



Faculty of Engineering
Philadelphia University
Amman – Jordan

Undergraduate Student Handbook
Electrical Engineering Department

2019 – 2020

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Contact Information

Department Contacts

Electrical Engineering Department
Faculty of Engineering
Philadelphia University
P.O.Box: 1
Amman, 19392
Jordan
Tel: + 962 6 4799000 ext. 2223

Dr. Tarek Tutunji, Dean
Tel: + 962 6 4799000 ext. 2330
ttutunji@philadelphia.edu.jo

Dr. Mones Omari , Head of Department
Tel: + 962 6 4799000 ext. 2251
malomari@philadelphia.edu.jo

Important websites

Admission and Registration Information
<http://www.philadelphia.edu.jo/admissions/undergraduate-studies>

Electrical Engineering Department
<http://www.philadelphia.edu.jo/faculties-main/faculty-of-engineering-and-technology/electrical-engineering>

Student Affairs Deanship
<http://www.philadelphia.edu.jo/deanships/deanship-of-student-affairs>

Introduction

Philadelphia University

Historical Background

Philadelphia University was established in 1989 as a private, accredited university in Amman, Jordan. The Faculty of engineering was established in 1991. More than 800 engineers had graduated and are working in Jordan and abroad. The Faculty of Engineering includes the following departments:

- Electrical Engineering
- Computer Engineering
- Mechanical Engineering
- Communications and Electronics Engineering
- Mechatronics Engineering
- Architecture Engineering
- Civil Engineering
- Renewable Engineering

The Faculty of Engineering is located within several buildings with a total area of 5400m², and includes 28 specialized and highly technically equipped laboratories. The total number of enrolled students is about 2400 students.

Mission of Philadelphia University

Prepare graduates who are well-equipped with knowledge, skills and values and who are highly motivated to lifelong learning and capable of fulfilling contemporary requirements.

Foster academic research and graduate studies and support innovation plans.
Establish a productive partnership with local community.

Mission of Faculty of Engineering

The mission of the faculty is to graduate comprehensively prepared and innovative engineers being able to interact with the challenges of global economy in different engineering disciplines. These disciplines are established to cover the requirements of the society in governmental authorities and public and private sectors. It is essential to create an productive atmosphere of work and study for both students and staff with to appreciation of their own culture, heritage and of their responsibilities to the society. It also provides research and consultancy in different engineering fields to serve the requirements of all society sectors.

Electrical Engineering Department

The Electrical Engineering Department (EED), which was established in 1991, specializes in Electrical Power and Control Engineering. It has 10 - full time faculty members highly qualified and with excellent experiences in engineering teaching. The total enrolled students at present is 287 students. The department has 4 – laboratories:

-Electric Circuits.

-Electric Machines covers two courses Electric Machine (1) and Electric Machine (2).

-Electric Power.

-Control and Measurements covers two courses Automatic Control and Measurements and Instrumentations.

Most of the department graduates are employed in reputable engineering companies and institutions in the region and especially in the Arabian Gulf countries with high degree of satisfaction and achievement. On the other hand, there are a number of graduates of the department pursuing postgraduate studies at international advanced universities in North America, Europe and other western countries. Philadelphia University has close cooperation ties with regional and international universities and research institutions in a number of countries.

Mission

Electrical engineering department aims to graduate students with the following attributes:

A strong background in mathematics and sciences with good understanding of their importance to electrical engineering discipline, the ability to function with in multi-disciplinary teams. To understand and handle electric power systems. To have skills in oral and written communications. Broad education and knowledge that is necessary to understand contemporary issues and global impact of engineering and technological developments on social issues. A clear understanding that life-long learning is essential for sustained professional development. To use techniques, skills and modern engineering tools necessary for engineering practice. To recognize a problem, formulate different strategies and use engineering principles to solve the problem. Good understanding of the ethics of the engineering profession.

