Ministry of Science Research and Technology

DANESHPAJOOHAN PISHRO
Higher Education Institute

2018

Civil Engineering-B.S.

DANESHPAJOOHAN PISHRO HIGHER EDUCATION INSTITUTE

- COURSE CHART
- SYLLABUS
- SEMESTER CHART

Civil Engineering Undergraduate Course Chart

General Courses

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
61-11-004	Islamic Thoughts-I	2	2	0	-----	-----
61-11-011	Islamic Thoughts-II	2	2	0	Islamic Thoughts-I	-----
61-11-003	Rite of Life (Applied Ethics)	2	2	0	-----	-----
61-11-012	Islamic Revolution of Iran	2	2	0	-----	-----
61-11-014	Analytical History of Islam	2	2	0	-----	-----
61-15-001	Persian Language	3	3	0	-----	-----
61-15-002	English Language	3	3	0	-----	-----
61-15-005	Physical Education	1	0.5	0.5	-----	-----
61-15-011	Exercise-I	1	0	1	Physical Education	-----
61-15-007	Family and Population Knowledge	2	2	0	-----	-----
61-11-008	Introduction to Constitution	2	2	0	-----	-----
61-11-013	The Holy Quran Exegesis	2	2	0	-----	-----
Total Credits		22				

Note1: Only one course between 'Islamic Revolution of Iran' and 'Introduction to Constitution' shall be taken.

Science Courses

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
51-11-019	Mathematics-I	3	3	0	-----	-----
51-11-021	Mathematics-II	3	3	0	Mathematics-I	-----
51-11-022	Differential Equations	3	3	0	------	Mathematics-II
51-11-031	Computer Programming	3	3	0	Mathematics-I	-----
51-11-023	Numerical Methods	2	2	0	Computer Programming, Differential Equations	-----
51-22-030	Physics-I	3	3	0	-----	Mathematics-I
51-22-032	Physics-I Lab	1	0	1	-----	Physics-I
51-11-024	Engineering Statistics and Probability	2	2	0	Mathematics-I	-----
Total Credits		20				

Civil Engineering Courses

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371020	Technical and Structural Drawing	2	1	1	-----	-----
1371021	Surveying and Operation	2	1	1	Mathematics-I	-----
1371022	Construction Materials and Laboratory	2	1.5	0.5	Engineering Geology	-----
1371023	Concrete Technology	2	2	0	Construction Materials and Laboratory	-----
1371024	Concrete Technology Laboratory	1	0	1	Concrete Technology	-----
1371025	Architectural and Urban Planning Design	2	2	0	Technical and Structural Drawing	-----
1371026	Statics	3	3	0	Mathematics-I	-----
1371027	Dynamics	3	3	0	Statics	-----
1371028	Strength of Materials-I	3	3	0	Statics	-----
1371029	Structural Analysis-I	3	3	0	Strength of Materials-I	-----
1371030	Structural Analysis-II	3	3	0	Structural Analysis-I, Numerical Methods	-----
1371031	Design of Reinforced Concrete Structures-I	3	3	0	Concrete Technology, Structural Analysis-I	-----
1371032	Design of Reinforced Concrete Structures-II	3	3	0	Design of Reinforced Concrete Structures-II	-----
1371033	Design of Concrete Structures Project	1	0	1	Structural Analysis-II, Concrete Structures-II	-----
1371034	Design of Steel Structures-I	3	3	0	Structural Analysis-I	-----

1371035	Design of Steel Structures-II	2	2	0	Design of Steel Structures-I	-----
1371036	Design of Steel Structures Project	1	0	1	Structural Analysis-II, Steel Structures-II	-----
1371037	Engineering Geology	2	2	0	-----	-----
1371038	Soil Mechanics	3	3	0	Engineering Geology, Strength of Materials-I	-----
1371039	Soil Mechanics Laboratory	1	0	1	Soil Mechanics	-----
1371040	Foundation Engineering	2	2	0	Concrete Structures-I, Soil Mechanics	-----
1371041	Fluid Mechanics	3	3	0	Dynamics	-----
1371042	Hydraulics and Laboratory	3	2	1	Fluid Mechanics	-----
1371043	Building Construction Methods	2	1	1	Architectural and Urban Planning Design, Concrete Structures-II, Steel Structures-II	-----
1371044	Road Construction	2	2	0	Surveying and Operation, Soil Mechanics	-----
1371045	Road Construction Project	1	0	1	Road Construction	-----
1371046	Pavement Design	2	2	0	Road Construction, Construction Materials and Lab	-----
1371047	Construction Cost Estimation	1	0.5	0.5	English Language	Architectural and Urban Planning Design
1371048	Internship	1	0	1	(after passing 70 credits)	-----
1371061	Principles of Earthquake Eng. and Wind	3	3	0	Structural Analysis-II	-----
1371049	Environmental Engineering	2	2	0	-----	-----
Total Credits		67	Note2: All the above courses are compulsory.			

