Department of Electronic Engineering Technology

Communication Engineering Technology

Major Core Courses (42 Credits)

Code	No.	Course Name	Cr	Hrs	Theo	Lab	Field	Pre-req.
53	135	Electrical Circuits (1)	4	6	3	3	0	
53	136	Electrical Circuits (2)	4	6	3	3	0	53/135, 76/105
53	137	Electronics (1)	4	6	3	3	0	53/135, 56/113
53	238	Electronics (2)	4	6	3	3	0	53/137
53	139	Digital Circuits	4	6	3	3	0	
53	242	Embedded Systems	4	6	3	3	0	53/139, 60/108
53	105	Electronic Workshop	1	3	0	3	0	
53	307	Electronic Project (communication)	2	3	1	2	0	53/263, 53/242, 53/207
53	263	Communication Theory	3	4	2	2	0	53/136
53	264	Digital Communications	3	4	2	2	0	53/263, 53/139
53	256	Electromagnetic Applications	3	4	2	2	0	53/136
53	359	Antenna Theory	2	2	2	0	0	53/256
53	399	Field Training	4	16	0	0	16	30/162

Major Elective Courses (6 Credits)

Code	No.	Course Name	Cr.	Hrs.	Theo.	Lab.	Field	Pre-req.
53	356	Microwave Communications	3	4	2	2	0	53/256
53	358	Optical Communications	3	4	2	2	0	53/263
53	364	Communication Electronics	3	4	2	2	0	53/263, 53/137
53	366	Selected topics in Communications	3	3	3	0	0	53/263
53	367	Digital Communication Networks	3	3	3	0	0	53/264
53	369	Computer Applications in comm.	3	4	2	2	0	53/263, 76/106

Computer Engineering Technology

Major Core Courses (42 Credits)

Code	No.	Course Name	Cr.	Hrs.	Theo.	Lab.	Field	Pre-req.
53	129	Electrical Circuits Fundamentals	4	6	3	3	0	
53	137	Electronics (1)	4	6	3	3	0	53/129, 56/113
53	139	Digital Circuits	4	6	3	3	0	
53	242	Embedded Systems	4	6	3	3	0	53/139, 60/108
60	132	Comp. Programming Language (1)	4	6	3	3	0	76/105, 60/108
60	205	Computer Maintenance	3	5	2	3	0	
60	307	Computer Project	2	4	1	3	0	60/230, 53/242, 30/162
60	222	Computer Operating System	3	3	3	0	0	60/205, 60/132
60	230	Comp. Programming Language (2)	3	3	3	0	0	60/132
60	348	Comp. Organization & Architecture	3	3	3	0	0	53/242, 60/205
60	255	Computer Networks (1)	4	6	3	3	0	53/139
60	399	Field Training	4	16	0	0	16	30/162, 60/255

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Major Elective Courses (6 Credits)

Code	No.	Course Name	Cr.	Hrs.	Theo.	Lab.	Field	Pre-req.
60	211	Computer applications	3	5	2	3	0	60/132
60	251	Communication of Digital Information	3	3	3	0	0	53/139
60	354	Computer Networks (2)	3	3	3	0	0	60/255
60	293	Introduction to Data Structures	3	5	2	3	0	60/132
60	360	Selected topics in Computer Eng.	3	3	3	0	0	60/132, 205,255
60	231	Object Oriented Programming	3	4	2	2	0	60/132
60	347	Microprocessors Peripherals	3	4	2	2	0	53/242
60	242	Internet Programming	3	4	2	2	0	60/132
60	234	Logic Circuit Families	3	3	3	0	0	53/139,137

Biomedical Equipment Technology

Major Core Courses (42 Credits)

