Undergraduate Handbook

CIVIL ENGINEERING DEPARTMENT

Philadelphia University
Amman – Jordan

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Contact Information

Civil Engineering Department

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Important websites

Admission and Registration information

http://www.philadelphia.edu.jo/university/index.php?option=com_content&task=view&id=318&Itemid=444

http://www.philadelphia.edu.jo/arabic/admission.asp

Civil Engineering Department

http://www.philadelphia.edu.jo/faculties/faculty-of-engineering/civil-engineering

Deanship of Student affairs

http://www.philadelphia.edu.jo/university/index.php?option=com_content&task=view&id=134&Itemid=144

Introduction

History

Philadelphia University was established in 1989 as a private, accredited university in Jordan. The faculty of Engineering was established in 1991, and has graduated hundreds of engineers, who are working inside Jordan and abroad. The faculty of Engineering and Technology comprises the following departments:

Computer Engineering

Electrical Engineering

Mechanical Engineering

Communications and Electronics Engineering

Mechatronics Engineering

Architectural Engineering

Civil Engineering

Mechatronics Engineering

Renewable Energy Engineering

The faculty of Engineering and Technology is housed in several buildings with a total area of 5400m^2, and has 35 specialized and highly equipped laboratories. The total number of engineering students is more than 750 students

Mission Statement

As a distinguished academic institution, Philadelphia University commits itself to becoming a full partner in the development of both Jordanian society and other societies at the regional and global levels. The role of science, technology, information and means of communication is becoming absolutely vital to the well-being of humanity. In the coming few years, this role is bound to become a decisive engine of growth. High-quality relevant education, supported by problem-oriented, inter-disciplinary and inter-institutional research, is the

only means of leading any society to become an active and productive partner in human civilization.

The speed of globalization and the collapse of cultural and economic barriers require modern education, e-learning and interactive systems to be rooted in democratic interaction, human rights, complete freedom of thought and greater creativity by the younger sectors of society.

As the rapid development of knowledge, science and technology could widen the cultural divide between generations and society, modern approaches to education and lifelong interactive learning will be indispensable in alleviating the effects of this trend.

Carrying a revered name, with deep roots in history, of a major city of the Despoils on the King Road linking old civilizations, Philadelphia University is committed to moving forward, through the twin engines of quality and modernity, along the information highway. It hopes to make a strong bond between knowledge, learning and modern civilization.

The keynote here is proper, fast-developing and morally charged education. Young men and women are the vehicle that launches societies into a future propelled by quality education to prosperity and innovation. Philadelphia University and its sister institutions will be instrumental in bringing this about.

CIVIL ENGINEERING DEPARTMENT

Overview

The Civil Engineering Department at Philadelphia University has about 150 students, which accounts for 25% of the total engineering students in the Faculty of Engineering and Technology. The department has 9 faculty members with unique experience in various areas of civil engineering, who graduated from globally ranked foreign institutions. The faculty to student ratio in the department is about 1:16, which will provide the students with more time to share with their respective faculty members to enhance the quality of learning. The department has 8 laboratories that are dedicated to exposing students to the latest technologies in the subjects taught. Each laboratory is supervised by a faculty member, and is run by an experienced engineer.

Mission

The mission of the Department of Civil Engineering encompasses excellence in undergraduate education, research, and public service. We will do the following:

- Educate the next generation of engineering leaders to formulate and solve complex problems of importance to society, to collaborate as productive team members, to engage in life-long learning, and to act professionally and ethically
- Extend engineering knowledge across the breadth of the discipline and beyond through creative, innovative research ranging from the fundamental to the applied
- Facilitate the understanding and use of new ideas, technologies, and practices for the betterment of society through service and leadership in local, national, and international communities.

Civil Engineering Department Facilities

Department Laboratories

The following laboratories are the corner stone of the Civil Engineering Department where students get exposed to the latest equipments used in the testing and evaluating the physical and mechanical properties of construction materials, fluids, soils, and asphalt. The students also practice surveying in the field with the latest instruments and tools available.

Course No.: 0670213
Course Title: Strength of Materials Lab.
Credit Hrs: 1
Prerequisite Course: 0670212

Tensile test, Shear force and bending moment test, Impact test, Fatigue test, Creep test, Hardness test, Deflection of beams, Buckling.

Course No.: 0670216
Course Title: Materials of Construction Lab
Credit Hrs: 1
Prerequisite Course: 0670214

Tests of Cement at Construction site, Fineness of Cement, Normal Consistency, Initial and final Setting time, Density and Specific Gravity of cement, Slump Test, Flow Table test, Compressive Strength, Tensile Test, Sieve Analysis, Specific gravity and Absorption for Coarse aggregate, Specific Gravity and Absorption For fine aggregate.

Course No.: 0670262
Course Title: Surveying Lab
Credit Hrs: 1
Prerequisite Course: 0670261

Pacing and taping, Layout of buildings using theodolites, Angles measurement and coordinates geometry using theodolites, Traverse survey using total stations, Running a leveling network using levels, Determination of irregular areas using Planimeter device, Loop and link

traverse, Measurement of horizontal distances of building using theodolite, Measurement of vertical distances using theodolite .

Course No.: 0670322
Course Title: Highway Engineering Lab
Credit Hrs: 1
Prerequisite Course: 0670323

Tests on asphalt : Penetration, Softening point , Flash and fire points, Ductility and Viscosity, Aggregate properties by blending of aggregate using L.A.A.V and CBR Test, Marshall mix design for asphalt mixture, Specific gravity for asphalt mixture , Skid resistance for surface layer.

Course No.: 0670332
Course Title: Soil Mechanics Lab
Credit Hrs: 1
Prerequisite Course: 0670331

Water content, Specific gravity of soil particles, Liquid limit, Plastic Limit, Consolidation test, Compaction test, Density in field by sand cone, Permeability test (constant and variable head), Unconfined test, Direct shear test.