Elective Courses (not complete)

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1352038	Fundamentals of Construction Management	2	2	0	Construction Cost Estimation	-----
1371051	English for Civil Eng.	2	2	0	(after passing 70 credits)	-----
1352054	Mechanical and Electrical Installations	2	2	0	Technical and Structural Drawing, Fluid Mechanics	-----
1371052	Computer Software in Civil Eng.	2	2	0	Numerical Methods, Structural Analysis-II	-----
1352056	Systems Engineering	2	2	0	Mathematics-II, Eng. Statistics and Probability	-----
1371053	Engineering Economics	2	2	0	(after passing 50 credits)	-----
1371062	Fundamentals of Bridge Engineering	2	2	0	Concrete Structures-I, Steel Structures-I	-----
1352052	Hydraulic Structures	3	3	0	Soil Mechanics, Hydraulics and Lab	-----
1351035	Engineering Hydrology	2	2	0	Fluid Mechanics, Eng. Statistics and Probability	-----
1371081	Fundamentals of Traffic Engineering	2	2	0	Road Construction, Eng. Statistics and Probability	
1352057	Railway Engineering	2	2	0	-----	Pavement Design
1352053	Transportation Engineering	2	2	0	Road Construction, Eng. Statistics and Probability	
1371082	Structure and Road Construction Equipment	2	2	0	(after passing 70 credits)	
1371083	National Regulations of Buildings	3	3	0	(after passing 105 credits)	
1371087	Strength of Materials-II	3	3	0	Strength of Materials-I	
Total Credits		--				

Total Credits (All Courses)	142

Civil Engineering Syllabus

Mathematics-I

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
51-11-019	Mathematics-I	3	3	0	-----	-----

Consists principally of one-variable Calculus, Functions, Derivative, Integrals, Integration Methods, Complex Numbers and Infinite Series.

Mathematics-II

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
51-11-021	Mathematics-II	3	3	0	Mathematics-I	-----

The main scope of this course is to teach the students some topics in introductory linear algebra including matrix algebra and linear transformations and multivariable calculus including multivariable functions, directional and partial derivatives, velocity and acceleration, tangent plane and normal gradient line, cylindrical and spherical coordinates, vector field and line integrals, surface integral, Green's theorem, Divergence theorem and Stoke's theorem.

Differential Equations

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
51-11-022	Differential Equations	3	3	0	------	Mathematics-II

The main reason for solving many differential equations is to try to learn something about an underlying physical process that the equation is believed to model. Gaining an understanding of a complex natural process is usually accomplished by combining or building upon simpler and more basic models. Thus a thorough knowledge of these models, the equations that describe them and their solutions, is the first and indispensable step toward the solution of more complex and realistic problems. Topics covered in this course:

Introduction to Differential Equations; First Order Differential Equations; Second Order Linear Equations; Higher Order Linear Equations; Series Solutions of Second Order Linear Equations; The Laplace Transform; Systems of First Order Linear Equations.

Computer Programming

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
51-11-031	Computer Programming	3	3	0	Mathematics-I	-----

Explanation of main computer parts; The concept of software and hardware; Algorithms design and an introduction to a structured computer programming language.

Numerical Methods

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
51-11-023	Numerical Methods	2	2	0	Computer Programming, Differential Equations	-----

This course is an introduction to numerical methods for solving mathematical problems that arise in Science and Engineering. The goal is to provide a basic understanding of the derivation, analysis and use of these numerical methods. The course includes:

Error Analysis; Numerical solution of Nonlinear Equations; Interpolation, Polynomial Approximation, Curve Fitting; Numerical Differentiation and Integration; Numerical Solution of Ordinary Differential Equations; Solutions of Systems of Equations.

