

Brief Courses descriptions for Electrical Engineering Program's Curriculum

Study Plan 2022-2023

Electric Circuits I (610211):

The main goals of this course is to introduce concepts of Electric circuits by studying the following main topics; electric circuit elements, techniques of circuit analysis, transient conditions, and the steady states analysis. At the completion of this course the student should be able to understand the principle of electric circuit design and application, Comprehend the principles of DC and AC circuits, understand the techniques to analyze different circuit configuration.

Prerequisite: General Physics (2) (216132)

Electric Circuits II (610212):

The main goals of this course is to introduce concepts of electric circuits by studying the following main topics; electric circuit elements, techniques of circuit analysis, Transient conditions, and the steady states analysis. At the completion of this course the student should be able to: Understand the principle of electric circuit design and application. Comprehend the principles of DC and AC. Understand the techniques to analyze different circuit configuration.

Prerequisite: Electric Circuits I (610211)

Electrical Circuits Lab. (610216):

The student learns the requirements for building simple DC/AC circuits. Students learn the use of power supplies, as well as, electric measuring devices and components.

Prerequisite: Electric Circuits I (610211)

Logic Circuits (610220):

This class is an introduction to the basic concepts, analysis, and design of digital systems. This consists of both combinational and sequential logic. Lectures will enable students to experience with several levels of digital systems.

Prerequisite: Programming language (610263)

Logic Circuits Lab. (610222):

To develop an understanding of the fundamental principles of logic circuits and to build digital logic circuits that can perform special applications such as decoders adders counter. Familiarization AND, OR, NOT, NOR, and NAND gates). De Morgan's theorems. Combinational circuits. MSI components. RS, JK, D and T. Flip-Flops. Sequential circuits. Registers and counters.

Prerequisite: Logic Circuits (610220)

Engineering Analysis II (0610262):

This course introduces students to the various numerical methods used for solving mathematical problems such as: non-linear equation, systems of linear equations, numerical integration and differentiation, solution of differential equations, and curve fitting techniques.

Prerequisite: Linear Algebra and Vector Calculus (250205)

Programming Language (610263)

This course introduces students to the basic concepts in programming: variables, data types, conditional statements, looping statements, functions and arrays. C++ language is used to demonstrate such concepts.

Prerequisite: Computer Remedial (750099)

Electromagnetics I (650313):

This is an introductory course on electromagnetism. It emphasizes fundamental concepts and laws leading to the formulation and application of mathematical equations to describe electric and magnetic fields.

Prerequisite: Engineering Analysis 1 (650260)

Electrical Machines (I) (610314):

This course will introduce the students for fundamental concepts and principles of operation of various types of electrical machines. It will equip the students with basic experimental and modeling skills for handling problems associated with electrical machines. It will give the students an appreciation of design and operational problems in the electrical power industry.

Prerequisite: Electromagnetic Field (650313)

Electrical Machines (I) lab. (610316):

To understand the operation performance of electrical machines operations and applications. At completing this module the student should be able to know the types of machines used in real life and understand its applications. Using measuring instrument to measure different machines ratings under operation and indicate its characteristics.

Prerequisite: Electrical Machines (1) (610314)

Microprocessors (610323):

This course covers the basic concepts of microprocessor based systems, and the assembly language for Intel microprocessor.

Prerequisite: Logic Circuits (610220)

Microprocessors Lab (630324):

This laboratory improves students skills in writing an assembly program that can be used to solve different problems. Familiarization with the Microprocessor Lab. Microprocessor Instruction Set-and Assembly Language Fundamentals. Writing, Debugging, and Executing Various assembly language programs. Memory (RAM) Interfacing. Microprocessor interfacing

Prerequisite: Microprocessors (610323)

Instrumentation and Measurement (610332):

This course will introduce the students to the basic measurement techniques, instrument construction, principle of operation, and measurement calculations.

Prerequisite: Electronics II (0650342)

Power Systems (I) (610411)

This course will introduce the students to basic concepts in electric power systems. It will help the student understand how the power system is modeled and how its performance is analyzed under normal as well as various fault conditions.

Prerequisite: Electrical Machines (1) (610314)

Power System (2) (610412):

This course will introduce the students to various important topics in power system analysis. These topics are (1) the load or power flow, (2) the stability of power systems, (3) over current protection of power systems, and (4) the economic dispatch

Prerequisite: Power Systems (1) (610411)+_Engineering Analysis II (0610262)

Automatic Control (610414):

The course is a requirement for level 4 of electric engineering students. It introduces the basic principles and analysis of control feedback systems.

