Faculty of Engineering

Philadelphia University

Amman – Jordan

Mechanical Engineering Program
Student's handbook

2021 – 2022

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Important websites

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

Mechanical Engineering Program
https://www.philadelphia.edu.jo/faculties/faculty-of-engineering/mechanical-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 1000 engineers have been graduated and are working in Jordan and abroad. The Faculty of Engineering includes the following engineering programs:

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

Mission of Philadelphia University

Prepare graduates who are well-equipped with knowledge, skills and valuesand 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 and Technology

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 a 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.

Mechanical Engineering Program

The Mechanical Engineering Program, which was established in 1991, specializes in thermal, applied mechanics, and manufacturing Engineering. It has 10 full time faculty members and 3 laboratory engineers highly qualified and with excellent experiences in engineering teaching. The program has 7 laboratories, namely:

- Thermal lab.
- Internal combustion engines lab.
- Measurements lab.
- Control systems lab.
- Mechanical vibration lab.
- Strength of materials lab.
- Fluid mechanics lab

Most of the program 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 program pursuing postgraduate studies at international advanced universities in North America,Europe and Australia. Philadelphia University has close cooperation ties with regional and international universities and research institutions in a number of countries.

Mission

The Mission of Mechanical Engineering Department in the Faculty of Engineering at the Philadelphia University of Jordan is focused on the followings:

- To expose its students to a mechanical engineering curriculum that includes multidisciplinary educational and research subjects, contemporary laboratories, and industrial trainings that are required to prepare them for a variety of professions.
- To prepare its graduates to continue their education throughout their lives, serve the profession, and face intellectual, ethical, and professional difficulties.
- To provide its students with modern drafting and analysis software in order to improve their computing abilities and to encourage them to pursue higher education and research.
- To enhance capabilities of student's innovative ideas, leadership and teamwork through a verity of numerous initiatives in their curriculum.

Program's Educational Objectives (PEOs)

In accordance with the ABET accreditation criteria and pursuant to Philadelphia University's mission statement, and Faculty's mission statement, Mechanical Engineering program has the following objectives that ensure that the graduates of the program in few years after graduation are able to:

1. Apply their engineering practice skills outside of the classroom, allowing them to excel as engineers in industry, community, graduate or professional studies, and lifetime learning.
2. Contribute to engineering system design, manufacture, implementation, and management.

3. As a leader or team member, effectively convey ideas and solutions while acknowledging environmental, sociological, economic, and ethical challenges that may arise in a variety of work environments.

Student outcomes (SOs)

Student outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviors that students acquire as they progress through the program. The Mechanical Engineering Program has adopted the following student outcomes:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts .
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Table 1: Mapping of PEOs and SOs of Mechanical Engineering program

Program educational objectives	Student outcomes						
	1	2	3	4	5	6	7
Apply their knowledge in engineering practice to areas beyond their coursework, enabling them to succeed as engineers in Industry, community, graduate or professio studies, and lifelong learning.	**x**	**x**					**x**
To contribute to the design, manufacture, implementatic and management of engineering systems.		**x**	**x**		**x**	**x**	**x**
Efficiently communicate ideas and solutions as leaders c team member recognizing the environmental, societal, economic, and ethical issues encountered in a various w environment.				**x**	**x**	**x**	**x**

Staff

1. Faculty members:

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Curriculum

The Mechanical engineering program's curriculum consist of 160 credit hours (Cr. Hrs.). There are 27 Cr. Hrs. that are university requirements,27 Cr. Hrs. for faculty requirements, and 106 Cr. Hrs. for program 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 thecourses with an accumulative grade point average of 60% to graduate.

A detailed grade description can be found at the admissions office website.

Table 2: Mapping of Program Educational Objectives and Curriculum Courses of Mechanical Engineering Program

