Brief Course Description for Electrical Engineering Department study plan 2011-2015

Fundamentals of engineering (610111)

The course is a requirement for electrical engineering students. It introduces the basic principles of engineering such as numbering systems, tables and graphs, statistics, Newton's Laws, introduction to thermodynamics, SI unit system, unit conversion, and introduction to the fundamentals of electrical engineering.

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

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

Electromagnetics (1) (610213)

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

Electric 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.

Electrical Machines(1) (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.

Electric Machine Lab. (1) (610316)

1. To understand the operation performance of electrical machines operations and applications.
2. 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.

Instrumentation and Measurement (610332)
This course will introduce the students to the basic measurement techniques, instrument construction, principle of operation, and measurement calculations.

Instrumentation &Measurements Lab. (610336)
This laboratory is to learn the fundamentals of sensors and transducers for measurements of light, temperature, speed, force and position measurements.

Engineering Project 1 (610359)
Theoretical investigation, practical implementation or both of a project under the supervision of a faculty member. Detailed report as well as oral examination is required.

Power Systems (1) (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.

Power System (2) (0610412)
Load flow (power flow). The stability of the power lines and generation. The distribution of the load between units in the electrical plant. Protection of power systems for Symmetrical and unsymmetrical calculation.

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.

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

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.

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.

Engineering Training (610458)

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 eight consecutive weeks (if training is inside Jordan) or six consecutive weeks (if training is outside Jordan).

Engineering Project (2)   (610459)
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.

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.

Electric Machine (2) (610514)
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.

Electrical Transmission and Distribution Network Design(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.

Electric Machine Lab. (2) (610517)
To introduce the operation performance of electrical machines operations and applications.
At completing this module the student should be able to:
Learn about 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.

Drive Systems (610518)
The course is a requirement for the electrical engineering students. It introduces the principles, operation, and design of electrical drive systems. Students will learn the basic of DC and AC drives systems, the investigation methods of the whole system and performances evaluation. As well as electrical drives with special electrical machines, and the principles of drive system synthesis.

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. Students will learn converter topologies, control techniques, and applications. Also learn analysis and design aspects of converters and understand losses and protection of power semiconductor devices.

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.

Engineering Project (3) (610559)

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.

Engineering Drawing (620131)

This course object to give the student a fundamental knowledge about the instruments used in engineering drawing and their use, Graphic geometry, Lettering, Orthographic and isometric drawing and sketching, Sectional views, Introduction to descriptive geometry, Surface intersections and developments. In addition, students have to use computer aiding in drawing (AutoCAD Drawing)

Logic Circuits (630211)

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.

Logic Circuits Lab (630212)

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.

Engineering Analysis 2 (630262)

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

Programming Language (630263)

The course is a requirement for all engineering students. It introduces the basic principles of structured programming. Students will learn and practice the application of these programming principles to solve engineering problems using the C++ programming language.

Microprocessors (630313)

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

Microprocessors Lab (630314)

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.

Embedded Systems (630414)
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.

Reverse Engineering (640458)
The course is a requirement for level 4 of electrical engineering students. It Introduces students Reverse Engineering Methodology and the application of these methodologies through practical projects.

Basis of Engineering Analysis (650163)
The course aims to provide students with the ability to understand and deal with Linear Algebra including Matrices, Vectors, Determinants and Linear Systems, as well as Vector Differential Calculus such as Gradients, Diversion, and Curl operations.

Electronics 1 (650242)
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.

Engineering Analysis 1 (650260)
The course is a requirement for all engineering students. It introduces the principles of digital communications to make the student able to understand the communication system with zoom in digital form of electronics.

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 and Laplace Transform in communication systems.

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.

Electronics (1) 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.

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.

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.

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).

Digital Communications (650425)
The course is a requirement for all engineering students. It introduces the principles of digital communications to make the student able to understand the communication system with zoom in digital form of electronics.

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.

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.

Transmission Communications Systems(650527)
The course is a elective for Communication and Electronics engineering and a requirement for Electrical Engineering students. It introduces the principles of communications systems, how RF wave propagate, Antenna theory and patterns for different Antennas, Basic structures for microwave systems. It also discusses basic Satellite systems and access schemes used for satellite communications. It discusses basic multiplexing and multiple access schemes. It also introduces basic telephony systems, wireless systems and mobile networks, in addition to different internet access schemes.

Applied Physics (211104)

This module is a first year physics course which will introduce the students to the basic language and ideas of physics that occur in all branches of science and technology. In addition it provides them with a clear and logical presentation of the basic concepts and principles of physics, and to strengthen their understanding through a broad range of interesting applications to the real world. Topics include: space and time; vectors; straight-line kinematics; circular motion; experimental basis of Newton's laws and some application; work and energy; electric charge and force; electric filed; Gauss's law; electric potential and electrostatic energy; capacitance and dielectrics; current and resistance; elements of circuit analysis and Kirchhoff's laws; magneto statics; and sources of magnetic field.

General Chemistry 1 (212101)

This course introduces the fundamental theories of chemistry and covers atomic nature of matter, stoichiometry, periodic table, aqueous solution and concentrations, oxidation – reduction reaction, atomic structure, chemical bonding, law of gases , acids and bases.

Calculus I (250101)
The course deals with the following main topics: differentiation of algebraic and transcendental functions, an introduction to analytic geometry, applications of differentiation, and a brief introduction to integration.

Calculus II (250102)
This course introduces advanced principles of calculus to form the foundation needed for student's advancement. The module deals with the following main topics: Techniques of Integration, Sequences and Series, and Conic Sections and Polar Coordinates.

(620171) Engineering Workshop (1)

Development of basic skills in fields of hand filing, Turning, Welding, Piping and plumbing, Carpentry, Sand casting, Glass works, Sheet metal fabrication, Metal forming.

(620172) Engineering Workshop (2)

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

(620313) Thermodynamics

Basic course in engineering thermodynamics, Properties and behavior of pure substance, First law, Second law, Entropy, System and control volume analysis.

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.