

B.Sc. in Civil Engineering Study Plan

■ University Compulsory Courses 16 C.H

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■ University Elective Courses 9 C.H

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■ Faculty Compulsory Courses 32 C.H

Line No.	Code	Course	
224000	CHE400CH	PROFESSIONAL ETHICS FOR ENGINEERS	1
242020	EE202EE	COMMUNICATION SKILLS FOR ENGINEERS	2
901010	MATH101	CALCULUS(1)	3
901020	MATH102	CALCULUS (2)	3
902010	MATH201	INTERMEDIATE ANALYSIS	3
902030	MATH203	ORDINARY DIFFERENTIAL EQUATIONS	3
911010	CHEM101	GENERAL CHEMISTRY(1)	3
911020	CHEM102	GENERAL CHEMISTRY (2)	3
911072	CHEM107B	GENERAL CHEMISTRY LAB	1
921010	PHY101	GENERAL PHYSICS (1)	3
921020	PHY102	GENERAL PHYSICS (2)	3
921072	PHY107B	GENERAL PHYSICS (LAB)	1
1731150	CS115	C++ PROGRAMMING LANGUAGES	3

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Line No.	Code	Course	
232011	CE201A	STATICS	3
232021	CE202A	STRENGTH OF MATERIALS	3
233211	CE321A	MATIRIALS SCIENCE	2
233220	CE322	CONCRETE TECHNOLOGY	3
233262	CE326B	MATERIALS LAB	1
233321	CE332A	STRUCTURAL ANALYSIS (1)	3
233411	CE341A	SURVEYING	3
233430	CE343	SURVEYING LABORATORY	1
233450	CE345	TRANSPORTATION ENGINEERING	3
233510	CE351	FLUID MECHANICS	3
233520	CE352	HYDRAULICS	3
233540	CE354	FLUID MECH AND HYDRAULICS LABORATORY	1
233710	CE371	BUILDING CONSTRUCTION	3
234310	CE431	STRUCTURAL ANALYSIS (2)	3
234321	CE432A	REINFORCED CONCRETE (1)	3
234341	CE434A	STEEL DESIGN	3
234421	CE442A	PAVEMENT MATERIALS & DESIGN (1)	3
234430	CE443	HIGHWAYS GEOMETRIC	3
234440	CE444	HIGHWAY LABORATORY	1
234520	CE452	ENVIRONMENTAL ENGINEERING	3
234531	CE453A	ENVIRONNEMENTAL ENGINEERING LAB	1
234620	CE462	GEOTECHNICAL ENGINEERING	3
234631	CE463A	GEOTECHNICAL ENGINEERING LAB	1
234640	CE464	FOUNDATION ENGINEERING (1)	3
234721	CE472A	CONTRACTS,SPECIFICATIONS AND QUANTITY SURVEYING	3
234901	CE490A	APPLIED ENGINEERING PRACTICES	3

235310	CE531	REINFORCED CONCRETE (2)	3
235512	CE551B	DESIGN OF ENVIRONMENTAL & WASTEWATER SYSTEMS	3
235702	CE570B	ENGINEERING PROJECTS &CONSTRUCTION MANAGEMENT	3
235910	CE591	GRADUATION PROJECT (1)	1
235920	CE592	GRADUATION PROJECT (2)	3
243051	EE305	NUMERICAL METHODS FOR ENGINEERS	3
251610	ME161	ENGINEERING WORKSHOPS	2
251612	ME161B	ENGINEERING WORKSHOP (LAB)	0
252010	ME201	ENGINEERING DRAWING(B)	2
252122	ME212B	DYNAMICS	3
293410	IE341	ENGINEERING ECONOMY	2
902350	MATH235	PROBABILITY & STATISTICS (FOR ENGINEERING STUDENTS)	3

■ Department Elective Courses 9 C.H

Line No.	Code	Course	
235031	CE503A	GEOGRAPHIC INFORMATION SYSTEM GIS	3
235041	CE504A	DAM ENGINEERING	3
235320	CE532	PRESTRESSED CONCRETE	3
235350	CE535	COMPUTER-AIDED ANALYSIS &DESIGN OF CE STRUCTURES	3
235360	CE536	BRIDGE ENGINEERING	3
235414	CE541D	TRAFFIC PLANNING & ENGINEERING	3
235423	CE542C	PHOTOGRAMMETRY &GEODESY	3
235460	CE546	HIGHWAY MAINTENANCE	3
235520	CE552	WATER RESOURCES	3
235532	CE553B	GROUNDWATER MANAGEMENT	3
235622	CE562B	FOUNDATIONS ON EXPANSIVE SOIL	3
235650	CE565	APPLIED GEOTECHNICAL ENGINEERING	3
235811	CE581A	SPECIAL TOBICS IN STRUCTURAL ENGINEERING	3
235820	CE582	SPECIAL TOBICS IN TRANSPORTATION ENGINEERING	3
235830	CE583	SPECIAL TOPICS IN W/E ENGINEERING	3
235840	CE584	SPECIAL TOPICS IN GEOTECHNICAL ENGINEERING	3