ME Course Number	ME Course Name	PEOs		
		1	2	3
620171	Engineering Workshop I	✓		
620172	Engineering Workshop I	✓		
620211	Statics	✓	✓	
620212	Dynamics	✓	✓	
620213	Strength of materials	✓	✓	
620232	Mechanical Drawing	✓		
620344	Engineering Measurements	✓	✓	
620274	Material Science	✓		
620301	Applied Engineering Mathematics	✓	✓	
620302	Finite Element Method	✓	✓	
620333	Theory of Machines	✓		
620320	Fluid Mechanics I	✓		
620323	Thermodynamics I	✓		
620324	Thermodynamics II	✓		
620428	Fluid Mechanics II	✓		
620434	Machine Design I	✓		
620435	Machine Design II	✓		
620443	Automatic Control	✓		
620420	Heat transfer I	✓		
620437	Reverse Engineering	✓		
620436	Exercises in Machine Design	✓		
620477	Production Processes	✓		
620414	Mechanical vibrations	✓		
620529	Internal combustion engines	✓		
620522	Air conditioning	✓		
620523	Design of Sanitary Systems	✓		
620427	Thermal Lab.	✓		
620520	Internal combustion engine Lab.	✓		
620429	Fluid Mechanics Lab.	✓		
620415	Mechanical vibration lab	✓		
620314	Strength of Material lab	✓		
620345	Engineering Measurements Lab.	✓		
620457	Control systems Lab.	✓		
620440	Engineering project I	✓		✓
620540	Engineering project II			✓
620499	Engineering Training	✓		✓

Mechanical Engineering Curriculum, Suggested Guidance Study Plan

First year							
First Semester				Second Semester			
Course No.	Course Title	Cr. Hrs.	Prerequisite	Course No.	Course Title	Cr. H.	Prerequisite
114103	Arabic language skills (1)	3	114099	130108	English language skills (2)	3	130107
130107	English language skills (1)	3	130099	250102	Calculus (2)	3	250101
250101	Calculus (1)	3	------	211102	General physics (2)	3	211101
211101	General physics (1)	3	------	212102	General chemistry lab.	1	212101
212101	General chemistry (1)	3	------	660132	Computer Engineering drawing (AUTOCAD)	1	660131
660131	Manual engineering drawing	1	------	111101	National Education	3	------
170101	Life Skills	1	------	610263	Programing language	3	------
Total		**17**		**Total**		**17**	

Second Year							
First Semester				Second Semester			
Course No.	Course Title	Cr. H.	Prerequisite	Course No.	Course Title	Cr. H.	Prerequisite
250202	Calculus (3)	3	250102	650260	Engineering analysis (1)	3	250102
620211	Statics	3	250102+211101	620172	Engineering workshops (2)	1	620171
620171	Engineering workshops (1)	1	-----	620212	Dynamics	3	620211
640253	Engineering skills	3	130108	620213	Solid mechanics	3	620211
620232	Mechanical drawing	2	660132	-------	University elective course	3	----
115102	Leadership and social responsibility	1	-------	620274	Material science	3	212101
------	University elective course	3	--------	620314	Strength of materials lab	1	620213
Total		**16**		**Total**		**17**	

Third Year							
First Semester				**Second Semester**			
Course No.	**Course Title**	**Cr. H.**	**Prerequisite**	**Course No.**	**Course Title**	**Cr. H.**	**Prerequisite**
630262	Engineering analysis (2)	3	650260	620324	Thermodynamics 2	3	620323
620323	Thermodynamics (1)	3	211102+ 250102	620344	Engineering measurements	3	610214
620320	Fluid Mechanics (1)	3	620212+650260	620420	Heat transfer 1	3	620323+ 650260
620333	Theory of machines	3	620212	620345	Engineering measurements lab	1	620344(*)
610214	Electrical Engineering	3	211102	620428	Fluid Mechanics (2)	3	620320+630262
610219	Electrical Engineering lab	1	610214(*)	620435	Machine Design (1)	3	620213
330103	Leadership and innovation	1	----	620429	Fluid Mechanics lab	1	620428(*)
				620427	Thermal lab	1	620420(*)
Total		**17**		**Total**		**18**	

Fourth Year							
First Semester				**Second Semester**			
Course No.	**Course Title**	**Cr. H.**	**Prerequisite**	**Course No.**	**Course Title**	**Cr. H.**	**Prerequisite**
620301	Applied Engineering mathematics	3	650260+620420	620414	Mechanical vibrations	3	650260+620212
620435	Machine design (2)	3	620434+620232	620415	Mechanical vibrations lab	1	620414(*)
620436	Exercises in machine design	1	620435(*)	------	Department elective course	3	-----
620523	Design of Sanitary systems	3	620320	620529	Internal combustion engines	3	620324
-----	Department elective course	3	----	640253	Entrepreneurship	3	640253
620437	Reverse Engineering	3	620453	620520	Internal combustion engine lab	1	620529(*)
Total		**16**		**Total**		**14**	

Fourth Year			
Summer Semester			
Course No.	**Course Title**	**Cr. H.**	**Prerequisite**
620499	Engineering Training	3	(115)Cr. Hr.