Physics-I

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
51-22-030	Physics-I	3	3	0	-----	Mathematics-I

To provide tools by which students can learn how to effectively read scientific material, identify fundamental concepts, reason through scientific questions, and solve quantitative problems. This course covers the fundamental concepts in Classical Mechanics and Thermodynamics.

Physics Lab-I

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
51-22-032	Physics-I Lab	1	0	1	-----	Physics-I

The main goal of this course is to introduce students to practical topics of Physics-I. Topics covered in this course:

Inclined planes experiments; Thermal conductivity of materials testing; Pendulum and spring tests; Calculating the friction of different surfaces.

Engineering Statistics and Probability

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
51-11-024	Engineering Statistics and Probability	2	2	0	Mathematics-I	-----

Analytic tools to deal with uncertainty, model the data/information, prediction and analyze of underlying systems.

This course provides elementary probabilistic and statistical concepts as well as the methods to apply them to the engineering problems.

Technical and Structural Drawing

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371020	Technical and Structural Drawing	2	1	1	-----	-----

Introduction to the concept of engineering drawing, orthographic drawing sketching, sections and conventions. Pictorial drawing and sketching, isometric and oblique, two point perspective, additional short problems in Architectural drawing.

Surveying and Operation

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371021	Surveying and Operation	2	1	1	Mathematics-I	-----

Introduction; Shape and size of the earth; Theory of errors; Measurement of distance, angle and elevation; Surveying network; Plane and topographic surveying.

Construction Materials and Laboratory

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371022	Construction Materials and Laboratory	2	1.5	0.5	Engineering Geology	-----

Cement, aggregates, and concrete building units concrete admixtures, brick and tile, stone, ferrous and nonferrous metals, gypsum and lime, glass, bituminous materials, building papers, plastics, building boards, exterior wall materials, flooring & roofing materials, insulating materials, acoustical materials interior finishing materials, adhesives, sealers, sealants, protective and decorating coatings.

Concrete Technology

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371023	Concrete Technology	2	2	0	Construction Materials and Laboratory	-----

Cement, aggregates, water, fresh concrete, mixing, handling, placing, compacting, admixtures, temperature problems, testing, mix design.

Concrete Technology Laboratory

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371024	Concrete Technology Laboratory	1	0	1	Concrete Technology	-----

Practical introduction to making concrete and concrete parts, and measuring their mechanical properties by applying different test on them.

Architectural and Urban Planning Design

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371025	Architectural and Urban Planning Design	2	2	0	Technical and Structural Drawing	-----

Introduction to project program development with emphasis on the analysis of functional and structural needs, additional problems in housing, common building design and presentation.

Statics

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371026	Statics	3	3	0	Mathematics-I	-----

Force systems; Equilibrium; Structures; Distributed forces; Friction; Moments and products of inertia.

Dynamics

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371027	Dynamics	3	3	0	Statics	-----

Dynamics of particles & rigid bodies at general plane motion including kinematics, dynamic equilibrium, work & energy, and impulse & momentum.

Strength of Materials-I

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371028	Strength of Materials-I	3	3	0	Statics	-----

Tension, compression, torsion, bending, shear, combined stresses in beams and frames, Mohr circle, beam deflection, buckling of column.

Structural Analysis-I

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371029	Structural Analysis-I	3	3	0	Strength of Materials-I	-----

Determinacy and Indeterminacy; Stability; Internal forces of frames; Trusses; Zero load method; Influence line; Deflection of structures; Area moment method; Virtual work; Unit load method; Settlement; Thermal effect; Misfit; Force method; three moment equation.

Structural Analysis-II

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371030	Structural Analysis-II	3	3	0	Structural Analysis-I, Numerical Methods	-----

Indeterminate structures; Displacement methods; Slope deflection; Moment distribution; Influence lines; non-prismatic beams.

Design of Reinforced Concrete Structures-I

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371031	Design of Reinforced Concrete Structures-I	3	3	0	Concrete Technology, Structural Analysis-I	-----

Introduction; Physical and mechanical properties of concrete; Design methods and requirements; Analysis and design of rectangular, T, I section in bending, shear, torsion; Members in compression and bending; Interaction curves for columns; Effect of slenderness in design of columns.