Code	No.	Course Name	Cr.	Hrs.	Theo.	Lab.	Field	Pre-req.
53	135	Electrical Circuits (1)	4	6	3	3	0	
53	136	Electrical Circuits (2)	4	6	3	3	0	53/135 , 76/105
53	137	Electronics (1)	4	6	3	3	0	53/135, 56/113
53	238	Electronics (2)	4	6	3	3	0	53/137
53	139	Digital Circuits	4	6	3	3	0	
53	242	Embedded Systems	4	6	3	3	0	53/139, 60/108
53	105	Electronic Workshop	1	3	0	3	0	
68	307	Electronic Project (Biomedical)	2	3	1	2	0	68/290, 53/207, 53/242
68	191	Biomedical Principles	2	2	2	0	0	
68	290	Biomedical Measurements (1)	3	4	2	2	0	68/191, 53/135
68	391	Biomedical Measurements (2)	3	4	2	2	0	68/290
68	289	Therapeutic Equipment	3	4	2	2	0	68/191, 53/135
68	399	Field Training	4	16	0	0	16	68/290, 30/162

Major Elective Courses (6 Credits)

Code	No.	Course Name	Cr.	Hrs.	Theo.	Lab.	Field	Pre-req.
68	294	Medical Imaging	3	4	2	2	0	68/191, 53/139
68	296	Hospital Supplies	3	3	3	0	0	68/191, 53/135
68	396	Maintenance of Biomedical Equipment	3	4	2	2	0	68/191
68	397	Computer applications in Biomedical Equipment	3	4	2	2	0	68/290, 76/106
68	398	Selected topics in Biomedical Electronics	3	3	3	0	0	68/391

Industrial Electronics Technology

Major Core Courses (42 Credits)

Code	No.	Course Name	Cr.	Hrs.	Theo.	Lab.	Field	Pre-req.
53	135	Electrical Circuits (1)	4	6	3	3	0	
53	136	Electrical Circuits (2)	4	6	3	3	0	53/135 , 76/105
53	137	Electronics (1)	4	6	3	3	0	53/135, 56/113
53	238	Electronics (2)	4	6	3	3	0	53/137
53	139	Digital Circuits	4	6	3	3	0	
53	242	Embedded Systems	4	6	3	3	0	53/139, 60/108
53	105	Electronic Workshop	1	3	0	3	0	
69	307	Electronic Project (Industrial Elect.)	2	3	1	2	0	69/274, 53/207, 53/242
69	274	Automatic Control	4	5	3	2	0	53/137
69	275	Industrial Electronics	4	5	3	2	0	53/238
69	370	Industrial Instrumentation	3	4	2	2	0	69/274
69	399	Field Training	4	16	0	0	16	30/162

Major Elective Courses (6 Credits)

Code	No.	Course Name	Cr.	Hrs.	Theo.	Lab.	Field	Pre-req.
69	382	Programmable Logic Controllers	3	4	2	2	0	53/139
69	385	Computer Based Control	3	3	3	0	0	69/274
69	386	Microprocessor Applications	3	4	2	2	0	53/242
69	376	Robotics	3	4	2	2	0	69/274
69	377	Computer app. In Industrial Electronics	3	4	2	2	0	69/274, 76/106
69	379	Selected topics in Industrial Electronics	3	3	3	0	0	69/370

Courses Description

Department of Electronic Engineering Technology

Communication Engineering Technology Courses:

53-105 Electronic Workshop **Credits:1** **Hrs:3**

Introduction to graphical symbols of electronic components, standards, and abbreviations. Schematic, block, and logic diagrams printed circuit boards. Safety and good practice and procedures in workshop. Recognition of passive and active electronic components. Introduction to electrical measurements devices: voltmeters and ammeters. Hand tools and soldering. Basic concepts in system operation, testing, and troubleshooting. Calibration of different types of equipment and systems.

53-129 Electrical Circuits Fundamentals **Credits: 4** **Hrs:6**

Introduce the fundamentals of DC electrical circuits, electrical variables, ohm's law, analysis of series, parallel, and series-parallel circuits, Kirchhoff laws, mesh and nodal analysis, electrical power and energy, circuit theorems. Introduce capacitors and inductors, the characteristics of AC signals.

53-135 Electrical Circuits (1) **Credits: 4** **Hrs.:6**

This course covers the theory and analysis of DC electric circuits: Current, Voltage, Resistance, Energy and Power. Ohm's Law, KVL and KCL. Series, parallel, and Series-Parallel circuits. Analysis methods (Mesh current, and Node Voltage). Circuit Theorems (Superposition, Thevenin, Norton, and Maximum power transfer). Capacitors and RC circuits. Inductors and RL circuits.