Fifth Year							
First Semester				**Second Semester**			
Course No.	**Course Title**	**Cr. H.**	**Prerequisite**	**Course No.**	**Course Title**	**Cr. H.**	**Prerequisite**
620522	Air conditioning (1)	3	620420	620302	Finite Element Method	3	620301 .
------	Department elective course	3	------	620540	Engineering project II	2	620499
620440	Engineering project I	1	(100) Cr. H.	620477	Production processes	3	620274+620172
620443	Automatic Control	3	620344	620457	Control systems lab	1	620443(*)
111100	Military science	3	-----	------	University elective course	3	----
Total		**13**		**Total**		**12**	

Brief Courses Descriptions of Mechanical Engineering program, study plan 21-22

1. Mechanical engineering specialization courses

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, Metal forming.

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.

Statics (620211):

Study of force vectors, equilibrium of a particle, moment of a force, equilibrium of a rigid body, internal normal and shear forces, bending moment, moment of inertia and the centroid.

Dynamics (620212):

A study of plane motion and force systems on particle, system of particles and rigid bodies. It will be an overview of the application of Newton's Laws to rectilinear and curvilinear motions. Work-energy principle, and impulse-momentum, will also be studied for particle and for rigid body.

Strength of materials (620213):

Study of stress, strain relation when a loads (axial, torsion, bending and buckling loads) are applied to a static solid bodies such as beams. mechanical properties of materials, pure bending, analysis and design of beam for bending, shear stress in beams, transformation of stress and strain, deflection of beams, columns, energy methods.

Mechanical Drawing (620232):

This course Introduce a knowledge to mechanical engineering drawing; sketching, assembly drawing, theory of orthographic projection, pictorial drawing; isometric and oblique drawings, Sections, working drawing, dimensioning. Applications Covers Subjects Related to Mechanical Engineering Areas. The course employs Pro-Engineer software in doing exercises.

Material Science (620274):

The course provide a fundamental understanding of materials, its structures on different levels (from crystal cell to macrostructure), phase transformations and how it influences its mechanical, electrical, optical and magnetic properties from common science perspective. This course will introduce the various properties and structures of materials and lay a strong foundation for further study of engineering and its related disciplines. Material failure, mechanical properties of materials, and heat treatment process will also be studied.

Applied Engineering Mathematics (620301):

Differential equations first order , second order and higher order types and solution with applications , linear algebra and vector calculus, partial differential equations types and solution with applications , complex numbers , analysis with applications .

Finite Element Method (620302):

Finite element method development and its applications in mechanical systems such as mechanics of solids, heat transfer and dynamical systems.

Strength of material lab. (620314):

This laboratory serves mainly the determination of some material properties such as strain, stress, yield stress, ultimate stress, and failure stress. Destructive testing of materials (DT), micro and macro examination of materials and phase diagrams for steel are also included.

Fluid Mechanics I (620320):

The course is a requirement for Mechanical Engineering students. At completing this course, the student should be able to understand fluid properties, Hydrostatics, Principle of floating objects, Buoyancy principle, Fluid in motion, Bernoulli equation, One dimensional Euler's equation, Free and forced vortices, Rotational flow equation and pressure variation, Control volume approach, Reynolds transport theorem, Continuity equation, Impulse-Momentum principles, Energy equation, Hydraulic and energy grade lines.

Thermodynamics I (620323):

The course is a requirement for Mechanical Engineering students. At completing this course, the student should be able to understand Basic concepts in engineering thermodynamics, Properties and behavior of pure substance and ideal gas laws, First law, Energy analysis of a closed system, Mass and energy analysis of control volumes Second law of thermodynamics and their application.

Theory of Machines (620333):

Simple mechanisms, velocity and acceleration analyses in mechanisms, force analysis in simple mechanisms, theory of gearing, gear trains, balancing of rotating masses, belt drive, and cams.

Engineering Measurements (620344):

This course is divided into three main parts: the starting part is a statistical concepts and calculations for theoretical and experimental data. The middle part concerns with the main basic circuit used to convert measured value to electrical signal and the last part includes the measuring instrument needed by mechanical engineer to measure a main physical variable such as flow, pressure, temperature, linear and angular velocities, forces and torques.

Mechanical vibrations (620414):

Study of oscillatory motion, derivation of governing equations of motion for undamped and damped vibratory systems in free and forced motions, basics of vibration isolation, free and forced vibrations of multi degrees of freedom systems, vibration absorbers, and vibration of one dimensional continuous systems.