Course No.: 0670382
Course Title: Fluid Mechanics Lab
Credit Hrs: 1
Prerequisite Course: 0670381

Fundamental Fluid prosperities, Basic units., Pressure and its Measurement, Fluid Statics, Force on plane& Inclined and Curved Submerged Surface, Floatation. Fluid Kinematics, Control Volume Approach, Differential and Integral Continuity Equation, Energy Equations, Application of Bernoulli equation, Momentum Principle and its Applications.

Course No.: 0670442
Course Title: Hydraulics Lab
Credit Hrs: 1
Prerequisite Course: 0670441

Conducting the following Experiments: Osborne Reynolds Demonstration, Impact of Jets, Orifice and free jet flow, Dead Weight Pressure, Metacentric Height, Ground Water Flow and Well abstraction unit, Energy Loss in Hydraulic Jump, Flow Over Weirs, Rainfall Hydrograph, Water Hammer.

Course No.: 0670444
Course Title: Sanitary Engineering Lab
Credit Hrs: 1
Prerequisite Course: 0670443

Preparation of solutions, acids-bases titration , water analysis including: solid, alkalinity, turbidity, hardness ,conductivity, biochemical and chemical oxygen demand determination, and JAR test for coagulations and flocculation process.

Technology Incubators

"*Economic and social development cannot be achieved in the absence of initiative and creativity, or in the presence of fear of change*"

His Majesty King Abdullah II

The Jordan Innovation Center (JIC) at Philadelphia University is a new type of Business Incubators to be launched in Jordan to provide support and development of new innovative technical and business ideas. It supports innovative projects in any discipline provided that it has a potential for commercial use.

A Business Incubator provides "a unique and highly flexible combination of business development processes, infrastructure and people, designed to nurture and grow new and small businesses by

supporting them through the early stages of development and change." (UKBI)

Business Incubators are a powerful economic development tool used extensively in Europe and the USA with around 4000 in existence worldwide today. The JIC at Philadelphia University intends to replicate this success within the Jordanian economy.

The Civil Engineering Department at Philadelphia University has direct interactions with the Business Incubator at the university, where several senior project designs from the department have been supported.

Faculty Members

The Civil Engineering Department includes the following faculty members:

Dr. Mohammed Mustafa Al-Iessa (Associate Prof.)

Dr. Mohammad Khairi Younes (Assistant Prof.)

Dr. Ala'a Taleb Obaidat (Assistant Prof.)

Dr. Ala'a Saleh Alshdiefat (Assistant Prof.)

Dr. Sawsan Alkawaldah (Assistant Prof.)

Dr. Mais Maher Al-Dwaik (Assistant Prof.)

Eng. Amany Asooly (Lecturer)

Eng. Abd Allah Odeibat (Lecturer)

Eng. Adnan Abdull Hadi (Lecturer)

Civil Engineering Curriculum

Overview

Civil Engineering is one of the highly progressing disciplines that need to be up to date with state of the art technology. The courses offered by the Civil Engineering Department at Philadelphia University follow the highest standards and the outlines and text books used by top foreign universities. Our faculty members have a broad experience in all aspects of civil Engineering, both in academic and field experience.

The Civil Engineering curricula at Philadelphia University consist of 160 credit hours (CHs). Out of the 160 CHs, there are 27 CHs that are university requirements, 27 CHs faculty requirements, and 106 CHs that are department requirements. Each is divided into sub-requirements as shown in the tables that follow. Grades at Philadelphia University are given in percentages (out of 100). A 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.

Philadelphia University
Faculty of Engineering and Technology

STUDY PLAN – Civil Engineering Dept.

2018 – 2019

Total Credit Hours (160) Hrs.

كلية الهندسة والتكنولوجيا

Student Name :	
Student No. :	
Academic Advisor :	

Mark	Pre-requisite	Cr. H.	Course	Course No.
	0670381	3	Hydraulics	0670441
	0670441	3	Hydrology	0670541
	* 0670441	1	Hydraulics Lab	0670442
	* 0670443	1	Sanitary Eng Lab	0670444
	0670331	3	Foundation Eng	0670531
	115 Cr. H.	3	Eng Training (**)	0670499
	100 Cr. H.	1	Eng Project - 1	0670551
	0670551 + 0670499	2	Eng Project - 2	0670552
	0670211	3	Fluid Mechanics	0670381
	0670381	3	Sanitary Eng	0670443

B. Compulsory Support Requirements (20) Cr. H.

Mark	Pre-requisite	Cr. H.	Course	Course No.
	0620171	1	Eng. Workshop (2)	0620172
	* 0212101	1	General Chemistry (1) Lab	0212102
	0250102	3	Calculus (3)	0250202
	0250102	3	Linear Algebra & Direc. Integra.	0250205
	0250102	3	Engineering Analysis - 1	0650260
	0250205	3	Engineering Analysis - 2	0630262
	0670211	3	Dynamics	0620212
	0250102	3	Engineering Statistics	0670203

C. Elective Requirements

The student must study (9) Cr. H. from the table below

Mark	Pre-requisite	Cr. H.	Course	Course No.
	0670412	3	Prestressed Concrete	0670517
	0670444+0212101	3	Environmental Eng.	0670343
	0670412	3	Bridge Eng.	0670519
	Dept. Approval	3	Special Topics in Civil Eng	0670553
	0670422	3	Airports & Railways Eng.	0670522
	0670531	3	Advanced Foundation Eng	0670532
	0670443	3	Treat. of Solid & Liquid Wastes	0670545

(*) Concurrent

16.09.2020

Second : Faculty Requirements (27) Cr. H.