TOTAL

159 C.H

*** For prerequisite & equivalent courses see the Courses' Description.**

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Faculty Compulsory Courses

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Line No.	Code	Course	
901010	MATH101	CALCULUS(1)	3
901020	MATH102	CALCULUS (2)	3
902010	MATH201	INTERMEDIATE ANALYSIS	3
902030	MATH203	ORDINARY DIFFERENTIAL EQUATIONS	3
911010	CHEM101	GENERAL CHEMISTRY(1)	3
911020	CHEM102	GENERAL CHEMISTRY (2)	3
911072	CHEM107B	GENERAL CHEMISTRY LAB	1
921010	PHY101	GENERAL PHYSICS (1)	3
921020	PHY102	GENERAL PHYSICS (2)	3
921072	PHY107B	GENERAL PHYSICS (LAB)	1
1731150	CS115	C++ PROGRAMMING LANGUAGES	3

Department Compulsory Courses

85 C.H

Line No.	Code	Course	
232001	CE200A	ENGINEERING DRAWING	3
232011	CE201A	STATICS	3
232021	CE202A	STRENGTH OF MATERIALS	3
232041	CE204A	DYNAMICS	2
232121	CE212A	ENGINEERING GEOLOGY	3
232140	CE214	ENGINEERING GEOLOGY LABORATORY	1
233111	CE311A	ENGINEERING CALCULATIONS	3
233241	CE324A	MATERIALS OF CONSTRUCTION	3
233261	CE326A	MATERIALS OF CONSTRUCTION LABORATORY	1
233321	CE332A	STRUCTURAL ANALYSIS (1)	3
233411	CE341A	SURVEYING	3
233430	CE343	SURVEYING LABORATORY	1
233441	CE344A	HIGHWAY DESIGN	3
233510	CE351	FLUID MECHANICS	3
233520	CE352	HYDRAULICS	3
233540	CE354	FLUID MECH AND HYDRAULICS LABORATORY	1
233710	CE371	BUILDING CONSTRUCTION	3
233721	CE372A	ENGINEERING ECONOMICS	2
234310	CE431	STRUCTURAL ANALYSIS (2)	3
234321	CE432A	REINFORCED CONCRETE (1)	3
234341	CE434A	STEEL DESIGN	3
234410	CE441	TRANSPORTATION ENGINEERING	3
234422	CE442B	PAVEMENT DESIGN AND MATERIALS	2
234440	CE444	HIGHWAY LABORATORY	1
234510	CE451	SANITRY ENGINEERING	3
234530	CE453	SANITARY ENGINEERING LABORATORY	1
234611	CE461A	SOIL MECHANICS (1)	3
234630	CE463	SOIL MECHANICS LAB	1
234640	CE464	FOUNDATION ENGINEERING (1)	3

234721	CE472A	CONTRACTS,SPECIFICATIONS AND QUANTITY SURVEYING	3
234901	CE490A	APPLIED ENGINEERING PRACTICES	3
235910	CE591	GRADUATION PROJECT (1)	1
235920	CE592	GRADUATION PROJECT (2)	3
251610	ME161	ENGINEERING WORKSHOPS	2
251612	ME161B	ENGINEERING WORKSHOP (LAB)	0
902350	MATH235	PROBABILITY & STATISTICS (FOR ENGINEERING STUDENTS)	3

Department Elective Courses

3 C.H

Line No.	Code	Course	
235211	CE521A	ADVANCED MATIRIALS OF CONSTRUCTION	3
235310	CE531	REINFORCED CONCRETE (2)	3
235331	CE533A	MATRIX ANALYSIS OF STRUCTURES	3
235341	CE534A	ADVANCED STRUCTURAL ANALYSIS AND DESIGN	3
235360	CE536	BRIDGE ENGINEERING	3
235420	CE542	PHOTOGRAMMETRY & GEODESY	3
235451	CE545A	GEOGRAPHIC INFORMATION SYSTEMS	3
235511	CE551A	ENVIRONMENTAL ENGINEERING	3
235520	CE552	WATER RESOURCES	3
235530	CE553	SURFACE AND GROUNDWATER HYDROLOGY	3
235540	CE554	IRRIGATION AND DRAINAGE	3
235550	CE555	WATER CHIMESTRY	3
235560	CE556	DAM ENGINEERING	3
235570	CE557	HAZARDOUS MATERIALS AND SOILD WASTE ENG.	3
235610	CE561	SOIL MECHANICS (2)	3
235630	CE563	SUBSURFACE EXPLORATION	3
235640	CE564	FOUNDATION ENG (2)	3
235660	CE566	SOIL STABILIZATION	3
235691	CE569A	ROCK MECHANICS	3
235701	CE570A	CONSTRUCTION MANAGEMENT	3
235801	CE580A	SPECIAL TOPICS IN CIVIL ENGINEERING	1

Specialization Compulsory Courses

17 C.H

Line No.	Code	Course	
233211	CE321A	MATIRIALS SCIENCE	2
235401	CE540A	PAVEMENT MATERIALS AN DESIGN (2)	3
235413	CE541C	TRANSPORTATION ENGINEERING	3
235431	CE543A	ADVANCED TRANSPORTATION ENGINEERING	3
235440	CE544	TRANSPORTATION PLANNING	3
235460	CE546	HIGHWAY MAINTENANCE	3

TOTAL

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*** For prerequisite & equivalent courses see the Courses' Description.**

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■ Faculty Compulsory Courses 29 C.H

