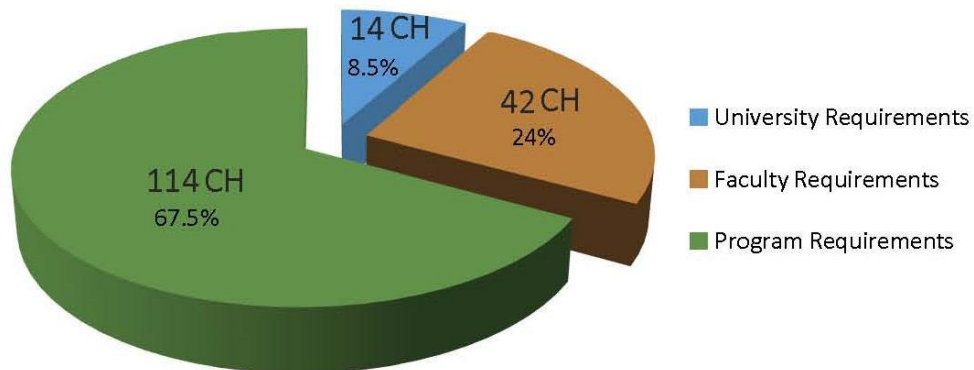


Civil Infrastructure Engineering Program



Program Description

Civil engineering today is concerned with the deterioration of the nation's roads, bridges, water and power distribution systems, storm and sanitary sewers and other public infrastructure. The aim of the Civil Infrastructure Engineering Program is to graduate civil engineers responsible for the life-cycle of the system he creates and must be capable of optimizing the total system performance of large-scale public works projects, including their social and environmental impacts, in a way that addresses critical issues of infrastructure behavior, deterioration science, and structural rehabilitation. On top of these fields comes surveying engineering, sanitary environment, transportation engineering, water-related engineering projects who can enrich the water resources and public works field.

Career Prospects

Graduates of this department has a variety of opportunities to work, for example:

- Government authorities.
- Consulting firms in civil engineering and construction.
- Civil engineering contractors and project managers.
- Water and sanitation utility companies.
- Environmental engineering organizations.
- Coastal engineers developing coastal environment systems.
- Water resources management authority.

Program Concentrations

The program provides the undergraduate student with a thorough foundation and technologies in the basic tenets of civil engineering and technologies. The program provides three different fields in which the students in this program can specialize. These three fields are:

1. Transportation Engineering
2. Geomatics and Environmental Engineering
3. Water Engineering

1. Transportation engineering is concerned with moving people and goods efficiently, safely, and in a manner conducive to a vibrant community. This involves specifying, designing,

constructing, and maintaining transportation infrastructure which includes streets, canals, highways, rail systems, airports, ports, and mass transit. It includes areas such as transportation design, transportation planning, traffic engineering, some aspects of urban engineering, queueing theory, pavement engineering, Intelligent Transportation System (ITS), and infrastructure management.

2. Geomatics and Environmental Engineering is the process by which a surveyor measures certain dimensions that occur on or near the surface of the Earth. Surveying equipment, such as levels and theodolites, are used for accurate measurement of angular deviation, horizontal, vertical and slope distances. With computerization, electronic distance measurement (EDM), total stations, GPS surveying and laser scanning have to a large extent supplanted traditional instrument. Data collected by survey measurement is converted into a graphical representation of the Earth's surface in the form of a map. This information is then used by civil engineers, contractors and realtors to design from, build on, and trade, respectively. Elements of a structure must be sized and positioned in relation to each other and to site boundaries and adjacent structures. Although surveying is a distinct profession with separate qualifications and licensing arrangements, civil engineers are trained in the basics of surveying and mapping, as well as geographic information systems. Surveyors also lay out the routes of railways, tramway tracks, highways, roads, pipelines and streets as well as position other infrastructure, such as harbors, before construction. Environmental engineering, emphasis is based both on the design of systems for water supply, water treatment, soil treatment, wastewater treatment, and waste management, as well as on the design of physical, chemical and biological unit operations and processes encountered in these systems.

3. Water Engineering is concerned with the collection and management of water (as a natural resource). As a discipline it therefore combines elements of hydrology, environmental science, meteorology, conservation, and resource management. This area of civil engineering relates to the prediction and management of both the quality and the quantity of water in both underground (aquifers) and above ground (lakes, rivers, and streams) resources. Water resource engineers analyze and model very small to very large areas of the earth to predict the amount and content of water as it flows into, through, or out of a facility. Although the actual design of the facility may be left to other engineers. Also concerned with design of pipelines, water supply network, drainage facilities (including bridges, dams, channels, culverts, levees, storm sewers), and canals. Hydraulic engineers design these facilities using the concepts of fluid pressure, fluid statics, fluid dynamics, and hydraulics, among others.