53-136 Electrical Circuits (2) **Credits:4** **Hrs:6**

Fundamentals of AC electrical circuits, phasors, and complex numbers. Analysis of RC, RL, and RLC circuits. Series and parallel resonances. Transformers and their applications.

Prerequisite: 53-135

53-139 Digital Circuits **Credits: 4** **Hrs:6**

Introducing the Fundamentals of number system of Binary, Hexadecimal, BCD and ASCII codes. Learning different types of logic gates, truth tables, Boolean Algebra and theorems including De Morgan's Theorems. Implementing digital logic circuits from Boolean expressions. Learning algebraic simplification, sum-of-product, and product-of-sum expression. Designing logic circuits using Karnaugh maps. Exploring different types of Flip Flop devices and their timing consideration, their applications as clocks, counters, registers, and storage devices. Learning the different types of Asynchronous, Synchronous counters, and Shift Registers. Designing Encoders, Decoders, Multiplexers, and De-multiplexer's circuits. A set of laboratory experiments provide students with practical knowledge on the above digital elements.

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53-137 Electronics (1) **Credits: 4** **Hrs:6**

Study of P-N junction diodes and their applications as rectifiers and regulators. Transistors such BJT's and FET's and their D.C and small-signal analysis. Operational amplifier basic circuits. Laboratory exercises include circuit construction, testing, and documentation procedures.

Prerequisite: 53-135, 56-113

53-207 Electronic Workshop Skills **Credits: 2** **Hrs:3**

Introduction to basic troubleshooting strategies and techniques. Basic diagnosis of common circuit faults, such as open and short circuit. Measurement and testing devices including digital multimeter, oscilloscope, and digital probe. Workshop organization and common tools and equipment used in the workshop. Maintenance reports format and terminology. Workshop safety precautions, electric hazards, and electrostatic risk to components.

Prerequisite: 53-105, 53-135

53-238 Electronics (2) **Credits: 4** **Hrs:6**

Analysis of multistage amplifiers, active filters, power amplifiers and feedback oscillator circuits. Basic analog integrated circuits, voltage regulators, and wave shaping circuits.

Prerequisite: 53-137

53-242 Embedded Systems **Credits: 4** **Hrs:6**

The course presents embedded system building blocks. It covers embedded microcontroller's architecture, instruction set, interrupts, timers and programming in assembly language, memory technologies, basic I/O devices (such as keypad and LCD), and embedded microcontroller interfacing to memory and I/O devices.

Prerequisite: 53-139, 60-108

53-256 Electromagnetic Applications **Credits: 3** **Hrs:4**

The course covers electromagnetic wave propagation and transmission. Topics include: Electric field vs. magnetic field propagation in transmission lines and in space. Basic phenomena such as the environmental effects on wave propagation and transmission are also included.

Prerequisite: 53-136

53-263 Communications Theory **Credits: 3** **Hrs:4**

Introduction to analog modulation and demodulation techniques used in analog broadcasting and telephony, such as amplitude, frequency, and phase modulation. Representation of periodic and aperiodic signals in time and frequency domains. Active and passive filters.

Prerequisite: 53-136

53-264 Digital Communications **Credits: 3** **Hrs:4**

Introduction to digital signal communications. Comparison of digital communication methods with analog communication methods. Methods of coding, modulation, and demodulation of signals.

Prerequisite: 53-263, 53-139

53-399 Field Training **Credits: 4** **Hrs:16**

Applied training in real-time communication devices and systems, including maintenance and troubleshooting. An oral presentation and final written technical report are required.

Prerequisite: 30-162, Number of passed credits set by CTS

53-307 Electronic project **Credits: 2** **Hrs:3**

Applied project in communication under the supervision of department faculty. A written technical report and oral presentation describing the project operation are required.

Prerequisite: 53- 263, 53-242, 53-207

53-356 Microwave Communications **Credits:3** **Hrs:4**

Microwave components and devices commonly used in microwave and wireless communication, including waveguides, passive components, active devices, and microwave resonators, power dividers, filters, amplifiers, oscillators, and mixers.