Heat transfer I (620420):

Introduction to modes of heat transfer; One-dimensional steady-state conduction; Un-steady state conduction, Lumped heat capacity systems; Introduction to convection; Hydro-dynamic and thermal boundary layers; Laminar and turbulent boundary layers, Convection in external and internal flows; Empirical relations for forced convection heat transfer; Heat exchangers.

Thermal lab. (620427):

It includes performing experiments on; conduction, and convection of heat, thermal properties and performance of radiation heat transfer, heat exchanger, condensation, and boiling.

Fluid mechanics II (620428):

The course is a requirement for Mechanical engineering students. At completing this course, the student should be able to understand Viscous flow equations of motion, Description Couette and Hell-Shaw flows, Laminar and turbulent flow boundary layers over flat plates, laminar and turbulent flow in conduits, friction factor, Darcy-Weisback equation and Moody diagrams, , Drag and lift forces, Compressible flow, normal and oblique shock waves, significance of the Mach number, Laval nozzle, and Isentropic flow through varying area channels, Flow measurements of pressure, velocity and mass flow rates. Orifice and Venturi meter, Thrust and efficiency of a propeller, axial and radial pumps, axial and radial turbines, and specific speed.

Fluid mechanics lab. (620429):

The course focuses on performing experiments on; density and viscosity of fluids, center of pressure on submerged plan surface, impact of water jet, fluid meter in incompressible flow Pipe flow, characteristics of a Single Centrifugal Pump, coupling of two identical pumps in series, coupling of two identical pumps in parallel and Pump Cavitation.

Machine Design I (620434):

This course involves an introduction to design process, Design considerations, Tolerances, Fits and surface finish, Selection of materials, Mechanical properties of engineering materials, Stress analysis of machine elements, deflection equations, and failure of machine elements under static loads, Fatigue analysis, shaft design, limits and fits.

Machine Design II (620435):

This course involves design of mechanical engineering elements which include, design of permanent joints, welding and adhesive bonding . Design of mechanical springs, ball bearing, journal bearings, gear design especially spur gear, helical and bevel gear, clutches brakes, flywheel an belts.

Exercises in Machine Design (620436)

This course involves design of mechanical engineering elements which include, static failure analysis, dynamic failure analysis, shaft design, design of permanent joints, welding and adhesive bonding design. Design of mechanical springs, ball bearing, journal bearings, gear design especially spur gear, helical and bevel gear, flywheel an belts.

Reverse Engineering (620437):

The course is a requirement for level 4 of mechanical engineering students. It Introduces students to ReverseEngineering Methodology and the application of these methodologies through practical projects. It also introduces students to Fusion 360 software.

Automatic Control (620443):

In automatic control course we will model physical system mathematically, transfer it into block diagrams or signal flow graphs and control the system using controller such as PID and phase-lead and phase lag controllers based on time response requirements such as steady state error, settling time, maximum overshot and stability.

Production Processes (620477):

This course provides the students with the needed material for understanding the principles of Manufacturing Processes, Materials Properties Fundamentals of Metal Casting and metal for casting, mechanical properties of materials, bulk deformation processes in metal working, sheet metal, working familiar with machine operations.

Internal combustion engine lab. (620520):

It includes Classifications of IC engines, parts, combustion, and applications. Performing experiments on the performance of Otto and Diesel engine in terms of power, exhaust emissions, its relation to internal processes like combustion, gas exchange, and varying engine operating conditions.

Design of Sanitary Systems (620523):

This course introduces knowledge and awareness for mechanical engineering students of the importance of mechanical systems design and its applications in practice. To present Basic definitions and terms of buildings and their mechanical systems economics, cold water supply, plumping materials and fittings, hot water supply, heating and cooling systems system, pipe sizing, fir fighting network and systems, ventilation system and finally to develop an intuitive understanding of mechanical systems.

Internal combustion engines (620529):

This course presents the concepts and theories of operation of internal combustion engines based upon the fundamental engineering sciences of thermodynamics, gas dynamics, heat transfer and mechanics. Discussing the design and operating characteristics of conventional spark-ignition (gasoline), compression-ignition (diesel). Thermodynamic ideal cycles are analyzed and compared to actual cycles. Fuel and air induction and exhaust processes are examined. Pollutant formation is discussed and engine operating characteristics are assessed.