Design of Reinforced Concrete Structures-II

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371032	Design of Reinforced Concrete Structures-II	3	3	0	Design of Reinforced Concrete Structures-II	-----

Bond stress and development length; One way slabs; Two way slabs; Yield line theory; Foundations; Crack widths and deflection; Shear friction; Corbels.

Design of Concrete Structures Project

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371033	Design of Concrete Structures Project	1	0	1	Structural Analysis-II, Concrete Structures-II	-----

A complete concrete structure project design including a 10-story building site concrete slab and shear wall. Design of all structural elements in the building.

Design of Steel Structures-I

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371034	Design of Steel Structures-I	3	3	0	Structural Analysis-I	-----

General principles of structural design; Mechanical properties of steel; Tension member; Design of beam; Design of compression member; Design of member in bending and compression; Castellated beams; Design of base plates.

Design of Steel Structures-II

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371035	Design of Steel Structures-II	2	2	0	Design of Steel Structures-I	-----

Analysis and design of beams by plastic methods design of composite beams; Design of plate girders; Torsion in I beams bolts; Welds; Design of connections.

Design of Steel Structures Project

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371036	Design of Steel Structures Project	1	0	1	Structural Analysis-II, Steel Structures-II	-----

Analysis and design of a building and/or an industrial building.

Engineering Geology

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371037	Engineering Geology	2	2	0	-----	-----

The nature and scope of physical geology, matter and energy. Minerals. Igneous activity and rocks, sedimentary rocks, metamorphic rocks, erosion on hill slopes, running water, underground water, tectonic, Earthquakes.

Soil Mechanics

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371038	Soil Mechanics	3	3	0	Engineering Geology, Strength of Materials-I	-----

In this course, the physical and mechanical properties of soil are discussed. These properties are categorized in seven subjects as: Strength of soil, permeability, compaction, consolidation, stress distribution, slope stability and ranking states of equilibrium.

Soil Mechanics Laboratory

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371039	Soil Mechanics Laboratory	1	0	1	Soil Mechanics	-----

Standardized laboratory tests for determination of soil engineering properties which are defined in soil mechanics.

Foundation Engineering

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371040	Foundation Engineering	2	2	0	Concrete Structures-I, Soil Mechanics	-----

Subsurface exploration; Ultimate bearing capacity of shallow foundations; Settlement of shallow foundations; Lateral earth pressure and retaining walls: Pile foundations.

Fluid Mechanics

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371041	Fluid Mechanics	3	3	0	Dynamics	-----

Fluid statics: pressure force on surfaces, buoyancy, fluid dynamics: continuity, energy and momentum principles, dimensional analysis & hydraulic similitude, drag force, laminar-flow, flow in pipes.

Hydraulics and Laboratory

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371042	Hydraulics and Laboratory	3	2	1	Fluid Mechanics	-----

Properties of fluids; Hydrostatic pressure; Basics principles of mass, momentum and energy conservation; Fluids in motion; Flow in pipes; Open Channel flow.

Practical introduction and surveying of Channels, Stream Discharge, different Flow types and etc.

Building Construction Methods

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371043	Building Construction Methods	2	1	1	Architectural and Urban Planning Design, Concrete Structures-II, Steel Structures-II	-----

An introduction to construction methods and its applications. This is a hands-on survey course which has four components: construction management, concrete/masonry, carpentry and woodworking. Students learn to use math, blueprints, building specifications, optical leveling equipment, hand tools, portable power tools, and stationary power tools in a sequence of

learning activities designed for students to acquire entry level skills and knowledge of the construction industry.

Road Construction

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371044	Road Construction	2	2	0	Surveying and Operation, Soil Mechanics	-----

Earthwork; Circular curves; Compound and reverse curves; Parabolic vertical curves; Transition spirals; Element of highway safety: curve super elevation; Widening on curves; Sight distance; Intersections.

Road Construction Project

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371045	Road Construction Project	1	0	1	Road Construction	-----

Design of a road, and road facilities.

Pavement Design

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371046	Pavement Design	2	2	0	Road Construction, Construction Materials and Lab	-----

Stress in flexible pavements; Materials characterization; Climate and environmental effects; Sub-grade stabilization; Design of flexible pavements; Pavement distress; Flexible overlay design; Geo-grade use in asphalt overlays.