Prerequisite: 53-256

53-359 Antenna Theory **Credits: 2** **Hrs:2**

Fundamental properties of antennas, types, transmission, and reception of electromagnetic waves. Effects of medium and atmosphere on wave propagation and applications in wireless networks.

Prerequisite: 53-256

53-358 Optical Communications **Credits: 3** **Hrs:4**

Operational principle of different components used in optical communication systems, include generation, transmission, manipulation, and detection of light. Passive and active devices in optical devices and systems.

Prerequisite: 53-263

53-364 Communication Electronics **Credits: 3** **Hrs: 4**

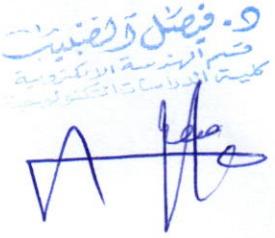
Hardware implementation of AM and FM modulators/Demodulators, including transmitter and receiver circuit. Multiplexing techniques such as FDMA, and TDMA.

Prerequisite: 53-263, 53-137

53-366 Selected Topics in Comm. Eng. **Credits: 3** **Hrs:3**

Selected topics in communication theory and design covering the latest advances in communication technology.

Prerequisite: 53-263



53-367 Digital Communication Networks **Credits: 3** **Hrs:3**

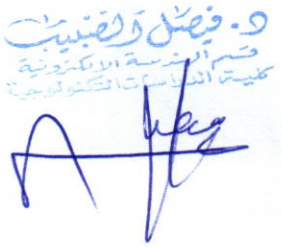
Introduction to the basic concepts of communication networks. Introduction to network protocols and networks layers. Basic transmission media and their characteristics, basic data transmission and data flow techniques through communication networks. Network architectures and topologies such as LAN, WAN, and MAN. Basic concepts of network security.

Prerequisite: 53-264

53-369 Computer Applications in Comm. Eng. **Credits: 3** **Hrs:4**

Introduction to computer hardware and software in various communication systems. The role of computers as an integral part in modern communication system operation. Introduction to software-defined radio (SDR). Simulation/calculation software packages are also introduced.

Prerequisite: 53-263, 76-106



Computer Engineering Technology Courses:

60-108 Introduction to Programming **Credits: 2** **Hrs:3**

Introduction to the basic principles of computer programming using a high-level programming language. The topics include basic data types, variable declaration, assignment, operators, flow-control, decisions, repetition, and the basic use of arrays. The course also covers function declaration and function call. Students will create simple programs to solve typical engineering problems.

60-132 Computer Programming Language (1) **Credits: 4** **Hrs: 6**

Introduction to structural programming including memory concepts, decision making, and relational operators. Top-down control structures. Logical operators using repetition structure. Function definitions, prototypes, and application to modular programming. Declaring and storing for simple and multiple-subscripted Array and Pointers. Structures and I/O.

Prerequisite: 76-105, 60-108

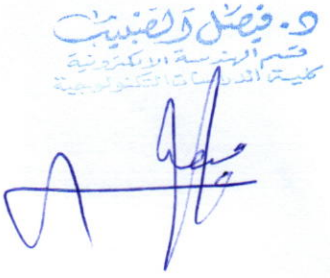
60-205 Computer Maintenance **Credits: 3** **Hrs:5**

Introduction to hardware, peripherals, and software with emphasis on computer operations, terminology, and organization. Installation, configuration, maintenance, diagnoses and troubleshooting of computer problems.

60-211 Computer Applications **Credits: 3** **Hrs:5**

Principles of Application design and development. The topics include user interface as well as database design and development. This includes the linking of the frontend with the backend.

Prerequisite: 60-132



60-222 Computer Operating Systems **Credits: 3** **Hrs:3**

Operation system. Structures and interrupt-Based I/O. Dual-Mode operation and hardware protection components. Synchronization, deadlock characterization, prevention, avoidance, and recovery. Memory Management, virtual memory, and file system organization.