العلامة	المتطلب السابق	الساعات المعتمدة	اسم المادة	رقم المادة
	---	3	Calculus (1)	0250101
	0250101	3	Calculus (2)	0250102
	---	3	General Physics (1)	0211101
	0211101	3	General Physics (2)	0211102
	---	3	General Chemistry (1)	0212101
	---	1	Manual Eng. Drawing	0660131
	0660131	1	Computer Eng. Drawing	0660132
	0660132	1	Eng. Workshop (1)	0620171
	---	3	Programming Language	0630263
	0130102	3	Engineering Skills	0640253
	0640253	3	Entrepreneurship	0610550

Third : Department Requirements (106) Cr. H.
A. Compulsory Requirements (77) Cr. H.

Mark	Pre-requisite	Cr. H.	Course Title	Course No.
	0250102	3	Engineering Geology	0670231
	0211101 + 0250102	3	Statics	0670211
	0620212	3	Strength of Materials	0670212
	* 0670212	1	Strength of Materials Lab.	0670213
	0250102	3	Construction Materials	0670214
	* 0670214	1	Construction Materials Lab	0670216
	0670214	3	Building Construction & Draw.	0670217
	0670231	3	Soil Mechanics	0670331
	* 0670331	1	Soil Mechanics Lab	0670332
	0670212	3	Structures (1)	0670311
	0670311	3	Structures (2)	0670312
	0670261	3	Eng. Design of Highways	0670324
	0670324	3	Pavement Design	0670323
	* 0670323	1	Design of Highways lab	0670322
	0670312	3	Reinforced Concrete -1	0670411
	0670411	3	Reinforced Concrete -2	0670412
	0670312	2	Metallic Structures	0670414
	0670324	2	Transportation & Traffic Eng	0670422
	0250102	3	Surveying	0670261
	* 0670261	1	Surveying Lab	0670262
	0670412	3	Management of Eng. Projects	0670571
	0670412	3	Specif., Contracts & Qu. Surv.	0670572

First : University Requirements (27) Cr. H.
A. :University Compulsory Req. (15) Cr. H.

Mark	Pre-requisite	Cr. H.	Course Title	Course No.
	114099	3	Arabic Language Skills (1)	114101
	---	3	Military Science	111100
	130099	3	English Language Skills (1)	130101
	130101	3	English Language Skills (2)	130102
	---	3	National Education	111101
	---	0	Society Volunteer Work	111000

B. : University Elective Courses (12) Cr. H.

The student must study (12) Cr. H. from the table below

Mark	Pre-requisite	Cr. H.	Course Title	Course No.
	---	3	Language Skills (1)	140111
	---	3	Language Skills (2)	140112
	---	3	Human Vision & Civilization (1)	111133
	---	3	Legal Culture	420143
	---	3	Human Rights	420140
	---	3	Introduction to Project Manag.	330111
	---	3	Social Networking Skills	731102
	---	3	Health Education	910102
	---	3	Connectivity & Commu. Skills	780101
	---	3	Entrepreneurship & Creativity	610230
	---	3	Environmental Culture	240152
	---	3	Introduction to Psychology	111112

Note:-

All students must take level examinations in Arabic Language, English Language, and Computer Skills. Student who fail to pass in any examinations (less than 50%) must successfully pass the remedial course which he/she did not pass.

Codes used in Curriculum:

610 Electrical Eng.
611 Renewable Energy Eng.
615 Alternative Energy Technology
620 Mechanical Eng.
630 Computer Eng.
640 Mechatronics Eng.
650 Communications & Electronics Eng.
660 Architectural Eng.
670 Civil Eng.

Courses Description

Study Plan 2011

Course No.: 0670202
Course Title: Engineering Statistics
Credit Hrs: 2
Prerequisite Course: 0250102

Introduction to engineering statistics, presentation and treatment of data; theory of probabilities; random variables; probability distributions (continuous and discrete); sampling theory; statistical estimation; testing hypothesis; correlation and regression analysis.

Course No.: 0670211
Course Title: Statics
Credit Hrs: 3
Prerequisite Course: 0250102

Force vectors, Statics of particles, rigid bodies, equivalent systems of forces, centroids and centers of gravity, analysis of structures, frames, machines and trusses, Internal force (shear and moment diagram), friction, moments of inertia.

Course No.: 0670212
Course Title: Strength of Materials
Credit Hrs: 3
Prerequisite Course: 0670211

Stress, Strain, Stress-Strain relationship, Axial load, Torsion, Bending, Transverse Shear, stress and strain transformation, deflection of beams, buckling of columns.

Course No.: 0670213
Course Title: Strength of Materials Lab.
Credit Hrs: 1
Prerequisite Course: 0670212

Tensile test, Shear force and bending moment test, Impact test, Fatigue test, Creep test, Hardness test, Deflection of beams, Buckling.

Course No.: 0670214
Course Title: Construction Materials
Credit Hrs: 3
Prerequisite Course: 0250102

The structure of material, powerful atomic and energy relationship, structure and properties of the nucleus, Electron shells, and Radioactivity, General classification and structure of materials, atomic of bonds, solid state structure, metallic crystals and defects, polymers structure, Elastic and plastic deformation, crack,

creep, fatigue. Bonding materials, cement testing and aggregate testing, water quality, admixtures, fresh concrete properties, concrete operation mixing, handing, placing, compacting concrete, curing concrete, design of concrete mixes, testing of concrete and bricks.

Course No.: 0670216
Course Title: Construction Materials Lab
Credit Hrs: 1
Prerequisite Course: 0670214

Tests of Cement at Construction site, Fineness of Cement, Normal Consistency, Initial and final Setting time, Density and Specific Gravity of cement, Slump Test, Flow Table test, Compressive Strength, Tensile Test, Sieve Analysis, Specific gravity and Absorption for Coarse aggregate, Specific Gravity and Absorption For fine aggregate.

Course No.: 0670231
Course Title: Engineering Geology
Credit Hrs: 3
Prerequisite Course: 0250102

A study of earth materials, Formation of rock, Surface feature, Analysis of agents of weathering, Erosion, soil investigation, Diastrophism and their effect on engineering construction.