Prerequisite: Instrumentation and Measurement (610332)+ Engineering Analysis 1 (650260)

Automatic Control Lab. (610416):

Measurement of motor characteristics: armature connection and field connection. Transient response of motors. Closed-loop position and speed control systems. Dead band and transient characteristics. Passive network compensation. Stabilization with Tacho generator feedback: frequency response measurement.

Prerequisite: Automatic Control (610414)

Power System Lab. (610417):

Introduce practical concept of Electrical Power systems. Transmission Line Performance and Characteristics, Reactive Power Compensation Using Parallel and series capacitor Bank, Various Method of Earthing, Symmetrical and Asymmetrical Faults ,Power System Protection.

Prerequisite: Power Systems (1) (610411)

Electric Installation (610419):

The course is an elective requirement for all electrical, telecommunication and computer engineering students. It introduces the basic principles and design of electrical wiring and installations in buildings and industrial plants. Students will learn to solve and design engineering problems of wiring and installations circuits.

Prerequisite: Power Systems (1) (610411)

Embedded Systems (610424):

The course is an introduction to microcontroller-based embedded systems design, development and implementation. It includes embedded system types, microcontroller architecture, programming, I/O interfacing, interrupt management and other related topics.

Prerequisite: Microprocessors (610323)

Engineering Project (I) (610440)

The course is a requirement for level 4 of electrical engineering students. It introduces the basic principles and analysis of scientific research and technical report writing.

Prerequisite: 100 Cr.H

Engineering Training (610499)

Field training which the electrical engineering students should undergo in reputable factories or companies in the private or public sectors. The training is for a period of seven weeks .

Prerequisite: 115 Cr.H

High Voltage Engineering (610510):

Giving a comprehensive material on planning, operating, and testing high-voltage electrical devices and designing the insulation coordination in order to ensure the reliable operation of the power network.

Prerequisite: Power Systems II (610412)

Power System Protection (610513):

The course is a requirement for the electrical engineering students. It introduces the basic philosophy and the principles, operation, and design of power system protection schemes. Students will learn the various types of the old and modern types of protective relays used in protection of power system components. Studying the principles for protecting different elements and studying different technologies used in designing protective relays. And relay coordination with the application of computer programs for protective schemes.

Prerequisite: Power Systems I (610411)

Electrical Machines II, (0610514):

The course is a requirement for all electrical engineering students. It introduces the basic principles and fundamental concepts of operation of various types of electrical AC machines, to be familiar with basic experimental and modeling skills for handling problems associated with electrical AC machines and operational problems in the electrical power industry.

Prerequisite: Electrical Machines I, (0610314):

Transmission and Distribution of Power Systems (610515):

The course aims to teach students how to design transmission and distribution power system. The students will learn how to choose the ratings of transformers, circuit breakers, and cross sectional area of cables and overhead lines needed to build transmission and distribution system.

Prerequisite: Power Systems I (610411)

Special topics in Electrical Engineering (610516):

The scope of this course will be chosen based on latest topic in electrical engineering.

Prerequisite: Department Approval

Operating and Control of Power Systems (610520):

The main objective of power system operation and control is to maintain continuous supply of power with an acceptable quality, to all the consumers in the system. The system will be in equilibrium, when there is a balance between the power demand and the power generated.

Prerequisite: Power Systems I (610411)

Power Electronics (610530):

The course is a requirement for the electrical engineering students. It introduces the principles, operation, and design of power electronics converter circuits, topologies, control techniques, and applications, analysis, losses and protection of power semiconductor devices.

Prerequisite: Electronics II (0650342)

Engineering Project (2) (610540):

The course is a requirement for level 5 for all electrical engineering students. It introduces the student to conduct some aspects of scientific research which include, objective statement, design steps, scheduling, prototyping, testing, verifying and final product.

Prerequisite: Engineering Project (1) (610440) + Engineering Training (610499)

Entrepreneurship (610550):

The course is a requirement for level 5 Engineering students. It introduces the students to the concept of entrepreneurship and how it is related to engineering practices, also the fundamentals of engineering economics.