The mission can be summarized in the following statements:

- 1- Prepare electrical engineering graduates for a career with wide range of opportunities in design, development and, management.
- 2- Promote the intellectual, ethical and technological aspects of the student.
- 3- Actively contribute, improve and sustain an environment of continuous learning with the professional ability for engineering application in local market taking in to account all possible technical and economic constraints

The Electrical Engineering Program Educational objectives (PEOs):

1. Apply the basic concepts of mathematics, science and engineering in the solution of wide range of engineering technical and practical problems.
2. Have the ability to experiment, design, develop, operate and service technical systems that integrate contemporary engineering practices and modern tools and to overcome environmental and sustainability constraints.
3. Promote an environment for personal professional development in leadership skills, accountability, multi-disciplinary team work, communication skills, decision making and ethical practices.
4. Pursue and engage in professional engineering practices in work markets at all levels with emphasis on continuous career development.
5. Engage in innovational and entrepreneurial projects to generate sustainable technical and economic development in local communities

The Electrical Engineering Program Student Outcomes (SOs):

- a. An ability to apply knowledge of mathematics, science, and engineering
- b. An ability to design and conduct experiments, as well as to analyze and interpret data.
- c. An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, and sustainability.
- d. An ability to function on multidisciplinary teams.
- e. An ability to identify, formulate, and solve engineering problems.
- f. An understanding of professional and ethical responsibility.
- g. An ability to communicate effectively.

- h. An ability to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- i. An ability to engage in life-long learning
- j. A knowledge of modern issues.
- k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The following tables include the Electrical Engineering Program mapping of its PEOs, SOs, and courses:

Table 1: Student Outcomes Mapping to Program Educational Objective

Student Outcomes		PEO1	PEO2	PEO3	PEO4	PEO5
a	An ability to apply knowledge of mathematics, science, and engineering	√				
b	An ability to design and conduct experiments, as well as to analyze and interpret data.		√			
c	An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, and sustainability.		√			
d	An ability to function on multidisciplinary teams.			√		
e	An ability to identify, formulate, and solve engineering problems.	√	√			
f	An understanding of professional and ethical responsibility.			√		
g	An ability to communicate effectively.			√		
h	An ability to understand the impact of engineering solutions in a global, economic, environmental, and societal context.					√
i	An ability to engage in life-long learning				√	
j	A knowledge of modern issues.		√			√
k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.		√			√

Table 2: Student Outcomes Mapping to Electrical Engineering Courses

0	Course Number	Course Name	a	b	c	d	e	f	g	h	i	j	k
1	610111	Fundamentals of Engineering	√	√	√		√						
2	610211	Electric Circuits (1)	√	√			√						
3	610212	Electric Circuits (2)	√				√						√
4	610213	Electromagnetic (1)	√				√						
5	610314	Electric Machines (1)	√	√			√						
6	610332	Instrumentation and Measurement	√	√	√		√						√
7	610359	Engineering Project (1)		√	√								√
8	610411	Power Systems (1)	√				√						√
9	610412	Power Systems (2)	√		√		√						√
10	610414	Automatic Control	√		√	√	√						√
11	610458	Engineering Training		√	√	√	√	√	√	√	√	√	√
12	610459	Engineering Project (2)	√	√	√		√		√	√		√	√
13	610513	Power Systems Protection	√		√		√						
14	610514	Electric Machines (2)	√		√		√						
15	610530	Power Electronics	√		√		√						√
16	610559	Engineering Project (3)		√	√	√	√		√				√
17	610419	Electric Installation	√	√	√		√					√	√
18	610515	Transmission & Distribution of Power Systems	√		√		√			√		√	√
19	610516	Special Topics in Electrical Engineering	selected with the approval of the department										
20	610518	Drive Systems	√		√		√						√
21	610550	Entrepreneurship				√		√	√	√		√	√
22	610216	Electric Circuits Lab.	√	√	√								
23	610316	Electric Machines (1) Lab.	√	√		√							√
24	610336	Instrumentation and Measurement Lab.	√	√		√							
25	610416	Automatic Control Lab.	√	√	√	√							
26	610417	Power Systems Lab.	√	√		√							√
27	610517	Electric Machines (2) Lab.	√	√		√							√