Course No.: 0670261
Course Title: Surveying
Credit Hrs: 3
Prerequisite Course: 0250102

Principles of surveying, Distance measurement, Chain surveying, Electronic distance measurement, Angle measurement, Coordinates geometry, Traverse surveying, Leveling, Profile and cross- sections, Contouring, Areas and volumes, earth works, Design and setting out horizontal and vertical curves.

Course No.: 0670262
Course Title: Surveying Lab
Credit Hrs: 1
Prerequisite Course: 0670261

Pacing and taping, Layout of buildings using theodolites, Angles measurement and coordinates geometry using theodolites, Traverse survey using total stations, Running a leveling network using levels, Determination of irregular areas using Planimeter device, Loop and link traverse, Measurement of horizontal distances of building using theodolite, Measurement of vertical distances using theodolite .

Course No.: 0670311
Course Title: Structural Analysis I
Credit Hrs: 3
Prerequisite Course: 0670212

Structural forms, types of supports, degree of determinacy, reactions, determinate structures, plane trusses, space trusses, shear and moment diagrams for beams and frames, three hinged arches, influence lines for beams and trusses, deflections.

Course No.: 0670312
Course Title: Structural Analysis II
Credit Hrs: 3
Prerequisite Course: 0670311

Analysis of statically indeterminate structures force method; slope deflection method; moment distribution method; stiffness method of structural analysis, plastic method.

Course No.: 0670323
Course Title: Pavement Design
Credit Hrs: 3
Prerequisite Course: 0670324

Types of Pavement, Asphaltic pavement materials, Reclamation and cumulative properties of layered construction of roads, Axle Loads, Design of hot asphalt mixture using the Marshall test, Pavement maintenance.

Course No.: 0670322
Course Title: Highway Engineering Lab
Credit Hrs: 1
Prerequisite Course: 0670323

Tests on asphalt : Penetration, Softening point , Flash and fire points, Ductility and Viscosity, Aggregate properties by blending of aggregate using L.A.A.V and CBR Test, Marshall mix design for asphalt mixture, Specific gravity for asphalt mixture , Skid resistance for surface layer.

Course No.: 0670324
Course Title: Geometric Design of Highway
Credit Hrs: 3
Prerequisite Course: 0670261

Design control and criteria; Characteristics of driver, pedestrian, vehicle and the road; sight distance; horizontal and vertical alignment; cross-section elements; super elevation attainment; earthwork computations; mass haul diagram; highway classification; intersections and interchanges; drainage design.

Course No.: 0670331
Course Title: Soil Mechanics
Credit Hrs: 3
Prerequisite Course: 0670231

Composition and structure of soils, Phase relations and index properties, Soil classification, Soil compaction, Principle of effective stress, Stresses due to self weight, Stresses due to applied loads, Soil shear strength, Soil permeability, One dimensional seepage, Consolidation theory

Course No.: 0670332
Course Title: Soil Mechanics Lab
Credit Hrs: 1
Prerequisite Course: 0670331

Water content, Specific gravity of soil particles, Liquid limit, Plastic Limit, Consolidation test, Compaction test, Density in field by sand cone, Permeability test (constant and variable head), Unconfined test, Direct shear test.

Course No.: 0670343
Course Title: Environmental Engineering
Credit Hrs: 3
Prerequisite Course: 0212101

Environmental system overview, Conservation theory, Material balance, State of Mixing, Reactor types, Water quality and Wastewater characteristics, Water quality standards, Water pollution, Water and wastewater treatment systems; objectives of primary, secondary and tertiary treatment; Air pollution, Acid rain, Ozone depletion and global warming; Air pollution control devices.

Course No.: 0670381
Course Title: Fluid Mechanics
Credit Hrs: 3
Prerequisite Course: 0670211

Fundamental Fluid prosperities, Basic units. Pressure and its Measurement, Fluid Statics, Force on plane& Inclined and Curved Submerged Surface, Floatation. Fluid Kinematics, Control Volume Approach, Differential and Integral Continuity Equation, Energy Equations, Application of Bernoulli equation, Momentum Principle and its Applications.

Course No.: 0670382
Course Title: Fluid Mechanics Lab
Credit Hrs: 1
Prerequisite Course: 0670381

Fundamental Fluid prosperities, Basic units., Pressure and its Measurement, Fluid Statics, Force on plane& Inclined and Curved Submerged Surface, Floatation. Fluid Kinematics, Control Volume Approach, Differential and Integral Continuity Equation, Energy Equations, Application of Bernoulli equation, Momentum Principle

and its Applications.

Course No.: 0670411
Course Title: Reinforced Concrete (1)
Credit Hrs: 3
Prerequisite Course: 0670312

Properties of concrete and steel, cracked and untracked sections, strength design for bending, stress block, singly and doubly reinforced sections, rectangular sections, T-sections, shear design, bond requirements, development length, one-way and ribbed slabs, approximate methods for two-way slabs, short columns and interaction diagrams.

Course No.: 0670412
Course Title: Reinforced Concrete (2)
Credit Hrs: 3
Prerequisite Course: 0670411

Ultimate strength versus unified design approaches, tension- and compression-controlled members, strain limits. Serviceability analysis, deflection and cracking control. Analysis and design for torsion. Slender columns. Analysis of building frames, simplifications, idealization. Two-way slabs, direct design method, equivalent frame method. Design of stairs.

Course No.: 0670413
Course Title: Steel Structures
Credit Hrs: 3
Prerequisite Course: 0670312

Structural Steel Design, Design of structural steel elements in bridges and building structures, plate girders, and other built-up members, beams and slender columns, and connections, detailing of steel structures; computer applications.

Course No.: 0670421
Course Title: Transportation Engineering
Credit Hrs: 3
Prerequisite Course: 0670324

Transportation systems; transportation system and elements; traffic flow theory; transport demand forecasting; environment impact, traffic studies; traffic safety; capacity and level of service concept capacity analysis of multilane, two lane and freeway; capacity analysis of signalized and unsignalized intersections; traffic signal coordination; computer applications in traffic.