Line No.	Code	Course	
901010	MATH101	CALCULUS(1)	3
901020	MATH102	CALCULUS (2)	3
902010	MATH201	INTERMEDIATE ANALYSIS	3
902030	MATH203	ORDINARY DIFFERENTIAL EQUATIONS	3
911010	CHEM101	GENERAL CHEMISTRY(1)	3
911020	CHEM102	GENERAL CHEMISTRY (2)	3
911072	CHEM107B	GENERAL CHEMISTRY LAB	1
921010	PHY101	GENERAL PHYSICS (1)	3
921020	PHY102	GENERAL PHYSICS (2)	3
921072	PHY107B	GENERAL PHYSICS (LAB)	1
1731150	CS115	C++ PROGRAMMING LANGUAGES	3

■ Department Compulsory Courses 85 C.H

Line No.	Code	Course	
232001	CE200A	ENGINEERING DRAWING	3
232011	CE201A	STATICS	3
232021	CE202A	STRENGTH OF MATERIALS	3
232041	CE204A	DYNAMICS	2
232121	CE212A	ENGINEERING GEOLOGY	3
232140	CE214	ENGINEERING GEOLOGY LABORATORY	1
233111	CE311A	ENGINEERING CALCULATIONS	3
233241	CE324A	MATERIALS OF CONSTRUCTION	3
233261	CE326A	MATERIALS OF CONSTRUCTION LABORATORY	1
233321	CE332A	STRUCTURAL ANALYSIS (1)	3
233411	CE341A	SURVEYING	3
233430	CE343	SURVEYING LABORATORY	1
233441	CE344A	HIGHWAY DESIGN	3
233510	CE351	FLUID MECHANICS	3
233520	CE352	HYDRAULICS	3
233540	CE354	FLUID MECH AND HYDRAULICS LABORATORY	1
233710	CE371	BUILDING CONSTRUCTION	3
233721	CE372A	ENGINEERING ECONOMICS	2
234310	CE431	STRUCTURAL ANALYSIS (2)	3
234321	CE432A	REINFORCED CONCRETE (1)	3
234341	CE434A	STEEL DESIGN	3
234410	CE441	TRANSPORTATION ENGINEERING	3
234422	CE442B	PAVEMENT DESIGN AND MATERIALS	2
234440	CE444	HIGHWAY LABORATORY	1
234510	CE451	SANITARY ENGINEERING	3
234530	CE453	SANITARY ENGINEERING LABORATORY	1
234611	CE461A	SOIL MECHANICS (1)	3
234630	CE463	SOIL MECHANICS LAB	1
234640	CE464	FOUNDATION ENGINEERING (1)	3

234721	CE472A	CONTRACTS,SPECIFICATIONS AND QUANTITY SURVEYING	3
234901	CE490A	APPLIED ENGINEERING PRACTICES	3
235910	CE591	GRADUATION PROJECT (1)	1
235920	CE592	GRADUATION PROJECT (2)	3
251610	ME161	ENGINEERING WORKSHOPS	2
251612	ME161B	ENGINEERING WORKSHOP (LAB)	0
902350	MATH235	PROBABILITY & STATISTICS (FOR ENGINEERING STUDENTS)	3

■ Specialization Compulsory Courses 17 C.H

Line No.	Code	Course	
235511	CE551A	ENVIRONMENTAL ENGINEERING	3
235520	CE552	WATER RESOURCES	3
235530	CE553	SURFACE AND GROUNDWATER HYDROLOGY	3
235550	CE555	WATER CHIMESTRY	3
235560	CE556	DAM ENGINEERING	3
235580	CE558	DESIGN OF DRINKING & WASTE WATER SYSTEMS	2

■ Specialization Elective Courses 3 C.H

Line No.	Code	Course	
233211	CE321A	MATERIALS SCIENCE	2
235211	CE521A	ADVANCED MATERIALS OF CONSTRUCTION	3
235310	CE531	REINFORCED CONCRETE (2)	3
235331	CE533A	MATRIX ANALYSIS OF STRUCTURES	3
235360	CE536	BRIDGE ENGINEERING	3
235401	CE540A	PAVEMENT MATERIALS AN DESIGN (2)	3
235413	CE541C	TRANSPORTATION ENGINEERING	3
235420	CE542	PHOTOGRAMMETRY & GEODESY	3
235431	CE543A	ADVANCED TRANSPORTATION ENGINEERING	3
235440	CE544	TRANSPORTATION PLANNING	3
235451	CE545A	GEOGRAPHIC INFORMATION SYSTEMS	3
235460	CE546	HIGHWAY MAINTENANCE	3
235540	CE554	IRRIGATION AND DRAINAGE	3
235570	CE557	HAZARDOUS MATERIALS AND SOILD WASTE ENG.	3
235610	CE561	SOIL MECHANICS (2)	3
235630	CE563	SUBSURFACE EXPLORATION	3
235640	CE564	FOUNDATION ENG (2)	3
235660	CE566	SOIL STABILIZATION	3
235691	CE569A	ROCK MECHANICS	3
235701	CE570A	CONSTRUCTION MANAGEMENT	3
235801	CE580A	SPECIAL TOPICS IN CIVIL ENGINEERING	1

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B.Sc. in Civil Engineering Structures Study Plan