Study Requirements

To obtain the Bachelor of Science Degree in Engineering, the student must successfully complete 180 credit hours, with a GPA at graduation of at least 2.0.

The study requirements are divided into:

University Requirements

The university is considered a core of Human Thinking at its highest level, and the source of investment and development of human resources. It is concerned with the rise of the Arabian Civilization and the Historical Heritage of the Egyptian Society, and its traditions. It is also concerned with the education of Religion, Morals and Nationalism (Egyptian National Law for Universities, Law 49 for Year 1972). Therefore, Ain Shams University graduate should be:

- 0. Aware of national, regional and international contemporary issues, to have an intellectual and enlightened personality and to interact effectively in the community through different communication skills.*

To achieve this goal, Ain Shams University has designed a number of courses planned to build the student personality, develop his skills, and increase his awareness of different topics. These courses are called University Requirements. The Faculty of Engineering Ain Shams University has selected some of these courses to be offered within the Engineering Programs. These courses are:

Course Code	Course Title	Credit Hours
ASU011	Technical English Language	0
ASU111	Human Rights	2
ASU112	Report Writing and Communication skills	3
ASU113	Professional Ethics and Legislations	3
ASU114	Selected Topics in Contemporary Issues	2
-	ASU Elective (1)	2
-	ASU Elective (2)	2
Total		14
Pool of ASU Elective (1) Courses		
ASU321	Innovation and Entrepreneurship	2
ASU322	Language Course – can accept equivalent certificates	2
ASU323	Introduction to Accounting	2
ASU324	History of Engineering and Technology	2
Pool of ASU Elective (2) Courses		
ASU331	Human Resources Management	2
ASU332	History of Architecture	2
ASU333	Introduction to Marketing	2
ASU334	Building Safety and Fire Protection	2
ASU335	Literature and Arts	2
ASU336	Business Administration	2

A placement test in English Language will be conducted for all admitted students to the Faculty of Engineering. If the student passes this test, then he will be exempted from taking the English Course. The English course is a pre-requisite for all Faculty requirements courses.

For ASU322 – Language course, any non-English language is accepted including Arabic. If a student has an equivalent certificate, he is exempted from taking this course. Examples of equivalent certificates: TOEFL, IELTS ... etc.

Faculty Requirements

All the programs offered at the Faculty of Engineering, Ain Shams University are Engineering Programs. The graduates have the privilege of being Engineers and are automatically enrolled in the Egyptian Engineering Syndicate (EES). The graduates are also entitled to take the Fundamentals of Engineering Exam offered by the National Council of Examiners for Engineering and Surveying (NCEES), based on the agreement between EES and NCEES.

To achieve these Intended Learning Outcomes, a set of courses must be completed as a Faculty Requirement. These courses are divided into Basic Science Courses and Basic Engineering Courses.

Course Code	Course Title	Credit Hours
PHM011	Basic Mathematics	0
ENG111	Field Training	0
PHM012	Mathematics (1)	3
PHM013	Mathematics (2)	3
PHM021	Vibration and Waves	3
PHM022	Electricity and Magnetism	3
PHM031	Statics	3
PHM032	Dynamics	3
PHM041	Engineering Chemistry	3
PHM111	Probability and Statistics	2
MDP081	Production Engineering	3
MDP011	Engineering Drawing	3
CEP011	Projection and Engineering Graphics	3
CSE031	Computing in Engineering	2
ENG011	Fundamentals of Engineering	2
CES151	Structures and Properties of Construction Materials	2
CES171	Engineering Economics and Finance	2
CES271	Project Management Essentials in Construction	2
Total		42

A placement test in Mathematics will be conducted for all admitted students except some High School Degrees which are determined by the Faculty Council. If the student passes this test,

then he will be exempted from taking Basic Mathematics Course. The Basic Mathematics course is a pre-requisite for all Faculty requirements courses.

Specialization requirements

In order to get a Bachelor of Science Degree in Civil Infrastructure Engineering program, and to satisfy the Program Competences, the following set of courses need to be completed.