Computer aided design CAD-CAM (620538):

Provide students with an introduction and basic concepts of Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) and their relationship to machine control and product development. The CAD/CAM management is addressed by explaining the production planning and control concepts to give the student a complete system overview of manufacturing facility. The course also include an introduction to Fusion 360 software.

Mechanical vibration lab. (620415):

The purpose of this laboratory is to provide students with the required skills and knowledge by using mechanical vibrations concepts to perform experiments such as; Mass-spring system, Simple and compound pendulums, Mass moment of inertia (Bifilar suspension), Transverse vibration, Forced vibration with negligible damping, and Undamped vibration absorber.

Engineering measurements lab. (620345):

The purpose of this laboratory is to provide students with the required skills and knowledge in using measurement tools in order to perform experiments such as; linear measurement, angular measurement, speed measurement, temperature measurement, strain gauge and Wheatstone Bridge circuit, and illumination measurement.

Engineering project I (620440):

The course is a requirement for level 4 of mechanical engineering students. It is the first part of a two semester project, It introduces the basic principles and analysis of scientific research and technical report writing. It is mainly focused on literature review and design aspects. Presentation in front of audience and the project supervisor is required for assessment and evaluation.

Control systems lab. (620457):

This course includes performing experiments in servo control valve and open loop position control; Position control (PID); Speed control (PID); Pressure control (PID); MATLAB/ Simulink applications; LABVIEW applications.

Engineering training (620499):

Field training which the mechanical engineering students should undergo in reputable factories or companies in the private or public sectors inside or outside Jordan.

Engineering project II (620540):

The course is a requirement for level 5 for all mechanical engineering students. It is the second part of a two semester project. It introduces the student to conduct some aspects of scientific research which include, objective statement, design steps, scheduling, prototyping, simulation and testing, verifying and final product. Presentation in front of audience and the project supervisor is required for assessment and evaluation.

2. Some other supporting courses of Mechanical Engineering curriculum

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.

Calculus III (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: Multidimensional analytic geometry, functions of several variables, vector-valued functions, partial derivatives, Gradient, maxima-minima problems and applications, double and triple integrals; potential fields; flux; Green's divergence and Stokes' theorems

Engineering Analysis I (650260)

The course aims to provide students with the ability to understand and deal with first, second, and higher order differential equations as well as power series methods and Laplace transform.

Engineering Analysis II (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.

General Physics I (211101)

This module is a first year physics course which will introduce the students majoring in engineering or physics and other sciences 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. The course is a survey of the concepts, principles, methods and major findings of classical Physics. Primarily, it covers Newtonian mechanics, with topics include: Vectors, kinematics and dynamics of a single particle in one, two and three dimensions, Circular motion, Newton's laws of motion, Work, energy and power, Conservation of energy, Linear momentum, Rotational motion, Angular momentum; general rotation, and Static Equilibrium; Elasticity and Fracture.

General Physics II (211102)

This module is a first year physics course which will introduce the students majoring in engineering or physics and other sciences 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. The course is a survey of the concepts, principles, methods and major findings of classical Physics. Primarily, it covers Electricity and magnetism in general, with topics that include: Charge and matter, Electric filed, Gausses Law, Electric Potential, Capacitance and dielectrics, Current and resistance, Direct current circuits, Magnetic field, Faraday's Law of Induction, Sources of the magnetic field, Electromagnetic waves.

General Chemistry (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.

Programming Language (610263)

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.

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.

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 it includes the fundamentals of engineering economy.

Student's Academic Guidance

The definition of academic Guidance is based on the interaction between the engineering student and his/her advisor until the required courses within his/her curricula is being registered.

Course registration

The student has to know the following:

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

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

- Making sure that he/she passed the prerequisite (refer to mechanical Engineering program Curriculum)
- The registration should follow the sequence shown in the study plan, this should include:
- University requirements: compulsory and electives.
- Faculty requirements: compulsory and electives.

- **Specialty requirements.**
  - It is preferred that the student refers to the study plan during the registration process to take the suggested 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 taking the advisor comments into consideration, but the student will take full responsibility for this action as well as its consequences since this might delay his/her graduation.
  - 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 the student has to stay registered for at least 9 credit hours. This withdrawal (Drop) should be approved by the course instructor 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 department. There is a defined period within which the student can be refund for the course fees, after this time period the student will lose his right to any the refund.

- The student can Add/Drop courses according to the admission and registration office time table only. The student is allowed a limited number of Adds/Drops that is set by the admissions and registration department