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Line No.	Code	Course	
901010	MATH101	CALCULUS(I)	3
901020	MATH102	CALCULUS (2)	3
902010	MATH201	INTERMEDIATE ANALYSIS	3
902030	MATH203	ORDINARY DIFFERENTIAL EQUATIONS	3
911010	CHEM101	GENERAL CHEMISTRY(I)	3
911020	CHEM102	GENERAL CHEMISTRY (2)	3
911072	CHEM107B	GENERAL CHEMISTRY LAB	1
921010	PHY101	GENERAL PHYSICS (1)	3
921020	PHY102	GENERAL PHYSICS (2)	3
921072	PHY107B	GENERAL PHYSICS (LAB)	1
1731150	CS115	C++ PROGRAMMING LANGUAGES	3

Department Compulsory Courses 85 C.H

Line No.	Code	Course	
232001	CE200A	ENGINEERING DRAWING	3
232011	CE201A	STATICS	3
232021	CE202A	STRENGTH OF MATERIALS	3
232041	CE204A	DYNAMICS	2
232121	CE212A	ENGINEERING GEOLOGY	3
232140	CE214	ENGINEERING GEOLOGY LABORATORY	1
233111	CE311A	ENGINEERING CALCULATIONS	3
233241	CE324A	MATERIALS OF CONSTRUCTION	3
233261	CE326A	MATERIALS OF CONSTRUCTION LABORATORY	1
233321	CE332A	STRUCTURAL ANALYSIS (1)	3
233411	CE341A	SURVEYING	3
233430	CE343	SURVEYING LABORATORY	1
233441	CE344A	HIGHWAY DESIGN	3
233510	CE351	FLUID MECHANICS	3
233520	CE352	HYDRAULICS	3
233540	CE354	FLUID MECH AND HYDRAULICS LABORATORY	1
233710	CE371	BUILDING CONSTRUCTION	3
233721	CE372A	ENGINEERING ECONOMICS	2
234310	CE431	STRUCTURAL ANALYSIS (2)	3
234321	CE432A	REINFORCED CONCRETE (1)	3
234341	CE434A	STEEL DESIGN	3
234410	CE441	TRANSPORTATION ENGINEERING	3
234422	CE442B	PAVEMENT DESIGN AND MATERIALS	2
234440	CE444	HIGHWAY LABORATORY	1
234510	CE451	SANITARY ENGINEERING	3
234530	CE453	SANITARY ENGINEERING LABORATORY	1
234611	CE461A	SOIL MECHANICS (1)	3

234630	CE463	SOIL MECHANICS LAB	1
234640	CE464	FOUNDATION ENGINEERING (1)	3
234721	CE472A	CONTRACTS, SPECIFICATIONS AND QUANTITY SURVEYING	3
234901	CE490A	APPLIED ENGINEERING PRACTICES	3
235910	CE591	GRADUATION PROJECT (1)	1
235920	CE592	GRADUATION PROJECT (2)	3
251610	ME161	ENGINEERING WORKSHOPS	2
251612	ME161B	ENGINEERING WORKSHOP (LAB)	0
902350	MATH235	PROBABILITY & STATISTICS (FOR ENGINEERING STUDENTS)	3

Department Elective Courses 3 C.H

Line No.	Code	Course	
235211	CE521A	ADVANCED MATERIALS OF CONSTRUCTION	3
235360	CE536	BRIDGE ENGINEERING	3
235401	CE540A	PAVEMENT MATERIALS AND DESIGN (2)	3
235413	CE541C	TRANSPORTATION ENGINEERING	3
235420	CE542	PHOTOGRAMMETRY & GEODESY	3
235431	CE543A	ADVANCED TRANSPORTATION ENGINEERING	3
235440	CE544	TRANSPORTATION PLANNING	3
235451	CE545A	GEOGRAPHIC INFORMATION SYSTEMS	3
235460	CE546	HIGHWAY MAINTENANCE	3
235511	CE551A	ENVIRONMENTAL ENGINEERING	3
235520	CE552	WATER RESOURCES	3
235530	CE553	SURFACE AND GROUNDWATER HYDROLOGY	3
235540	CE554	IRRIGATION AND DRAINAGE	3
235550	CE555	WATER CHEMISTRY	3
235560	CE556	DAM ENGINEERING	3
235570	CE557	HAZARDOUS MATERIALS AND SOIL WASTE ENG.	3
235610	CE561	SOIL MECHANICS (2)	3
235630	CE563	SUBSURFACE EXPLORATION	3
235640	CE564	FOUNDATION ENG (2)	3
235660	CE566	SOIL STABILIZATION	3
235691	CE569A	ROCK MECHANICS	3
235801	CE580A	SPECIAL TOPICS IN CIVIL ENGINEERING	1

Specialization Compulsory Courses 17 C.H

Line No.	Code	Course	
233211	CE321A	MATERIALS SCIENCE	2
235310	CE531	REINFORCED CONCRETE (2)	3
235320	CE532	PRESTRESSED CONCRETE	3
235331	CE533A	MATRIX ANALYSIS OF STRUCTURES	3
235341	CE534A	ADVANCED STRUCTURAL ANALYSIS AND DESIGN	3
235701	CE570A	CONSTRUCTION MANAGEMENT	3
TOTAL			159 C.H

*** For prerequisite & equivalent courses see the Courses' Description.**

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Line No.	Code	Course	
901010	MATH101	CALCULUS(1)	3
901020	MATH102	CALCULUS (2)	3
902010	MATH201	INTERMEDIATE ANALYSIS	3
902030	MATH203	ORDINARY DIFFERENTIAL EQUATIONS	3
911010	CHEM101	GENERAL CHEMISTRY(1)	3
911020	CHEM102	GENERAL CHEMISTRY (2)	3
911072	CHEM107B	GENERAL CHEMISTRY LAB	1
921010	PHY101	GENERAL PHYSICS (1)	3
921020	PHY102	GENERAL PHYSICS (2)	3
921072	PHY107B	GENERAL PHYSICS (LAB)	1
1721150	CS115	C++ PROGRAMMING	3