Course Code	Course Title	Credit Hours
PHM112	Differential Equations and Numerical Analysis	4
CES113	Structural Mechanics	3
CES114	Strength of Materials	3
CES213	Structural Analysis	3
CES224	Concrete Structures Design (1)	3
CES324	Concrete Structures Design (2)	3
CES427	Concrete Structures Design (3)	3
CES430	Construction Methods and Techniques	2
CES241	Steel Structures Design (1)	3
CES344	Steel Structures Design (2)	3
CES251	Concrete Technology (1)	3
CES252	Concrete Technology (2)	3
CES161	Geology	2
CES263	Soil Mechanics (1)	4
CES364	Soil Mechanics (2)	3
CES365	Foundation Design (1)	3
CES479	Planning and Scheduling of Repetitive Projects	2
CEP213	Surveying (1)	4
CEP214	Surveying (2)	4
CEP312	Surveying (3)	2
CEP314	Infrastructure Network Planning	2
CEP221	Introduction to Transportation and Traffic Engineering	3
CEP332	Highway Geometric and Structural Design	3
CEP342	Railway Engineering Principles	2
CEP151	Introduction to Environmental Engineering	2
CEP353	Design of Water and Wastewater Networks	3
CEI113	Fluid Mechanics for Civil Engineers	3
CEI212	Hydraulics	3
CEI222	Irrigation and Drainage	3
CEI262	Principles of Water Resources Engineering	2
CEI132	Civil Engineering Drawing	2
CEI333	Design of Irrigation Structures	2
CEI435	Hydraulic Structures	2

Course Code	Course Title	Credit Hours
CEI341	Coastal Engineering	2
CEI441	Port Engineering and Navigation	2
CEI352	Applied Hydrology	2
-	Civil Infrastructure Engineering Elective (1)	2
-	Civil Infrastructure Engineering Elective (2)	2
-	Civil Infrastructure Engineering Elective (3)	2
-	Civil Infrastructure Engineering Elective (4)	2
CEP492	Civil Engineering Design Graduation Project (1) Elect.	3
CEP493	Civil Engineering Senior Seminar Elective	2
CEP494	Civil Engineering Design Graduation Project (2) Elect.	3
Total		114

Technical Electives for Civil Infrastructure Engineering

The student shall select four Technical Elective Courses from the following list. Accordingly, a total number of 8 credit hours should be earned.

Pool of Transportation Engineering Elective Courses		
Pool of Civil Infrastructure Engineering Elective (1)		
CEP323	Principles of Traffic Engineering	2
CEP333	Road Construction Material	2
Pool of Civil Infrastructure Engineering Elective (2)		
CEP424	Transportation Economics	2
CEP434	Road Maintenance	2
Pool of Civil Infrastructure Engineering Elective (3)		
CEP425	Urban Transportation Planning	2
CEP435	Road Construction	2
Pool of Civil Infrastructure Engineering Elective (4)		
CEP426	Intelligent Transportation Systems	2
CEP436	Airport Engineering	2
Pool of Geomatics and Environmental Engineering Elective Courses		
Pool of Civil Infrastructure Engineering Elective (1)		
CEP313	Photogrammetric Surveying	2
CEP354	Computer Applications in Sanitary Engineering	2
Pool of Civil Infrastructure Engineering Elective (2)		
CEP415	Geodetic and GPS Surveying	2
CEP455	Principles of Water and Waste Water Treatment	2
Pool of Civil Infrastructure Engineering Elective (3)		
CEP416	Hydrographic Surveying and Harbor Engineering	2
CEP456	Water and Wastewater Supply	2
Pool of Civil Infrastructure Engineering Elective (4)		
CEP417	GIS Applications in Civil Infrastructure Projects	2
CEP457	Reuse of Treated Wastewater	2
Pool of Water Engineering Elective Courses		
Pool of Civil Infrastructure Engineering Elective (1)		
CEI321	Modern Irrigation Systems	2
CEI433	Dams Engineering	2

CEI451	Ground water Hydrology	2
Pool of Civil Infrastructure Engineering Elective (2)		
CEI413	Environmental Hydraulics	2
CEI442	Coastal Environment Engineering	2
CEI463	Environmental Impact Assessment for Water Engineering Projects	2
Pool of Civil Infrastructure Engineering Elective (3)		
CEI412	Pump Stations Engineering	2
CEI416	Hydraulic Modeling	2
CEI443	Inland Navigation	2
CEI461	Geographical Information Systems in Water Engineering	2
Pool of Civil Infrastructure Engineering Elective (4)		
CEI414	River Engineering	2
CEI417	Sustainable Urban Water Systems	2
CEI436	Topics in Hydraulic Structures	2
CEI466	Water Security and Governance	2

Civil and Infrastructure Engineering Program Course Tree