Construction Cost Estimation

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371047	Construction Cost Estimation	1	0.5	0.5	English Language	Architectural and Urban Planning Design

General Introduction to get acquainted with types of contract, conditions of contract and getting tenders. Developing relationship with employer, consulting engineers, contractor, and formulating duties of groups. Methods of measurement for some type of constructions. Cost analysis for different types of constructions.

Internship

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371048	Internship	1	0	1	(after passing 70 credits)	-----

Practical introduction of studied courses through the university, in industrial environments.

Principles of Earthquake Engineering and Wind

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371061	Principles of Earthquake Eng. and Wind	3	3	0	Structural Analysis-II	-----

Earthquake signals & filtration; Baseline correction; Frequency filtering method; Low-pass & high-pass filters; Modal analysis under earthquake loading; Spectra & response spectrum; Earthquake codes; Earthquake damage; Shaking table tests.

Effects and possible loads applied to buildings from wind.

Environmental Engineering

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371049	Environmental Engineering	2	2	0	-----	-----

The Principles of water and wastewater treatment, water quality management, air pollution, solid waste, noise pollution and soil treatment will be discussed.

Fundamentals of Construction Management

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1352038	Fundamentals of Construction Management	2	2	0	Construction Cost Estimation	-----

This course provides engineering students with a comprehensive understanding of how to plan, optimize and efficiently manage projects (or tasks) to implement products, services or developments. This includes building the structure, processes, components and linkages with a team for successful project delivery within schedule, budget and quality requirements.

English for Civil Engineering

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371051	English for Civil Eng.	2	2	0	(after passing 70 credits)	-----

Technical terms in areas of: Drawing, concrete, materials, construction, soil, road, structures, transportation, water, etc... are discussed.

Mechanical and Electrical Installations

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1352054	Mechanical and Electrical Installations	2	2	0	Technical and Structural Drawing, Fluid Mechanics	-----

Brief introduction to all the necessary Electrical and Mechanical systems used in a building, such as: Air-Conditioning system, Wiring, Sewer system, Elevators and etc.

Computer Applications in Civil Engineering

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371052	Computer Software in Civil Eng.	2	2	0	Numerical Methods, Structural Analysis-II	-----

The objective of this course is to teach the students to calculate the necessary forces, moments, shears and structural design of a multistory building with the help of a computer and the relevant software.

Systems Engineering

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1352056	Systems Engineering	2	2	0	Mathematics-II, Eng. Statistics and Probability	-----

Development of concepts and techniques commonly associated with systems engineering which are applicable to design and operation of systems that concern civil engineers.

Engineering Economics

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371053	Engineering Economics	2	2	0	(after passing 50 credits)	-----

The systematic evaluation of the economic benefits and costs of projects, involving engineering design and analysis. Economic decision-making in an environment of limited resources and uncertainty. Present economy, the economy of multi-year projects, selection among competing alternatives, sensitivity of outcomes to input parameters, before- and after-tax analysis, replacement economy, inflation, and estimation of future events.

Fundamentals of Bridge Engineering

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371062	Fundamentals of Bridge Engineering	2	2	0	Concrete Structures-I, Steel Structures-I	-----

Analysis and design of different bridge decks including: concrete slabs, T beam decks multi-beam decks (steel or pre-stressed), box beam bridges (steel or concrete), segmental post-tensioned box girder bridge.

Hydraulic Structures

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1352052	Hydraulic Structures	3	3	0	Soil Mechanics, Hydraulics and Lab	-----

The aim of this course is to develop for the students: insight into the basic physical principles that govern the control of flows in hydraulic systems; analytical and mathematical skills needed to describe and predict flow conditions in hydraulic structures; an ability to effectively apply these principles and skills to the analysis and design of structures in hydraulic systems.

Engineering Hydrology

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1351035	Engineering Hydrology	2	2	0	Fluid Mechanics, Eng. Statistics and Probability	-----

Hydrological cycle; Atmospheric water; Precipitation; Hydrological abstractions; Surface water; Rainfall-runoff relationships; Groundwater; Statistical hydrology.

Fundamentals of Traffic Engineering

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371081	Fundamentals of Traffic Engineering	2	2	0	Road Construction, Eng. Statistics and Probability	

Elements of traffic engineering; Travel time and delay studies; Spot speed studies; Volume studies; Traffic theory; Highway capacity; Parking studies; Traffic control devices.