Department Compulsory Courses 85 C.H

Line No.	Code	Course	
232001	CE200A	ENGINEERING DRAWING	3
232011	CE201A	STATICS	3
232021	CE202A	STRENGTH OF MATERIALS	3
232041	CE204A	DYNAMICS	2
232121	CE212A	ENGINEERING GEOLOGY	3
232140	CE214	ENGINEERING GEOLOGY LABORATORY	1
233111	CE311A	ENGINEERING CALCULATIONS	3
233241	CE324A	MATERIALS OF CONSTRUCTION	3
233261	CE326A	MATERIALS OF CONSTRUCTION LABORATORY	1
233321	CE332A	STRUCTURAL ANALYSIS (1)	3
233411	CE341A	SURVEYING	3
233430	CE343	SURVEYING LABORATORY	1
233441	CE344A	HIGHWAY DESIGN	3
233510	CE351	FLUID MECHANICS	3
233520	CE352	HYDRAULICS	3
233540	CE354	FLUID MECH AND HYDRAULICS LABORATORY	1
233710	CE371	BUILDING CONSTRUCTION	3
233721	CE372A	ENGINEERING ECONOMICS	2
234310	CE431	STRUCTURAL ANALYSIS (2)	3
234321	CE432A	REINFORCED CONCRETE (1)	3
234341	CE434A	STEEL DESIGN	3
234410	CE441	TRANSPORTATION ENGINEERING	3
234422	CE442B	PAVEMENT DESIGN AND MATERIALS	2
234440	CE444	HIGHWAY LABORATORY	1
234510	CE451	SANITARY ENGINEERING	3
234530	CE453	SANITARY ENGINEERING LABORATORY	1
234611	CE461A	SOIL MECHANICS (1)	3

234630	CE463	SOIL MECHANICS LAB	1
234640	CE464	FOUNDATION ENGINEERING (1)	3
234721	CE472A	CONTRACTS,SPECIFICATIONS AND QUANTITY SURVEYING	3
234901	CE490A	APPLIED ENGINEERING PRACTICES	3
235910	CE591	GRADUATION PROJECT (1)	1
235920	CE592	GRADUATION PROJECT (2)	3
251610	ME161	ENGINEERING WORKSHOPS	2
251612	ME161B	ENGINEERING WORKSHOP (LAB)	0
902350	MATH235	PROBABILITY & STATISTICS (FOR ENGINEERING STUDENTS)	3

Department Elective Courses 3 C.H

Line No.	Code	Course	
235211	CE521A	ADVANCED MATIRIALS OF CONSTRUCTION	3
235360	CE536	BRIDGE ENGINEERING	3
235401	CE540A	PAVEMENT MATERIALS AN DESIGN (2)	3
235413	CE541C	TRANSPORTATION ENGINEERING	3
235420	CE542	PHOTOGRAMMETRY & GEODESY	3
235431	CE543A	ADVANCED TRANSPORTATION ENGINEERING	3
235440	CE544	TRANSPORTATION PLANNING	3
235451	CE545A	GEOGRAPHIC INFORMATION SYSTEMS	3
235460	CE546	HIGHWAY MAINTENANCE	3
235511	CE551A	ENVIRONMENTAL ENGINEERING	3
235520	CE552	WATER RESOURCES	3
235530	CE553	SURFACE AND GROUNDWATER HYDROLOGY	3
235540	CE554	IRRIGATION AND DRAINAGE	3
235550	CE555	WATER CHIMESTRY	3
235560	CE556	DAM ENGINEERING	3
235570	CE557	HAZARDOUS MATERIALS AND SOILD WASTE ENG.	3
235801	CE580A	SPECIAL TOPICS IN CIVIL ENGINEERING	1

Specialization Compulsory Courses 17 C.H

Line No.	Code	Course	
233211	CE321A	MATIRIALS SCIENCE	2
235610	CE561	SOIL MECHANICS (2)	3
235630	CE563	SUBSURFACE EXPLORATION	3
235640	CE564	FOUNDATION ENG (2)	3
235660	CE566	SOIL STABILIZATION	3
235691	CE569A	ROCK MECHANICS	3

TOTAL 159 C.H

*** For prerequisite & equivalent courses see the Courses' Description.**

B.Sc. in Civil Engineering

Courses' Description

CE 201 Statics 3C,3H

Introduction to mechanics of rigid bodies. Basic concepts; force and displacement vectors, force systems, equivalent force systems, static equilibrium, analysis of simple structures, friction, geometric properties: centroids and moments of inertia. Introduction to shear and bending moment diagrams. *Pre: Phys 101.*

CE 202 Strength of Materials 3C,3H

Concepts of stress and strain. Stresses and displacements of axially loaded members. The state of stress and strain; Normal, bending, shear, and torsion stresses. Mechanical properties of materials, combined stresses, composite sections. Deflections: integration Method, Moment area method, Buckling of columns. *Pre: CE 201.*