Prerequisite: 60-205, 60-132

60-231 Object Oriented Programming **Credits: 3** **Hrs:4**

Introduction to object-oriented programming Java application applets, control structures, methods, arrays, string, graphics, and GUI components.

Prerequisite: 60-132

60-230 Computer Programming Language (2) **Credits: 3** **Hrs:3**

Introduction to object-oriented programming concepts including classes, objects, methods, encapsulation, inheritance, polymorphism, and interfaces. Graphical user-interface programming is also introduced.

Prerequisite: 60-132

60-234 Logic Circuits Families **Credits: 3** **Hrs:3**

Basic electronic components such as diodes, transistors, and FETs, in the construction of digital logic gates. Switching operations of transistor circuits and analysis of different logic families that constitute the building blocks of microprocessors in general.

Prerequisite: 53-137, 53-139

60-242 Internet Programming **Credits: 3** **Hrs:4**

This course covers the fundamentals of internet programming, including client-side and server-side scripting. Students will gain practical experience through hands-on projects using web technologies such as HTML, CSS, and JavaScript. Upon completion of the course, students will be able to develop dynamic, interactive web applications.

Prerequisite: 60-132

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60-251 Communication of Digital Information **Credits: 3** **Hrs: 3**

Introduction to digital data communication. Analog to digital conversion, baseband modulation techniques, and data scrambling schemes. Bandpass modulation schemes, data compression, data encoding, and error detection techniques. Multiplexing techniques. Relationship between bit and sample rates and their relation to channel bandwidth and capacity. Link budget calculation.

Prerequisite: 53-139

60-255 Computer Networks (1) **Credits: 4** **Hrs:6**

This course introduces the students to computer networking, including local area networks, protocols, standards, topologies, networking media, TCP/IP addressing, and networking hardware.

Prerequisite: 53-139

60-292 Introduction to Data Structures **Credits: 3** **Hrs:5**

Introduction to algorithmic problem solving, basic data structures, arrays, stacks, queues, linked lists, trees and graphs. Searching, sorting and hashing techniques for different data structures.

Prerequisite: 60-132

60-399 Field Training **Credits: 4** **Hrs:16**

Applied training related to computer applications in private or public institutes. A detailed oral presentation and written technical report are required upon completion of the course.

Prerequisite: 30-162, 60-255 + Number of passed credits set by CTS

60-307 Computer Project **Credits: 2** **Hrs:4**

The design, construction, and presentation of an original project related to computer hardware and software. The project maybe assigned to an individual student or team of students. Detailed written and oral progress and final reports are required.

Prerequisite: 60-230, 53-242, 30-162

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60-347 Microprocessor Peripherals **Credits: 3** **Hrs.: 4**

The course presents digital and analog serial and parallel techniques to interface a microprocessor/Microcontroller with peripherals including keyboard, display, timer, sensors, and actuators. For each peripheral, students will learn the operation, configuration, and programming of the associated IC chip. The course will also include hardware implementation of interrupts.

Prerequisite: 53-242

60-349 Computer Organization and Architecture **Credits: 3** **Hrs:3**

This course covers basic topics about computer architecture and organization. The course provides the study of the structure, characteristics and operation of computer system including a basic background, its design process and its internal characteristics which includes processor components, control unit architecture, memory organization and system organization. All internal components of a computer including processors, memories, and input/output connections are considered from an architectural perspective. Integer and floating-point representation in arithmetic logic unit (ALU) with arithmetical operations are explained. Operating system principles are also described.

Prerequisite: 53-242, 60-205

60-354 Computer Networks (2) **Credits: 3** **Hrs:3**

This course introduces the students to WAN topologies,transmission methods and technologies including X25 and Frame Relay, ISDN, DSL, SONET. Wireless networking including wireless spectrum, wireless-LAN/wireless-WAN architechure and implementation. TCP/IP addressing, services, utilities, and tool utilized troubleshooting. Virtual networks and access remote.

Prerequisite: 60-255

60-360 Selected Topics in Comp. Eng. **Credits: 3** **Hrs:3**

Selected topics covering different aspects and trends in computer engineering technology.