Faculty Members

The Electrical Engineering department has the following full time faculty members:

Dr. Mohammed M. Ali	Email: m_selman@philadelphia.edu.jo Office: Engineering building, Office No 6709, ext. 2128
Dr. Mones Omari	Email: malomari@philadelphia.edu.jo Office: Engineering building, Office No 6831, ext. 2251
Professor Mohammed Tawfeeq Lazim	Email: drmohamadtofik@yahoo.com Office: Engineering building, Office No 6713, ext. 2492
Dr. Ibrahim Badran	Email: ibbadran@gmail.com Office: Engineering building, Office No E921 ext. 2391
Dr. Mohammad Abdul Qader Abu Naser	Email: mnaser@philadelphia.edu.jo Office: Engineering building, Office No 6712, ext. 2492
Dr. Ayman Abdel-Karim Agha	Email: aagha@philadelphia.edu.jo Office: Engineering building, Office No 6811, ext. 2504
Eng. Abdullah Al-Omoush	Email: alomoush@philadelphia.edu.jo Office: Engineering building, Office No.: 6810, ext. 2504
Eng. Ahlam Ahmad Damati	Email: adamati@philadelphia.edu.jo Office: Engineering building, Office No 6713, ext. 2339

Electrical Engineering Curricula

The Electrical engineering curricula at Philadelphia University consist of 160 credit hours (CH). There are 27 CH that are university requirements, 29 CH for faculty requirements, and 104 CH for department requirements. Grades at Philadelphia University are given in percentages (out of 100). Minimum pass grade for any subject is 50. The student is supposed to pass the courses with an accumulative grade point average of 60% to graduate. A detailed grade description can be found at the admissions office website.

Electrical Engineering Curricula "Suggested Guidance Study Plan"

First Year							
First Semester				Second Semester			
Course No.	Course Title	Cr. H.	Prerequisite	Course No.	Course Title	Cr. H.	Prerequisite
114101	Arabic Language Skills (1)	3	114099	111101	National Education	3	----
130101	English Language Skills (1)	3	130099	130102	English Language Skills (2)	3	130101
250101	Calculus (1)	3	-----	250102	Calculus (2)	3	250101
211104	Applied Physics	3	-----	----	Selected Elective Faculty Course	3	----
620131	Engineering Drawing	3	-----	630263	Programming Language	3	----
620171	Engineering Workshop (1)	1	-----	620172	Engineering Workshop (2)	1	620171
Total		16		Total		16	

Second Year							
First Semester				Second Semester			
Course No.	Course Title	Cr. H.	Prerequisite	Course No.	Course Title	Cr. H.	Prerequisite
640253	Engineering Skills	3	130102	630262	Engineering Analysis (2)	3	650260
610211	Electric Circuits (1)	3	211104	610213	Electromagnetic (1)	3	650260 + 650163
630211	Logic Circuits	3	630263	610212	Electric Circuits (2)	3	610211
650163	Basis of Engineering Analysis	3	250102	650242	Electronics (1)	3	610211
650260	Engineering Analysis (1)	3	250102	----	Selected Elective University Course	3	----
610216	Electric Circuits Lab.	1	610211	630212	Logic Circuits Lab.	1	630211
Total		16		Total		16	