CE 321 Materials Science & Engineering 2C, 2H

Atomic structure, bonding, crystalline and non-crystalline structure, defects and dislocations, diffusion, structure-property and processing-property relations in metallic, ceramics, and polymers, mechanical behavior of materials, including: elastic and plastic deformation, fracture, creep, fatigue, impact, mechanical testing, metal strengthening, corrosion of metals and ceramics, polymer degradation, criteria for materials selection. *Pre: Chem. 102, CE 202*

CE 322 Concrete Technology 3C, 3H

Concrete as construction material, cementing materials, concrete aggregates fresh concrete properties. Mixing, transporting, placing and compacting of concrete, admixtures, curing of concrete and strength development, hot and cold weather- concreting, strength determination and non-destructive testing, durability of concrete and concrete mix design. *Pre: CE 321.*

CE 326 Materials lab 1C,3L

Specific Gravity of Cement; Normal Consistency & Setting Time of Cement Past; Fresh and Mechanical Properties of Mortar; Sieve Analysis of Aggregate; Specific Gravity of Aggregate; Unit Weight of Aggregate; Abrasion test of Aggregate; Workability tests on concrete; Hardened properties of concrete (stress-strain diagram in compression; and compressive, splitting, and flexural strengths); Mechanical and durability tests on bricks, tiles, and natural stone; Mechanical Properties of Steel; Tests on wood (Mechanical and Visual); Impact Test on Steel; Hardness Test on Metals; Flexural and Serviceability Behavior of Hot-Rolled Steel and Reinforced Concrete Beams. *Pre/Cor: CE 322(or Corequisite)*

CE 332 Structural Analysis 1 3C,3H

Analysis of statically determinate structures: stability and determinacy of structures, type of loads. Shear and moment diagrams. Deflections, settlements of supports, temperature changes. Methods of virtual work; Castigliano, moment-area, conjugate beam methods. Influence lines for beams and trusses, Analysis of statically indeterminate structures, method of consistent displacements; three moment equation, evaluation of fixed end moments. *Pre: CE 202.*

CE 341 Surveying 3C,3H

Principles of surveying; linear measurements; Theory of errors and adjustment of observations. Leveling and its application in contouring, profiles and cross-sections.

Areas, volumes, earthwork and mass-haul-diagram. Measurement of angles; coordinates geometry; traverse surveys. Tachometry and electronic distance measurements. Principles of triangulation. Construction survey. Introduction to Photogrammetry and GIS. *Pre: Math 235.*

CE 343 Surveying Laboratory 1C,3L

Chain surveying, the use of the level and leveling staff; setting out levels; profile and cross-section leveling. The theodolite and its use traverse surveying. Tacheometry and electronic distance measurements. Measurement of areas with planometer. The usage of laser theodolite and level. Total stations. Computer applications in surveying. *Pre/Cor: CE 341(or Corequisite)*

CE 345 Transportation Engineering 3C,3H

The field of transportation engineering; role of transportation in society economics; social; political; and environmental. Operational and vehicular characteristics for all modes of transportation. Traffic control devices; pavement markings; object marking; delineators; studs; signs; and channelization; introduction to traffic signal timings. Rail transportation; Urban rail transit; railway cross section; Urban rail transit cross section. Air transport demand, selection of airport site and runway orientation; Airport passenger terminal area. Water transportation including marine structures, classes of harbors and planning and design of port facilities. Introduction to Intelligent Transportation Systems (ITS). *Pre: CE 341.*

CE 351 Fluid Mechanics for Civil Engineering 3C,3H

Properties of fluids, Statics of fluids. Dynamics of fluids: system and control volume; equations of continuity, Euler, Bernoulli, energy, linear momentum, and angular momentum with applications. Dimensional analysis and dynamic similitude. Viscous flow: laminar flow through tubes, energy grade lines, turbulent flow in pressure conduits and in open channels, steady incompressible flow through simple pipes and open channels. *Pre: CE 201.*

CE 352 Hydraulics and Hydrology 3C,3H

Pipe flow networks, hydraulic machinery, open channel flow, elements of hydrology: hydrologic cycle evaporation; transpiration; precipitation; run off; hydrographs; design discharge; rainfall statistics; magnitude of floods; watershed characteristics; channel routing; frequency analysis; the unit hydrograph; SCS Curve Number Method. Aquifers; Darcy's law; and well hydraulics. *re:CE 351.*

CE 354 Fluid Mechanics and Hydraulics Laboratory 1C,3H

Experiments on: properties of fluids; flow measurements; statics of fluids; principles of continuity, Bernoulli, energy, and momentum; viscous effects; free surface flow; and pumps. *Pre: CE 351, Pre/Cor: CE352(or Corequisite)*

CE 371 Building Construction 3C,3H

Introduction to the development of building philosophy. Types of buildings. Structural elements and transfer of load among the building components. Types of foundation, geometric design of foundations. Geometric design of stairs. Form work. Flooring, and damp proofing. Provision of joints in structures. Timber and steel structures; design and construction details. Civil engineering drawing: Sections and details of different components and works. *Pre: ME 201, CE 202.*

CE 431 Structural Analysis II 3C, 3H

Analysis of statically indeterminate structures: slope deflection method; moment distribution method; non-prismatic members, stiffness method for trusses, beams, and frames; computer applications. *Pre: CE 332.*