Prerequisite: Engineering Skills (640253)

Power Systems Reliability (610586):

In general way, power system reliability addresses the issues of service interruption and power supply loss. In several cases, it is defined as an objective to attempt in terms of indices directly related to the customer. Typical reliability index values for US utilities are SAIFI, SAIDI, and CAIDI

Prerequisite: Power Systems I (610411)

Introduction to Renewable Energy (611341):

Renewable energy is energy derived from natural sources that are replenished at a higher rate than they are consumed. Sunlight and wind, for example, are such sources that are constantly being replenished. Renewable energy sources are plentiful and all around us.

Prerequisite: General Physics (2) (216132)

Engineering Workshop I (620171):

Development of basic skills in fields of hand filing, turning, welding, piping and plumbing, carpentry, sand casting, glass works, sheet metal fabrication, and metal forming.

Prerequisite: None

Engineering Workshop II (620172):

Household electric circuits, florescent lamps circuits, parallel and series circuits, switches and fuses installations, electronic welding, electronic devices maintenance and circuit boards design.

Prerequisite: Engineering Workshop I (620171)

Engineering Skills (640253):

This course provides an introduction to engineering problem solving skills, engineering design, technical report writing, oral communication, engineering ethics, and project management.

Prerequisite: Communication and Contact Skills (English Language 2) (116108)

Electronics I (0650242):

The course aims to provide the students with the ability of applying the electronics components and ICs in the implementation of different communication circuits and Electronics systems. In addition to analyzing and designing different electronics devices.

Prerequisite: Electric Circuits I (610211)

Engineering Analysis I (0650260):

The course is a requirement for all engineering students. It introduces the fundamental of ordinary differential equations and the most important methods for solving them with emphasis on applied problems in engineering and physics. The Laplace transform and power series are presented as an alternative method for solving the ordinary differential equations.

Prerequisite: Calculus (2) (250102)

Signals and Systems (650320):

The course is a requirement for Electrical, Communication and Electronics engineering students. It introduces the modeling and analysis of Signals and Systems both continuous and discrete, in the time and frequency domains. Topics include theory and application of Fourier series, Fourier transform, the Convolution operation and Laplace Transform in communication systems.

Prerequisite: Engineering Analysis 1 (0650260)

Electronics 2 (650342):

The course aims to provide students with capabilities to understand and deal with different types of amplifiers as well as their frequency response, feedback, and stability. The course will cover the efficiency of power and operational amplifiers and their applications as well as the analysis and design of waveform signal generators and oscillators.

Prerequisite: Electronics I (0650242)

Electronics (I) Lab. (650343):

This laboratory assists the user in learning the operation and the structure of the electronics devices like diodes and transistor, the types of rectifier circuit, design and analysis of different types of amplifier, the user will be able to deal with different instrumentation devices like DC power supplies, DMMs, oscilloscopes, function generators and bread boards.

Prerequisite: Electronics I (0650242)

Digital Electronics (650344):

The course introduce the fundamental principles of various digital devices both discrete components and integrated components that find application in digital electronics. To study the characteristics and circuit diagrams of different digital families such as TTL, ECL & MOSFETS. To apply the digital electronics components and ICs in the implementation of different communication circuits and systems.

Prerequisite: Electronics I (0650242)

Probability and Random Variables (650364):

The course is a requirement for Electrical, Communication and Electronics engineering students. It introduces the topics of probability, random variables, and random processes at the undergraduate level.

Prerequisite: Engineering Analysis 1 (0650260)

Analog Communications (650420):

The course introduces the Continuous-Wave Modulation Techniques, Frequency Division Multiplexing (FDM), FM Stereo Multiplexing, and Super-Heterodyne Receiver, Noise in AM and FM receivers, Sampling Theorem, Pulse Amplitude Modulation (PAM), Time Division Multiplexing (TDM).

Prerequisite: Signals and Systems (650320)

Communication Lab. (650428):

This laboratory assist the user in learning the fundamentals of modulations and demodulations techniques to deal with different types of it such as AM,DSB-SC,FM,PWM,PAM and to know the advantages and disadvantages of each one.

Prerequisite: Analog Communications (650420)

Communication Circuits (650526):

This course aims to provide students with all information about Radio Frequency Amplifier and Oscillators. Modulation & AM Modulation Systems. AM Transmitter Circuit. AM Receiver Circuit. Frequency Modulations, FM transmitter Circuit, FM Receiver Circuit. PLL in Communication Application.

Prerequisite: Analog Communications (650420) + Electronics I (0650242)