Course No.: 0670441
Course Title: Hydraulics

Credit Hrs: 3

Prerequisite Course: 0670381

Flow in pipes, Pipes Networks Analysis, Open Channel Fundamentals, Open Channel Flow Analysis, Classification of Flow, (Uniform Flow), Critical Flow (Supercritical, Subcritical), Gradually Varied Flow, Water Surface Profile Analysis, Rapid Varied Flow (Hydraulic Jump), Dimensional Analysis, Similitude in Engineering, Pumps, Turbines.

Course No.: 0670442

Course Title: Hydraulics Lab

Credit Hrs: 1

Prerequisite Course: 0670441

Conducting the following Experiments: Osborne Reynolds Demonstration, Impact of Jets, Orifice and free jet flow, Dead Weight Pressure, Metacentric Height, Ground Water Flow and Well abstraction unit, Energy Loss in Hydraulic Jump, Flow Over Weirs, Rainfall Hydrograph, Water Hammer.

Course No.: 0670443

Course Title: Sanitary Engineering

Credit Hrs: 3

Prerequisite Course: 0670343

Water use trends and forecasting, capacity requirements, water demands, population projection; Water treatment engineering design parameters, treatment processes, mechanisms, principles, types, and design. Wastewater treatment engineering design parameters, preliminary treatments, sedimentation, clarification, biological treatment.

Course No.: 0670444

Course Title: Sanitary Engineering Lab

Credit Hrs: 1

Prerequisite Course: 0670443

Preparation of solutions, acids-bases titration, water analysis including: solid, alkalinity, turbidity, hardness, conductivity, biochemical and chemical oxygen demand determination, and JAR test for coagulations and flocculation process.

Course No.: 0670472

Course Title: Engineering Economics

Credit Hrs: 3

Prerequisite Course: 250102

Concept of engineering economy. Understand the concept of time value money, simple and compound interest. Feasibility study and choice proper option among several alternatives. Inflation, depletion, and depreciation calculations. Cost of owning, operating equipment and Taxes. Breakeven, Minimum Cost life, and replacement analysis.

Course No.: 0670517
Course Title: Pre-Stressed Concrete
Credit Hrs: 3
Prerequisite Course: 0670412

The behavior of concrete and steel under sustained load. Analysis and design of pre-tensioned and post-tensioned reinforced concrete members, and designing these members into the integral structure. The aim of this course is Calculating stresses in a composite system with a precast prestressed concrete beam and a cast in place concrete slab at various stages of construction and service. Also Computing camber, deflections, and cracking of prestressed concrete beams.

Course No.: 0670519
Course Title: Bridge Engineering
Credit Hrs: 3
Prerequisite Course: 0670412

Materials of bridge construction; bridge loads and design philosophy; design of reinforced concrete bridges; design of prestressed concrete bridges; design of steel bridges; design of plate-girder and continuous steel beam bridges; inspection, rehabilitation and maintenance of bridges;
bridge-type selection criteria.

Course No.: 0670522
Course Title: Airports and Railways Engineering
Credit Hrs: 3
Prerequisite Course: 0670421

The course intends to introduce the nature of civil aviation and Airports, Aircraft characteristics related to airport design, components of airport and the characteristics for each component, design the pavement of airport, introduction of Railways.

Course No.: 0670531
Course Title: Foundation Engineering
Credit Hrs: 3
Prerequisite Course: 0670331

Introduction to foundation types, review of main chapters of soil mechanics (stresses, consolidation, shear strength. Soil site Exploration, Bearing Capacity, Factors to consider in foundation design, Design of Retaining Walls.

Course No.: 0670541
Course Title: Hydrology
Credit Hrs: 3
Prerequisite Course: 0670441

Introduction to Hydrology, Hydrological Cycle, Precipitation, Evaporation, Types of Rainfall, Rainfall Measurements, Hydrograph Analysis, Unit Hydrograph, Frequency and Peak Flow Analysis, Flood Routing,

Reservoir Sizing, Introduction to Ground Water, Ground Water Flow Equations and Types of Aquifers.

Course No.: 0670459
Course Title: Practical Training
Credit Hrs: 0
Prerequisite Course: 90 hrs.

Field training which the civil 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 (280 hr.).

Course Title: Liquid and solid waste management
Credit Hrs: 3
Prerequisite Course: 0670443

Waste definition, classification in the context of EU legislation; waste types; Integrated waste management, Waste treatment technology: incineration and other treatment; Examples for waste management practices in developing countries and developed countries; Waste generation in Jordan and sludge management.

Course No.: 0670551
Course Title: Graduation Project (1)
Credit Hrs: 1
Prerequisite Course: 120 hrs.

The course is a requirement for level 5 of civil engineering students. It introduces the basic principles and analysis of scientific research and technical report writing.

Course No.: 0670552
Course Title: Graduation Project (2)
Credit Hrs: 2
Prerequisite Course: 0670551

Continuation of project (1) (writing a technical report and the project drawings and details).

Course No.: 0670553
Course Title: Special Topics in Civil Engineering
Credit Hrs: 3
Prerequisite Course: 120 hrs.

Three Credit Hours given in any topic chosen in civil engineering.

Course No.: 0670571
Course Title: Project management
Credit Hrs: 3

Prerequisite Course: 0670412

Define project management and the role of management, project management concept, and determine project parties and responsibilities of each part. Project planning and plan the work: perform WBS, estimate activity duration, and establish relationships among the project activities. Perform network analysis and scheduling calculations, and determine critical path of the project. Tracking progress and evaluate the project status. Perform earned value analysis to control schedule and cost variances.

Course No.: 0670572

Course Title: Specifications, Contracts, and Quantities Surveying.