CE 432 Reinforced Concrete I 3C,3H

Introduction, materials, flexural analysis. Design Codes, safety provisions, introduction to working stress design, strength design, design of singly reinforced rectangular beams, doubly reinforced rectangular beams, T-beams. Shear and diagonal tension in beams, bond, anchorage and development length, analysis and design of one-way and two-way edge supported solid slabs, design of short columns. *Pre: CE 322, CE 431.*

CE 434 Steel Design 3C,3H

Properties of structural steel, elastic design and analysis of structural elements: tension members, compression members; beams; beam columns, Connections, weld and bolt design, design of trusses and moment resisting frames; introduction to plastic design. *Pre: CE 431, CE 371.*

CE 442 Pavement Materials and Design 3C,3H

Pavement types and definitions, soil classification for highway purposes, bituminous material types and tests, uses of asphalt in highways, design of bituminous mixtures by Marshall Procedure. Analysis of rigid and flexible highway pavement stresses (one layer system), Pavement layers, calculations of equivalent single axle load, design of rigid and flexible highway pavement by AASHTO procedure. *Pre: CE 345.*

CE 443 Highways Geometric Design 3C,3H

Route selection process. Highway design elements. Horizontal alignment (simple circular, reverse, compound and spiral curves. Super-elevation and transition curves, Vertical alignment (design and setting of vertical curves), Sight distances. Widening of horizontal curves. Coordination of vertical and horizontal alignment. Design of intersections, Types of interchanges. Highway Drainage. *Pre: CE 345*

CE 444 Highway Laboratory 1C,3L

Tests on mineral aggregates; sieve analysis, specific gravity, CBR and absorption. Tests on asphalt viscosity; penetration; flash point, ductility; specific gravity; softening point. Tests on asphalt paving mixtures using Marshal test, Skid Resistance, and Extraction Test. *Per/Cor: CE 442 (or Corequisite)*

CE 452 Environmental Engineering 3C,3H

Definitions; units; material balance; energy fundamentals; environmental chemistry; mathematics of growth; water pollution; solid waste management; air pollution ; hazardous waste and risk assessment ; and noise Pollution and Control. *Pre: CE 352(or Corequisite)*

CE 453 Environmental Engineering Lab. 1C,3L

Water and Wastewater Analysis including: solids determination; spectrophotometry and Beers' law; pH; turbidity; alkalinity; acidity; hardness; acid-base titration; biological and chemical oxygen demands; bacterial counts in water; coliform tests; Heavy metals determination and trace contaminants. *Pre/Co: CE452*

CE 462 Geotechnical Engineering 3C,3H

Introduction to geotechnical engineering, review of basic geology, Soil mineralogy, Classification of soils, Compaction in the laboratory and in the field, water flow and hydraulic properties, Stress in soils, Consolidation and settlement analysis. Shear strength of soils. *Pre: CE 202.*

CE 463 Geotechnical Engineering Laboratory 1C,3L

Soil Description and Identification, Moisture Content, Sieves and Hydrometer Analysis; Atterberg Limits (Liquid, Plastic and Shrinkage Limits); Compaction; Permeability tests (constant and falling head); Consolidation; Direct Shear; Unconfined Compression test; Triaxial Compression test. *Pre/Cor: CE 462(or Corequisite)*

CE 464 Foundation Engineering 3C,3H

Boring and sampling, In-situ Tests, Classification of foundations, Bearing capacity and settlement of foundations, Shallow Foundations, Deep foundations: type of deep foundations, Pile foundations analysis and design, Earth pressure and retaining walls. Computer programs. *Pre: CE 462.*

CE 472 Contracts, Specifications & Quantity Surveying 3C,3H

Legal aspects of engineering public works, general and special conditions. Settlement of disputes. Professional ethics. Specifications of construction materials according to different standards. Technical writing. Quantity surveying for civil engineering works. *Pre/Co: CE 432(or Corequisite)*

CE 490 Practical Engineering Training 3C

Practical training in a Civil Engineering Project or any other places approved by the department, and according to the regulations drafted by the college of Engineering Training Committee. *After Completing 117C.*

CE 503 Geographic Information Systems (GIS) 3C, 3H

Study the fundamental of GIS. Explore the data and data entry in GIS, data structure for GIS, data acquisition, data processing, database management, and analysis and manipulation. Emphasis on product generation. Maps, projection and datum. Data management and planning, Computer application of GIS in civil engineering. *Pre: CE 341.*

CE 504 Dam Engineering 3C,3H

Different types of dams, choice dam according to sight location, type of forces acting on dams, design and construction of different types of dams: gravity dams, arch dams, buttress dams, hollow dams, earth and rock-fill dams, cofferdams, weirs, spillways dam tunnels and gates; quality of water retained by dams; environmental impact of dams construction. *Pre: CE 352, CE 464, CE432*

CE 531 Reinforced Concrete II 3C,3H

Review of design basis, ultimate strength versus unified design approaches, tension- and compression-controlled members, strain limits. Serviceability analysis, deflection and cracking control, shrinkage and creep deflection. Analysis and design for torsion. Columns under biaxial bending, slender columns. Analysis of building frames, simplifications, idealization. Design of Ribbed slabs, column-supported slabs. Design of stairs. Design of footings. *Pre: CE 432.*