Prerequisite: 60-132, 60-205, 60-255

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60-109 Introduction to Information Security **Credits: 2** **Hrs:3**

The course provides students with the knowledge needed to protect computers, and networks from increasingly sophisticated attacks, helps them to understand how hackers and bots can access your system and how to keep your information and personal data safe from online fraud. Topics include: Introduction to cyber security, personal security, computer security, internet security, mobile security, and privacy.

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Biomedical Equipment Technology Courses:

68-191 Biomedical Principles **Credits: 2** **Hrs.: 2**

The course provides the student with a suitable medical background to better understand the theory of biomedical equipment covered in subsequent courses. The course will focus on studying the main physiological systems of the human body, human anatomy, and common medical terminology used by the medical staff in hospitals or other healthcare facilities.

68-290 Biomedical Measurements (1) **Credits: 3** **Hrs: 4**

The course introduces the concepts of bio-signals and electronic circuits used to collect, condition, and display bio-signals. The course provides in-depth studies of diagnostic equipment such as: ECG, EMG, and EEG. The student learns to focus on issues such as: physiological background, theory of operation, calibration, maintenance, inspection, safety, and report writing.

Prerequisite: 68-135, 68-191

68-289 Therapeutic Equipment **Credits: 3** **Hrs: 4**

The course introduces common therapeutic equipment related to the cardiovascular and respiratory systems such as: pacemakers, defibrillators, ventilators. In addition, the course covers other therapeutic equipment which includes hemodialysis machines, shortwave and microwave diathermy, electrosurgical generators, infusion and suction pumps, radiotherapy, and biomedical lasers. The course focuses on presenting the basic theory, application, operation, and the safe technical servicing of the aforementioned equipment.

Prerequisite: 53-135, 68-191

68-294 Medical Imaging **Credits: 3** **Hrs: 4**

This course introduces common medical imaging modalities such as: X-rays, CT, Ultrasound, MRI, and Nuclear Medicine. The course focuses on the basic theory, instrumentation, safety considerations, advantages, and shortfalls of each modality. A brief overview of digital image processing and the role of computers are also presented.

Prerequisite: 68-191, 53-139

68-296 Hospital Supplies **Credits: 3** **Hrs:3**

Introduction to the main hospital departments and major equipment and instruments used. Proper installation of medical equipment and their supply of water, gas electricity, and ambient conditions required for operation.

Prerequisite: 68-191, 53-135

68-399 Field Training **Credits: 4** **Hrs:16**

The course provides extensive field training in a biomedical engineering workshop at a public or private healthcare facility where the student gets familiarized with future work environment as a biomedical equipment technician. This Training intends to expose the student to a real job setting where he/she can apply his technical knowledge to manage, troubleshoot, and maintain medical equipment. The student also practices to be part of a technical team, therefore developing team work skills. The student learns how to write a technical report regarding the theory of operation, common faults, and maintenance procedures of four commonly used machines in the hospitals.

Prerequisite: 30-162, 68-290 + Number of passed credits set by CTS.

68-307 Electronic project **Credits: 2** **Hrs:3**

The course requires that the student use technical skills learned from previous courses to design, construct, and test an original project related to a medical device or circuit. The project may be assigned to an individual student or to a team of students. Detailed written final report and oral presentation are required upon completion of the project.

Prerequisite: 68-290, 53-207, 53-242

68-391 Biomedical Measurements (2) **Credits: 3** **Hrs:4**

This course introduces students to advanced biomedical measurement principles and equipment which are used to diagnose and monitor diseases of the cardiovascular and respiratory systems. In addition, the course covers the principles of various medical laboratory equipment and ultrasonic measurements. Specifically, the course will focus on measurements of blood pressure, blood flow, blood volume, blood composition, heart sounds, pulse oximetry; spirometers and related respiratory measurements; audiometers and acoustic measurements; human temperature, bone densitometry, and skin galvanic resistance.

Prerequisite: 68-290

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68-396 Maintenance of Biomedical Equipment **Credits: 3** **Hrs:4**

Introduction to classical and modern maintenance techniques and troubleshooting of biomedical equipment. Use of service manuals and testing devices safely and efficiently for fault-finding.

