

Curriculum for Associate Degree Program in Instrumentation and Process Control Specialization

The curriculum of associate degree program in “Instrumentation and Process Control” 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 Instrumentation and Process Control 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	

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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	20301113*
20403111	Electronics	3	3	-	20301113*
20403112	Electronics Lab	1	-	3	20403111*
20404121	Digital Fundamentals	2	2	-	20403111
20404122	Digital Fundamentals Laboratory	1	-	3	20404121*
20304241	Protection and Control Devices	2	2	-	-
20304244	Protection and Control Devices Laboratory	1	-	3	20304241*
20306111	Pressure and Level Measurements	3	3	-	-
20306112	Pressure and Level Measurements Lab	1	-	3	20306111*
20306221	Flow and Temperature Measurements	3	3	-	-
20306222	Flow and Temperature Measurements Lab	1	-	3	20306221*
20306231	Signal Conditioning and Processing	2	2	-	20404121
20306232	Signal Conditioning and Processing Lab	1	-	3	20306231*
20306241	Process Control	3	3	-	20306111*+ 20306221*
20306242	Process Control Lab	1	-	3	20306241
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*
20306291	Training**	3	-	-	-
20306292	Project	3	-	-	-
Total		43	27	30	-

* Co-requisite

** Equivalent to 280 training hours

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**Study Plan for Associate Degree
in
Instrumentation and Process Control**

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
		1			
21301111	General Mathematics	3	20201121	Engineering Materials	2
21302111	General Physics	3	20301113	Electrical Circuits	3
21302112	General Physics Lab.	1	20301114	Electrical circuits Lab.	1
21901100	Islamic Culture	3	20403111	Electronics	3
20506111	Occupational Safety	2	20403112	Electronics Lab.	1
			21702111	Communication Skills and Technical Writing	3
Total		18	Total		18

Second Year					
Third Semester			Fourth Semester		
Course ID	Course Name	Credit Hours	Course ID	Course Name	Credit Hours
20304241	Protection and Control Devices	2	20306241	Process Control	3
20304242	Protection and Control Devices Lab.	1	20306242	Process Control Lab.	1
20404121	Digital Fundamentals	2	20308291	Training	3
20404122	Digital fundamentals Lab.	1	20308292	Project	3
20306111	Pressure and Level Measurements	3	20306221	Flow and Temperature Measurements	3
20306112	Pressure and Level Measurements Lab.	1	20306222	Flow and Temperature Measurements Lab.	1
20306231	Signal Conditioning and Processing	2	20404211	Microprocessors	3
20201111	Engineering Workshops	1	20404212	Microprocessors Lab.	1
20306232	Signal Conditioning and Processing Lab.	1			
20307221	PLCs	3			
20307222	PLCs Lab.	1			
Total		18	Total		18

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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"> 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.	20301114	1 (1-3)
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	3 (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)
Numerical systems, operations, and codes, logic gates, Boolean algebra and logic simplification, combinational logic and function of combinational logic, flip – flops, counters, shift registers. Fixed – function Integrated Circuits, and Programmable Logic Devices (PLDs).		
Digital Fundamentals Lab.	20404122	1 (0-3)
Experiments in digital fundamentals have to cover logic gates, combinational logic, flip – flops, counters, shift registers.		
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 student practical skills in order to select, wire, troubleshoot and maintain the most common control and protection devices like fuses, circuit breakers relays, contactors, timers and switches .		
Pressure and Level Measurements	20306111	3 (3-0)
The course shall cover the different methods to measure the pressure of gasses, liquids and solid materials. Different level measurement methods shall be also treated. Calibration and installation of pressure and level instruments is also to be covered.		

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Pressure and Level Measurements Lab.	20306112	1 (0-3)
The student shall carry out the required experiments demonstrating different methods of level and pressure measurement by using capacitive and resistive transducers. LVDT is used also for level and a pressure measurement, calibration of pressure gauges by using dead weight tester is practiced.		
Flow and Temperature Measurements	20306221	3 (3-0)
Study of differential pressure and variable area method flow meter. Different types of flow meters. Basic concepts of temperature scales units, measuring methods and devices like TC, RTD, Bimetallic, thermocouple, semiconductor and filled system thermometers.		
Flow and Temperature Measurements Lab.	20306222	1 (0-3)
The practical activity includes the study of different methods to measure flow and temperature such as RTD, Thermocouple, Thermistor, Rotameters, Venturi tubes, Orifice plates and optical sensing propeller flow meter.		
Signal Conditioning and Processing	20306231	2 (2-0)
The course covers important issues related to noise and guarding techniques, filtering, signal conversion amplification, modulation. Signal detection and data acquisition and transmission.		
Signal Conditioning and Processing Lab.	20306232	1 (1-3)
The course covers the following topics: signal amplification, filtering, modulation and demodulation, conversion and detection and data acquisition.		
Process Control	20306241	3 (3-0)
Introduction to process control, studying transfer functions for basic elements P, I and D setting controls. Modes of automated process control on- off, P, PI and PID setting controls, Realizing the different control modes using operational amplifiers, open-loop control using PLC and computers and reading schematics of processes by using ISA.		
Process Control Lab.	20306242	1 (0-3)
Laboratory activities include the level, flow, temperature and pressure controls using Pneumatic and electrical control systems. The students shall do the necessary settings for the on-off, P, PI and PID controllers. Open-Loop controls are investigated using operational amplifiers. Conversion from P/me and me/P shall also be investigated.		
Microprocessors	2040421	3 (3-0)
Introduction to microprocessors architecture, instruction set, assemblers and assembly language programming, software development, microprocessors applications.		

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Microprocessors Lab.	20404212	1 (0-3)
Data transfer, Arithmetic Operations, Looping, Subroutines, General programs, Applications.		
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 (1-3)
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	20306291	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	20306292	3
An integrated assembly/design practical work related to the major fields of study.		