Third Year							
First Semester				Second Semester			
Course No.	Course Title	Cr. H.	Prerequisite	Course No.	Course Title	Cr. H.	Prerequisite
610314	Electric Machines (1)	3	610213	650364	Probability and Random Variables	3	650320
650342	Electronics (2)	3	610211+ 650242	610332	Instrumentation and Measurement	3	650342
630313	Microprocessors	3	630211	650344	Digital Electronics	3	650242+ 630211
620313	Thermodynamics	3	250102		Selected Elective University Course	3	----
650320	Systems and Signals	3	630262	610316	Electric Machines(1) Lab.	1	610314
610359	Engineering Project (1)	1	620172+ 650242	610336	Instrumentation and Measurement Lab.	1	610332
650343	Electronics (1) Lab.	1	650342	303146	Microprocessor Lab.	1	630313
Total		17		Total		15	

Fourth Year							
First Semester				Second Semester			
Course No.	Course Title	Cr. H.	Prerequisite	Course No.	Course Title	Cr. H.	Prerequisite
610514	Electric Machines (2)	3	610314	610414	Automatic Control	3	610332
610411	Power Systems (1)	3	610314	610412	Power Systems (2)	3	610411
650420	Analog Communications	3	650364	650425	Digital Communications	3	650420
630414	Embedded Systems	3	630313	640458	Reverse Engineering	3	610359
----	Selected Elective University Course	3	----	----	Selected Elective University Course	3	----
111100	Military Science	3	----				
Total		18		Total		15	

Fourth Year			
Summer Semester			
Course No.	Course Title	Cr. H.	Prerequisite
610458	Engineering Training	0	90 Cr. H.

Fifth Year							
First Semester				Second Semester			
Course No.	Course Title	Cr. H.	Prerequisite	Course No.	Course Title	Cr. H.	Prerequisite
610530	Power Electronics	3	650342	610550	Engineering Entrepreneurship	3	640253+120Cr.H
650526	Communications Circuits	3	650420	650527	Communications Transmission Systems	3	650425
----	Selected Elective University Course	3	----	610517	Electric Machines (2) Lab.	1	610314
650428	Communications Lab.	1	650420	610513	Power Systems Protection	3	610412
----	Selective Elective Department Course	3	----	----	Selective Elective Department Course	3	----
610416	Automatic Control Lab.	1	610414	610417	Power System Lab.	1	610411
610459	Engineering Project (2)	1	120 Cr. H +610359	610559	Engineering Project (3)	2	610459
Total		15		Total		16	

Brief Course Description of Electric Engineering Study Plan

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 Earthling, 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, Divergence, 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 field; 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.

Engineering Workshop (1)(620171)

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

Engineering Workshop (2)(620172)

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

Thermodynamics (620313)

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.

Student's Academic Guidance

The student has to know the following:

Each student in the faculty of engineering has an assigned academic advisor that is allocated by the department. The advisor is responsible to give advice guidance to the student while selecting courses for registration. This should be performed at the beginning of every semester.

Course registration.

The student has to take the following points into consideration while in the registration process:

- Making sure that he/she has passed the prerequisite subject (see Electrical Engineering Curricula)
- The registration should be guided by the suggested study plan, this includes:
 - University requirements: compulsory and electives.
 - Faculty requirements: compulsory and electives.
 - Specialty requirements: compulsory and electives.
- It is preferred that the student refers to the study plan during the registration process to take the appropriate academic load of credit hours according to the semester and year specified.
- The academic guidance process is not compulsory, so the student can register for classes without consulting the advisor, but the student will take full responsibility for this action as well as its consequences since this might delay his/her graduation due to improper selection of course.
- The student must understand that it is required to register for at least 12 credit hours and at most of 18 credit hours in regular semesters.
- The student has the right to withdraw (Drop) from a course or more during a certain semester under the condition that he/she has to stay registered for at least 9 credit hours. This withdrawal (Drop) should be approved by the course lecturer as well as the academic advisor.
- The withdrawal (Drop) should take place in a specific period of time that is set by the admission and registration deanship. There is a defined period within which the student can be refunded the course fees, after this time period the student will lose the right to be refunded.
- The student can Add/Drop courses according to the admission and registration Deanship time table only.