Prerequisite: 68-191

68-397 Computer Applications in Bio. Equip. **Credits: 3** **Hrs:4**

Introducing advances in computer hardware and software and their increasing role in various biomedical equipment. General and specific 'up-to-date' examples illustrated to demonstrate the integration with biomedical equipment in providing functions such as storage, control, and communication.

Prerequisite: 68-290, 76-106

68-398 Selected Topics in Bio. Electronics **Credits: 3** **Hrs:3**

Selected topics covering different aspects and trends in biomedical electronics.

Prerequisite: 68-391

Industrial Electronics Technology Courses:

69-275 Industrial Electronics **Credits: 4** **Hrs: 5**

The principle behind process control switches, their application and power ratings. The use of electronic switches such as Thyristors, Triac, and Diac and their applications electronic power circuits. Applications in the field of process control including Phase control circuit, zero-voltage switching circuit, AC and DC motor control circuits. Electronic sensors and their basic use in industry. Process control and sequential control fundamentals.

Prerequisite: 53-238

69-274 Automatic Control **Credits: 4** **Hrs:5**

This course aims to provide students with the basic concepts of control systems, open loop and closed loop systems. The block diagram representation is used to model the control systems, also any physical system can be represented by means of mathematical models. Describing several devices used in a servo control system such as dc-motors, tachometers, potentiometers, and operational amplifiers. Study the transient and steady state responses of simple closed-loop control systems. Frequency response analysis using Bode plot is introduced and compensation techniques are used to stabilize and/or improving the performance.

Prerequisite: 53-137

69-399 Field Training **Credits: 4** **Hrs:16**

The student applies his technical knowledge to diagnose and perform maintenance tasks on real industrial electronic devices and systems. An oral presentation and final written technical report are required.

Prerequisite: 30-162, Number of passes credits set by CTS

69-307 Electronic Project **Credits: 2** **Hrs:3**

Applied electronic project in industrial electronics under the supervision of department faculty. A written report and oral presentation describing the project operation are required.

Prerequisite: 69-274, 53-242, 53-207

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69-370 Industrial Instrumentation **Credits: 3** **Hrs:4**

Study of electrical and electronic process sensors and actuators in a variety of applications. Practical application of complete systems.

Prerequisite: 69-274

69-382 Programmable Logic Controllers **Credits: 3** **Hrs:4**

In this course students will be introduced to the fundamental concepts of programmable logic controllers, principles of operation, and numbering systems as applied to electrical control systems. At the end of this course, they will be able to identify and describe digital logic circuits and explain numbering systems; explain the operation of programmable logic controllers; convert ladder diagrams into programs; incorporate timers and counters utilizing programmable logic controllers; and execute and evaluate programs.

Prerequisite: 53-139

69-385 Computer – Based Control **Credits: 3** **Hrs:3**

Analysis and design of control systems, implementation of control systems using digital electronic systems. Applications to electrical systems. Identify basic concepts and practical aspects of computer–based control systems. Understand General flowcharts of algorithms of microprocessors used in classical control strategies.

Prerequisite: 69-274

69-386 Microprocessor Applications **Credits: 3** **Hrs:4**

A study of microprocessor applications regarding both hardware implementation and software design aspects of the problem. This is done through presenting some selected practical examples. This course concludes with a full account of an operable practical example.

Prerequisite: 53-242

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69-376 Robotics **Credits: 3** **Hrs:4**

Basic concepts and practical aspects of robotics, including history, geometry, end-effect, design, types, sensors, and programming. Application of robotics in industries and end-operation.

Prerequisite: 69-274

69-377 Computer App. in Industrial Electronics **Credits: 3** **Hrs:4**

Introduction to computer hardware and software in various industrial electronics and control arrangements. General and specific illustrations of how to integrate computers in such systems to do control and measurement functions.

Prerequisite: 69-274, 76-106

69-379 Selected Topics in Industrial Electronics **Credits: 3** **Hrs: 3**

Selected topics covering different aspects and trends in industrial electronics and control technology.

Prerequisite: 69-370

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