CE 532 Prestressed Concrete 3C,3H

Basic principles, short- and long-term properties of constituent materials, partial prestressing. Flexural behavior, analysis and design of prestressed concrete beams, classes, cracking, pretensioning, post-tensioning, service load design, load balancing, strength design, strain limits, flexural efficiency. Bond, transfer and development lengths, anchorage zone design. Shear and diagonal tension. Evaluation of immediate and long-term losses. Composite construction and design, shear-friction theory. Deflection calculation using approximate single time step approach. *Pre: CE 432.*

CE 535 Computer-aided analysis and design of CE Structures 3C, 3H

Analysis and design of civil engineering structural systems through the use of computers. Emphasis will be placed on available computer software used in industry. *Pre: CE 434, CE531.*

CE 536 Bridge Engineering and Design 3C,3H

Types of bridges; loads on bridges, analysis and design of reinforced concrete slab and girder type bridges, precast prestressed concrete bridge, metallic bridges. Substructure design. Construction details. *Pre: CE 531.*

CE 541 Traffic Planning and Engineering 3C,3H

Traffic flow theory. Volume, speed, delay, parking and safety studies. Traffic control devices. Capacity analysis of signalized and unsignalized intersections. Capacity analysis of two-lane and 4-lane highways. Fundamentals of traffic planning. Trip generation; trip distribution; mode choice; and traffic assignment techniques. Intelligent transportation systems. *Pre: CE 443.*

CE 542 Photogrammetry and Geodesy 3C,3H

Introduction to photogrammetry, optics, photographs, cameras, imaging systems and adjustment of observations. Photographic measurements, stereo copy, parallax, 3-D information and orientation. Terrestrial and close-range photogrammetry. Analogue, analytical and digital photogrammetry. Introduction to remote sensing, computer vision, geodesy principles, point positioning and GPS. *Pre: CE 341, CE 311.*

CE 546 Highway Maintenance 3C, 3H

Maintenance management concepts and components, evaluation of road conditions (Pavement, Shoulders, drainage facilities) flexible and rigid pavement distresses, pavement condition survey and rating procedures, highway maintenance and repair procedures, assessment of maintenance needs, evaluation and selection of proper maintenance alternatives, rehabilitation and repair of different pavement distresses. GIS and computer vision for maintenance inventory. *Pre: CE 442.*

CE 551 Design of Environmental and Wastewater Systems 3C, 3H

Characterization of water and wastewater; Design of water distribution networks and sewerage systems; Design of water treatment systems; Wastewater Treatment design; Storm drainage design; Landfill design; Design basics of non-conventional treatment methods including: absorbers, aeration towers and membrane processes; processing of sludge, and water reuse. *Pre: CE 452.*

CE 552 Water Resources 3C,3H

Water laws. Reservoirs, dams, and reservoir basins. Hydro- power generation. Flood estimation, routing and control. Engineering economy in water resources planning. Introduction to system engineering in water resources. Topics in arid and semi-arid region water resources. Desertification water conservation techniques, reuse of water, remote sensing and arid water resources. Linear programming and its applications in water resources. *Pre: CE 352*

CE 553 Groundwater Management 3C, 3H

Definition and occurrence; groundwater and the hydrologic cycle; Darcy's law; groundwater flow equations; analytic solutions; type curves; superposition; aquifer evaluation: pump test, slug test; salt water intrusion; delayed yield; basics of

numerical modeling; groundwater contamination; transport processes; one dimensional transport equation and available solutions; and groundwater remediation.

Pre: CE 352.

CE 565 Applied Geotechnical Engineering 3C,3H

Application of soil mechanics to earth pressures and retaining structures, pressures and bases for design of bracing of open cuts, anchored bulkheads, cofferdams, tunnels, and culverts, strength of intact rock, strength of rock joints, foundation in rock, Stability of slopes in soil and rock, Stability of earth and rockfill dams. Computer programs. *Pre: CE 464.*

CE 562 Foundations on Expansive Soil 3C,3H

The problem of expansive soils, The problem of expansive soils in Jordan, Clay mineralogy, Identification and classification of swelling soils, moisture equilibrium in soils, prediction of heave in expansive soils, soil shrinkage and influence of vegetation, evaluation of foundations on expansive soils, stiffened mats and strip foundations, undreamed piles, stabilization of expansive soils, construction techniques and inspection. *Pre: CE 464*

CE 570 Engineering Project and Construction Management 3C,3H

Duties and responsibilities of project managers. Organization and management of engineering projects. Network presentation and calculations. Role of networks and bar-charts in project planning, monitoring and control. Resource leveling and allocation. Selection of equipment and formalization with standard construction method. Cost of owning and operating equipment. Productivity and production cost calculations. *Pre: CE 371, CE 472*

CE 581 Special Topics in Structural Engineering 3C, 3H**CE 582 Special Topics in Transportation Engineering 3C, 3H****CE 583 Special Topics in W/E Engineering 3C, 3H****CE 584 Special Topics in Geotechnical Engineering 3C, 3H**

Pre: 5th Year Standing and Department Approval (Depends on the topic)

These courses cover special advanced topics in one of the areas of Civil Engineering. The contents vary depending on the topic.

CE 591 Graduation Project I 1C

Directed readings in the literature of civil engineering, introduction to research methods, seminar discussions dealing with special engineering topics of current interest. It is the first phase of the entire project. *After Completing 114C*

CE 592 Graduation Project II 3C

Planning, design, construction and management of a civil engineering project, as defined and outlined in the first phase. Writing a technical report. Preparation of technical engineering drawings. *Pre: CE 591.*