Credit Hrs: 3

Prerequisite Course: 0670412

Understand construction contracts' characteristics and features, contractual procedures, project delivery methods, type of contracts, contract's documents, and bill of quantities (BOQ). Be familiars with Jordanian construction contracts for construction projects. Understand specifications in construction projects and Jordanian specifications. Quantify several quantities in construction projects and able to prepare BOQ.

Courses Description

Study Plan 2018

Course No.: 0670203
Course Title: Engineering Statistics
Credit Hrs: 3
Prerequisite Course: 0250102

Introduction to engineering statistics, presentation and treatment of data; theory of probabilities; random variables; probability distributions (continuous and discrete); sampling theory; statistical estimation; testing hypothesis; correlation and regression analysis.

Course No.: 0670211
Course Title: Statics
Credit Hrs: 3
Prerequisite Course: 0250102+0211101

Force vectors, Statics of particles, rigid bodies, equivalent systems of forces, centroids and centers of gravity, analysis of structures, frames, machines and trusses, Internal force (shear and moment diagram), friction, moments of inertia.

Course No.: 0670212
Course Title: Strength of Materials
Credit Hrs: 3
Prerequisite Course: 0670211

Stress, Strain, Stress-Strain relationship, Axial load, Torsion, Bending, Transverse Shear, stress and strain transformation, deflection of beams, buckling of columns.

Course No.: 0670213
Course Title: Strength of Materials Lab.
Credit Hrs: 1
Prerequisite Course: 0670212

Tensile test, Shear force and bending moment test, Impact test, Fatigue test, Creep test, Hardness test, Deflection of beams, Buckling.

Course No.: 0670214
Course Title: Construction Materials
Credit Hrs: 3
Prerequisite Course: 0250102

The structure of material, powerful atomic and energy relationship, structure and properties of the nucleus, Electron shells, and Radioactivity, General classification and structure of materials, atomic of bonds, solid state

structure, metallic crystals and defects, polymers structure, Elastic and plastic deformation, crack, creep, fatigue. Bonding materials, cement testing and aggregate testing, water quality, admixtures, fresh concrete properties, concrete operation mixing, handing, placing, compacting concrete, curing concrete, design of concrete mixes, testing of concrete and bricks.

Course No.: 0670216
Course Title: Construction Materials Lab
Credit Hrs: 1
Prerequisite Course: 0670214

Tests of Cement at Construction site, Fineness of Cement, Normal Consistency, Initial and final Setting time, Density and Specific Gravity of cement, Slump Test, Flow Table test, Compressive Strength, Tensile Test, Sieve Analysis, Specific gravity and Absorption for Coarse aggregate, Specific Gravity and Absorption For fine aggregate.

Course No.: 0670217
Course Title: Building Construction and Civil Drawing
Credit Hrs: 3
Prerequisite Course : 0670214

Structural elements, Type of buildings, Type of loadings, type of slabs, calculation of Dead load and live load on solid and ribbed slab, one way and two way slab, distributed load from slab to beams, determination load on column that coming from slab, determination of maximum moment on beams, determine whether the column is short or slender, calculation of cross section of short column, site preparation, soil testing, excavation works, and types of foundation: raft, piles, footings, etc. determination of area and thickness of footing, Openings such as windows, doors, skylights and ventilation shafts, stairs, drawing sketches of cross section in beam, column, slab, ..etc..

Course No.: 0670231
Course Title: Engineering Geology
Credit Hrs: 3
Prerequisite Course: 0250102

A study of earth materials, Formation of rock, Surface feature, Analysis of agents of weathering, Erosion, soil investigation, Diastrophism and their effect on engineering construction.

Course No.: 0670261
Course Title: Surveying
Credit Hrs: 3
Prerequisite Course: 0250102

Principles of surveying, Distance measurement, Chain surveying, Electronic distance measurement, Angle measurement, Coordinates geometry, Traverse surveying, Leveling, Profile and cross- sections, Contouring, Areas and volumes, earth works, Design and setting out horizontal and vertical curves.

Course No.: 0670262
Course Title: Surveying Lab
Credit Hrs: 1
Prerequisite Course: 0670261

Pacing and taping, Layout of buildings using theodolites, Angles measurement and coordinates geometry using theodolites, Traverse survey using total stations, Running a leveling network using levels, Determination of irregular areas using Planimeter device, Loop and link traverse, Measurement of horizontal distances of building using theodolite, Measurement of vertical distances using theodolite .

Course No.: 0670311
Course Title: Structural Analysis I
Credit Hrs: 3
Prerequisite Course: 0670212

Structural forms, types of supports, degree of determinacy, reactions, determinate structures, plane trusses, space trusses, shear and moment diagrams for beams and frames, three hinged arches, influence lines for beams and trusses, deflections..

Course No.: 0670312
Course Title: Structural Analysis II
Credit Hrs: 3
Prerequisite Course: 0670311

Analysis of statically indeterminate structures force method; slope deflection method; moment distribution method; stiffness method of structural analysis, plastic method.

Course No.: 0670323
Course Title: Pavement Design
Credit Hrs: 3
Prerequisite Course: 0670324

Types of Pavement, Asphaltic pavement materials, Reclamation and cumulative properties of layered construction of roads, Axle Loads, Design of hot asphalt mixture using the Marshall test, Pavement maintenance.

Course No.: 0670322
Course Title: Highway Engineering Lab
Credit Hrs: 1
Prerequisite Course: 0670323

Tests on asphalt : Penetration, Softening point , Flash and fire points, Ductility and Viscosity, Aggregate properties by blending of aggregate using L.A.A.V and CBR Test, Marshall mix design for asphalt mixture, Specific gravity for asphalt mixture , Skid resistance for surface layer.