Railway Engineering

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1352057	Railway Engineering	2	2	0	-----	Pavement Design

To provide the students an awareness of major issues and problems of current interest to the railway industry; To enable the students to apply existing technology to the design, construction, and maintenance of railway physical facilities; To enhance the students' abilities to solve engineering problems, develop designs, and communicate the significance of the problems and designs.

Transportation Engineering

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1352053	Transportation Engineering	2	2	0	Road Construction, Eng. Statistics and Probability	

Fields of transportation engineering; Transportation's roles in society; Planning and design of road, rail, air, and water-way system components: Terminals, right-of-way; Control systems: evaluation of alternative modes and decision-making process; Introduction to computer-aided design and management of systems.

Structure and Road Construction Equipment

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371082	Structure and Road Construction Equipment	2	2	0	(after passing 70 credits)	

Operational hydraulic systems excavators; Loaders; Crawler road engineering tractors; Rollers; Graders; Scrapers; Management project control; Road construction Method.

National Regulations of Buildings

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371083	National Regulations of Buildings	3	3	0	(after passing 105 credits)	

21 general construction rules and regulations stated by Iran Construction Engineering Organization.

Strength of Materials-II

Course Code	Course Title	Credits	Theoretical	Practical	Pre-requisite	Simultaneous
1371087	Strength of Materials-II	3	3	0	Strength of Materials-I	

Transformation of stress and strain and yield criteria; Deflection of beams; Stability of equilibrium; Design of columns; Energy and virtual work methods; Statically indeterminate problems; Plastic limit analysis.

Civil Engineering-B.S.
Semester Chart

Semester	Guide				Course Title																Total
	CE Civil Engineering		E Elective																		
	S Science		G General		Credits	Course type															
I	Mathematics-I		Physics-I: Mechanics and Heat		Engineering Geology		Technical and Structural Drawing		English Language		Persian Language		Physics-I Laboratory: Mechanics and Heat								17
	3	S	3	S	2	CE	2	CE	3	G	3	G	1		S						
II	Mathematics-II		Differential Equations		Statics		Surveying and Operation		Construction Materials and Laboratory		Environmental Engineering		Physical Education		Islamic Thoughts-I						18
	3	S	3	S	3	CE	2	CE	2	CE	2	CE	1	G	2	G					
III	Computer Programming		Engineering Statistics and Probability		Dynamics		Strength of Materials-I		Concrete Technology		Architectural and Urban Planning Design		Rite of Life (Applied Ethics)		Exercise-I						18
	3	S	2	S	3	CE	3	CE	2	CE	2	CE	2	G	1	G					
IV	Numerical Methods		Concrete Technology Laboratory		Structural Analysis-I		Soil Mechanics		Fluid Mechanics		Systems Engineering		Engineering Economics		Islamic Thoughts-II						18
	2	S	1	CE	3	CE	3	CE	3	CE	2	E	2	E	2	G					
V	Structural Analysis-II		Design of Steel Structures-I		Soil Mechanics Laboratory		Hydraulics and Laboratory		Road Construction		Mechanical and Electrical Installations		Engineering Hydrology		Analytical History of Islam						18
	3	CE	3	CE	1	CE	3	CE	2	CE	2	E	2	E	2	G					
VI	Design of Reinforced Concrete Structures-I		Design of Steel Structures-II		Road Construction Project		Pavement Design		Construction Cost Estimation		National Regulations of Buildings		Computer Software in Civil Eng.		Hydraulic Structures		Family and Population Knowledge				19
	3	CE	2	CE	1	CE	2	CE	1	CE	3	E	2	E	3	E	2	G			
VII	Design of Reinforced Concrete Structures-II		Foundation Engineering		Design of Steel Structures Project		Structure and Road Construction Equipment		Principles of Earthquake Engineering and Wind		Fundamentals of Traffic Engineering		Transportation Engineering		English for Civil Eng.		The Holy Quran Exegesis				19
	3	CE	2	CE	1	CE	2	E	3	CE	2	E	2	E	2	E	2	G			
VIII	Design of Concrete Structures Project		Building Construction Methods		Fundamentals of Bridge Engineering		Strength of Materials-II		Railway Engineering		Fundamentals of Construction Management		Islamic Revolution of Iran		Internship						15
	1	CE	2	CE	2	E	3	E	2	E	2	E	2	G	1	CE					