semiconductor Devices. List of Principal Symbols. Semiconductor Power Switches. Phase-Controlled Converters. . Cycloconverters. Voltage-Fed Converters. Current-Fed Converters. Choppers. Basic calculations. Waveforms. Applications		
Power Electronics Lab.	20401112	1 (0-3)
Test of semiconductor devices. Investigation of characteristics of power electronics devices. Investigation of rectifier, chopper, and inverter circuits under different loads (R, L-loads).		

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Control Technology	20307211	3 (3-0)
Basic concepts. Open-loop and closed loop control systems. Representation of systems using block diagrams, transfer functions and frequency characteristics. Modes of linear control. Controller tuning. PC-based control systems.		
Control Technology Lab.	20307212	1 (0-3)
Experimental study and investigation of open-loop and closed loop systems and their elements using mathematical and physical models. Study of first and second order systems performance		
Electrical Machines	20304111	3 (3-0)
This course throws light on all 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 .		
Electrical Machines Lab.	20304114	1 (0-3)
This course focus ,on connection of various types of electrical machines , measurement of losses and efficiency ,speed control and mechanical characteristics of types of motors ,external characteristics of generators.		
Electrical Motor Drive Systems	20307231	3 (3-0)
Definition of electrical drive system. Elements of electrical drive system. DC and AC drive systems. Conversion of electrical energy into mechanical energy. Transmission of mechanical power. Main characteristics and modes of drive systems. Principles of speed control in drive systems using timers, relays, limit switches and speed signals. Open-loop speed control using variable voltage, flux and resistance in armature circuit. Closed-loop control of motor speed. Servo drives systems. Static control using ICs, and microprocessors		
Electrical Motor Drive Systems Lab.	20307232	1 (0-3)
Investigation of torque/speed characteristics of drive systems. Automatic start, stop and reverse of drive systems. Speed control. Effect of feedback on torque/ speed characteristics. Servo drives		
Microprocessors	20404211	3 (3-0)
Introduction to microprocessors architecture, instruction set, assemblers and assembly language programming, software development, microprocessors applications.		
Microprocessors Lab.	20404212	1 (0-3)
Data transfer, Arithmetic Operations, Looping, Subroutines, General programs, Applications.		

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Protection and Control Devices	20304241	2 (2-0)
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.		
Protection and Control Devices Lab.	20304242	1 (0-3)
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		
Programmable Logic Controllers	20307221	3 (3-0)
Comparison between relays and programmable controllers, basic structure of PLC, cycle-scan. CPU memory, Registers, timers, and counters addresses I/O modules, interfacing programming instructions, Programming devices programming procedures, peripheral equipments, troubleshooting and maintenance		
Programmable Logic Controllers Lab.	20307222	1 (0-3)
Realizing a definite number of cycle for two double acting cylinders, Realizing a discrete time-driver sequential control system by using limit switches or proximity switches, Realizing a discrete time-driver sequential control system, Investigating TON and TOFF timers with practical application, Investigating TRTG and TMOPN timers with practical application, Investigating UP and Down counters with practical application, Investigating UP- down and ring counter with practical application, Application of duty – cycle generator to generate train of pulses, Application of function : move , compare rotate and shift registers , and set-reset function		
Training	20307291	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	20307292	3
An integrated assembly/design practical work related to the major fields of study.		