Course No.: 0670324
Course Title: Geometric Design of Highway
Credit Hrs: 3
Prerequisite Course: 0670261

Design control and criteria; Characteristics of driver, pedestrian, vehicle and the road; sight distance; horizontal and vertical alignment; cross-section elements; super elevation attainment; earthwork computations; mass haul diagram; highway classification; intersections and interchanges; drainage design.

Course No.: 0670331
Course Title: Soil Mechanics
Credit Hrs: 3
Prerequisite Course: 0670231

Composition and structure of soils, Phase relations and index properties, Soil classification, Soil compaction, Principle of effective stress, Stresses due to self weight, Stresses due to applied loads, Soil shear strength, Soil permeability, One dimensional seepage, Consolidation theory

Course No.: 0670332
Course Title: Soil Mechanics Lab
Credit Hrs: 1
Prerequisite Course: 0670331

Water content, Specific gravity of soil particles, Liquid limit, Plastic Limit, Consolidation test, Compaction test, Density in field by sand cone, Permeability test (constant and variable head), Unconfined test, Direct shear test.

Course No.: 0670343
Course Title: Environmental Engineering
Credit Hrs: 3
Prerequisite Course: 0212101+0670444

Environmental system overview, Conservation theory, Material balance, State of Mixing, Reactor types, Water quality and Wastewater characteristics, Water quality standards, Water pollution, Water and wastewater treatment systems; objectives of primary, secondary and tertiary treatment; Air pollution, Acid rain, Ozone depletion and global warming; Air pollution control devices.

Course No.: 0670381
Course Title: Fluid Mechanics
Credit Hrs: 3
Prerequisite Course: 0670211

Fundamental Fluid prosperities, Basic units. Pressure and its Measurement, Fluid Statics, Force on plane& Inclined and Curved Submerged Surface, Floatation. Fluid Kinematics , Control Volume Approach, Differential and Integral Continuity Equation, Energy Equations, Application of Bernoulli equation, Momentum Principle and its Applications.

Course Title: Reinforced Concrete (1)
Credit Hrs: 3
Prerequisite Course: 0670312

Properties of concrete and steel, cracked and untracked sections, strength design for bending, stress block, singly and doubly reinforced sections, rectangular sections, T-sections, shear design, bond requirements, development length, one-way and ribbed slabs, approximate methods for two-way slabs, short columns and interaction diagrams.

Course No.: 0670412
Course Title: Reinforced Concrete (2)
Credit Hrs: 3
Prerequisite Course: 0670411

Ultimate strength versus unified design approaches, tension- and compression-controlled members, strain limits. Serviceability analysis, deflection and cracking control. Analysis and design for torsion. Slender columns. Analysis of building frames, simplifications, idealization. Two-way slabs, direct design method, equivalent frame method. Design of stairs.

Course No.: 0670414
Course Title: Steel Structures
Credit Hrs: 2
Prerequisite Course: 0670312

Structural Steel Design, Design of structural steel elements in bridges and building structures, plate girders, and other built-up members, beams and slender columns, and connections, detailing of steel structures; computer applications.

Course No.: 0670422
Course Title: Transportation Engineering
Credit Hrs: 2
Prerequisite Course: 0670324

Transportation systems; transportation system and elements; traffic flow theory; transport demand forecasting; environment impact, traffic studies; traffic safety; capacity and level of service concept capacity analysis of multilane, two lane and freeway; capacity analysis of signalized and unsignalized intersections; traffic signal coordination; computer applications in traffic.

Course No.: 0670441
Course Title: Hydraulics
Credit Hrs: 3
Prerequisite Course: 0670381

Flow in pipes, Pipes Networks Analysis, Open Channel Fundamentals, Open Channel Flow Analysis,

Classification of Flow, (Uniform Flow), Critical Flow (Supercritical, Subcritical), Gradually Varied Flow, Water Surface Profile Analysis, Rapid Varied Flow (Hydraulic Jump), Dimensional Analysis, Similitude in Engineering, Pumps, Turbines.

Course No.: 0670442
Course Title: Hydraulics Lab
Credit Hrs: 1
Prerequisite Course: 0670441

Conducting the following Experiments: Osborne Reynolds Demonstration, Impact of Jets, Orifice and free jet flow, Dead Weight Pressure, Metacentric Height, Ground Water Flow and Well abstraction unit, Energy Loss in Hydraulic Jump, Flow Over Weirs, Rainfall Hydrograph, Water Hammer.

Course No.: 0670443
Course Title: Sanitary Engineering
Credit Hrs: 3
Prerequisite Course: 0670381

Water use trends and forecasting, capacity requirements, water demands, population projection; Water treatment engineering design parameters, treatment processes, mechanisms, principles, types, and design. Wastewater treatment engineering design parameters, preliminary treatments, sedimentation, clarification, biological treatment.

Course No.: 0670444
Course Title: Sanitary Engineering Lab
Credit Hrs: 1
Prerequisite Course: 0670443

Preparation of solutions, acids-bases titration , water analysis including: solid, alkalinity, turbidity, hardness ,conductivity, biochemical and chemical oxygen demand determination, and JAR test for coagulations and flocculation process.

Course No.: 0670517
Course Title: Pre-Stressed Concrete
Credit Hrs: 3
Prerequisite Course: 0670412

The behavior of concrete and steel under sustained load. Analysis and design of pre-tensioned and post-tensioned reinforced concrete members, and designing these members into the integral structure. The aim of this course is Calculating stresses in a composite system with a precast prestressed concrete beam and a cast in place concrete slab at various stages of construction and service. Also Computing camber, deflections, and cracking of prestressed concrete beams.

Course No.: 0670519
Course Title: Bridge Engineering
Credit Hrs: 3
Prerequisite Course: 0670412

Materials of bridge construction; bridge loads and design philosophy; design of reinforced concrete bridges; design of prestressed concrete bridges; design of steel bridges; design of plate-girder and continuous steel beam bridges; inspection, rehabilitation and maintenance of bridges;
bridge-type selection criteria.

Course No.: 0670522
Course Title: Airports and Railways Engineering
Credit Hrs: 3
Prerequisite Course: 0670422

The course intends to introduce the nature of civil aviation and Airports, Aircraft characteristics related to airport design, components of airport and the characteristics for each component, design the pavement of airport , introduction of Railways.

Course No.: 0670531
Course Title: Foundation Engineering
Credit Hrs: 3
Prerequisite Course: 0670331

Introduction to foundation types, review of main chapters of soil mechanics (stresses, consolidation, shear strength. Soil site Exploration, Bearing Capacity, Factors to consider in foundation design, Design of Retaining Walls.

Course No.: 0670541
Course Title: Hydrology
Credit Hrs: 3
Prerequisite Course: 0670441

Introduction to Hydrology, Hydrological Cycle, Precipitation, Evaporation, Types of Rainfall, Rainfall Measurements, Hydrograph Analysis, Unit Hydrograph, Frequency and Peak Flow Analysis, Flood Routing, Reservoir Sizing, Introduction to Ground Water, Ground Water Flow Equations and Types of Aquifers.

Course No.: 0670499
Course Title: Practical Training
Credit Hrs: 3
Prerequisite Course: 115 hrs.

Field training which the civil 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 (280 hr).

Course No.: 0670545
Course Title: Liquid and solid waste management
Credit Hrs: 3
Prerequisite Course: 0670443

Waste definition, classification in the context of EU legislation; waste types; Integrated waste management, Waste treatment technology: incineration and other treatment; Examples for waste management practices in developing countries and developed countries; Waste generation in Jordan and sludge management.

Course Title: Graduation Project (1)
Credit Hrs: 1
Prerequisite Course: 100 hrs.

The course is a requirement for level 5 of civil engineering students. It introduces the basic principles and analysis of scientific research and technical report writing.

Course No.: 0670552
Course Title: Graduation Project (2)
Credit Hrs: 2
Prerequisite Course: 0670551+0670499

Continuation of project (1) (writing a technical report and the project drawings and details).

Course No.: 0670553
Course Title: Special Topics in Civil Engineering
Credit Hrs: 3
Prerequisite Course: Department Approval

Three Credit Hours given in any topic chosen in civil engineering.

Course No.: 0670571
Course Title: Project management
Credit Hrs: 3
Prerequisite Course: 0670412

Define project management and the role of management, project management concept, and determine project parties and responsibilities of each part. Project planning and plan the work: perform WBS, estimate activity duration, and establish relationships among the project activities. Perform network analysis and scheduling calculations, and determine critical path of the project. Tracking progress and evaluate the project status. Perform earned value analysis to control schedule and cost variances.

Course No.: 0670572
Course Title: Specifications, Contracts, and Quantities Surveying.
Credit Hrs: 3

Prerequisite Course: 0670412

Understand construction contracts' characteristics and features, contractual procedures, project delivery methods, type of contracts, contract's documents, and bill of quantities (BOQ). Be familiars with Jordanian construction contracts for construction projects. Understand specifications in construction projects and Jordanian specifications. Quantify several quantities in construction projects and able to prepare BOQ.

Student Advising

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

The student has to know the following:

- Each student in the Faculty of Engineering is assigned an academic advisor by the department. The advisor is responsible for advising what courses are chosen for registration. This should be performed at the beginning of every semester.
- The student has to take the following points into consideration regarding the registration process:
    - ✓ Making sure that he/she passed the relevant prerequisite courses (refer to Civil Engineering Curricula)
    - ✓ Following the sequence of registration steps shown in the study plan, which are as follows:
        - ☒ University requirements: compulsory courses and electives.
        - ☒ Faculty requirements: compulsory and electives.
        - ☒ Specialty requirements.
    - ✓ Consulting the study plan during the registration process in respect of the number of credit hours a student can take per semester.

- ✓ As the academic advising process is not compulsory, the student can register for classes without taking the advisor's comments into consideration, but he/she will take full responsibility for this action and its consequences since this might delay his/her graduation.

- The student must understand that he/she has to register for a minimum of 12 credit hours and a maximum of 18 in regular semesters.

- The student has the right to withdraw (drop) from a course or more during a certain semester provided that he/she remains registered for at least 9 credit hours. This withdrawal (drop) must be approved by the course professor and the academic advisor.

  The withdrawal (drop) should take place during a specific period of time that is set by the Admission and Registration Department. There is a specific period within which the student can get a refund for the course fees, after this period the student will lose his/her right to get the refund.

- The student can add/drop courses only in accordance with the admission and registration office time table. The student is allowed to add/drop a limited number of courses as per the regulations set by the Admissions and Registration Department.

Quality Assurance

Philadelphia University was ranked the first leading all public and private universities in Jordan in the quality assurance measures set by of the Hussein Fund for Creativity and Excellence for the Faculties of Information Technology and Law. The university has set and demonstrated the highest quality assurance measures in teaching,

management and research development that attracted the attention of domestic and foreign institutions.

In the Civil Engineering Department, the highest measures of quality assurance are being adopted to raise the level of teaching standards, and implement clear measures for teaching, advising, senior project organization, testing and course assessment. This is put in a feedback system that helps the department hear the comments from the students and allow them to evaluate both courses and instructors. This of course increases the level and quality of teaching as well as information delivery.

Both, the mission of the department and its objectives stress on the implementation of the highest quality measures and regulations to provide the best learning experience to our students. (*See department mission in the Civil Engineering Department mission section*).

Honors and Awards

Philadelphia University and the Civil Engineering Department promote and encourage students to excel in their studies through the introduction of various awards and honor lists that reflect the hard work of our students and encourage them to keep it up.

These awards are listed on the University Admission site (http://www.philadelphia.edu.jo/admission.asp). Also, an annual honor list is published and engraved on the entrance of the Faculty of Engineering that highlights the names of the honor students from each engineering discipline.