Civil Engineering Courses

Undergraduate

CE 121 Structural Engineering I
Discussion of materials, loads and forms of structures. Analysis of determinate structures. Displacements of structures and their importance in applications. Experimental aspects of materials behavior in structural applications. Emphasis is placed on basic experimental techniques, design of experiments, selection and use of appropriate instrumentation and interpretation of results.
4.5 credits (3 hours of lecture, 3 hours of laboratory). Prerequisite: ESC 101.

CE 122 Structural Engineering II
3 credits. Prerequisite: CE 121.

CE 131 Introduction to Geotechnical Engineering
Introduction to various indexing tests of soils, clay mineralogy, permeability, seepage and flow nets, stress distribution in soil masses, one-dimensional consolidation theory, strength characteristics of soils, application of Mohr’s Circle to soil mechanics, stability of slopes.
4.5 credits (3 hours of lecture, 3 hours of laboratory). Prerequisite: ESC 101; prerequisite or co-requisite. ESC 140.

CE 141 Environmental Systems Engineering
Qualitative and quantitative treatment of water and wastewater systems as related to domestic and industrial needs and their effect on the environment. Introduction to air pollution sources and control and solid/hazardous waste engineering. Design of water and wastewater treatment plants. Field and laboratory techniques for measurement of water quality parameters. Laboratory analysis of representative waters and wastewaters for commonly determined parameters as related to applications in water environment.
4.5 credits (3 hours of lecture, 3 hours of laboratory). Prerequisite: ESC 140.

CE 142 Water Resources Engineering (same as EID 142)
Problems in conservation and utilization of water. Hydrologic techniques. Surface water and ground water supplies. Water transmission and distribution. Flood control, navigation and irrigation. Introduction to open...
channel flow and pipe networks. Design of hydraulic structures. Experimental aspects of hydraulic phenomenon. Emphasis is placed on basic experimental techniques, design of experiments, selection and use of appropriate instrumentation and interpretation of results. 4.5 credits (3 hours of lecture, 3 hours of laboratory). Prerequisite: ESC 140.

CE 331 Foundation Engineering Layout of subsurface investigation program, SPT (Standard Penetration Test), Dutch-cone peneterometer. Analysis and design of spread footings on cohesive and cohesionless soil by stability and settlement procedures, combined footings, strap footings, floating foundations and pile foundations. Settlement analysis due to deep-seated consolidation. 3 credits. Prerequisite: CE 131.

CE 332 Lateral Earth Pressures and Retaining Structures Introduction to classical lateral earth pressure theories (Rankine and Coulomb). Analysis and design of cantilever and gravity retaining walls, cantilevered and anchored sheetpile bulkheads, anchorage systems (individual and continuous deadmen, grouted tiebacks) and braced cofferdams. Gravity Wall Systems (Gabion Walls, Criblock Walls and Double Wall). 3 credits. Prerequisite: CE 131.

CE 341 Design of Steel and Concrete Structures Study of behavior and design of structural steel components. Understanding and development of design requirements as related to current structural steel specifications. Study of behavior and design of reinforced concrete structural elements. Understanding and development of concrete design requirements in current specifications. Current design, fabrication and construction practices are equally emphasized in both steel and concrete design. 3 credits. Prerequisite: CE 122.

CE 346 Hydraulic Engineering An integration and application of the principles of fluid mechanics to problems concerned with water supply and distribution. Open channel flow and design of hydraulic structures. 3 credits. Prerequisite: CE 142.

CE 348 Environmental and Sanitary Engineering (same as EID 348). Topics include types of environmental pollution and their effects; water quality standards and introduction to laboratory analyses of water quality parameters, sources and estimates of water and wastewater flows; physicochemical unit treatment processes. Integrated lecture and design periods cover water supply network, wastewater collection system and water treatment design projects. 3 credits. Prerequisite: CE 141.

CE 351 Urban Transportation Planning Historical background and evolution of current procedures used in the “urban transportation planning process.” Covered are the historical framework, urban development theories, land use, trip generation, trip distribution models, traffic assignment techniques, modal split and introduction to urban transportation systems. 3 credits.

CE 352 Elements of Transportation Design Review of urban transportation planning process. Specific design elements of various highway and public transportation systems. Included are locational design, traffic service, environmental impact analyses, alternatives evaluation, geometric design elements, operations and capacity and level-of-service analysis. Also, selected topics in urban transportation systems. 3 credits.

CE 356 Civil Engineering Experimental Projects Exploratory experimental projects in materials, hydraulics, soils, environmental or other civil engineering specialties. Projects are conceived, designed and executed by groups of students under faculty supervision. 2 credits. Prerequisite: Permission of instructor. (Students are required to have taken introductory civil engineering subject(s) related to project.)

CE 363 Civil Engineering Design I Individual or group design projects based upon the interests of the students and with the approval of the instructor. Final engineering reports and formal oral presentations are required for all projects. Lectures by faculty and professional practitioners cover the following topics: engineering, environmental and economic feasibility assessment issues; preparation of plans and specifications; cost estimates; progress chart and critical path; interfacing with community; etc. Field visits to major New York City projects under construction.

3 credits. Prerequisite: permission of instructor. (Students are required to have taken introductory CE subject(s) related to project.)

CE 364 Civil Engineering Design II Continuation of CE 363. 3 credits. Prerequisite: CE 363

CE 369 Civil Engineering Project Individual design, research or experimental projects. Open only to well-qualified students. 3 credits. Prerequisite: permission of instructor.

CE 380 Fundamentals of Construction Management (same as EID 380). 3 credits.

Graduate

CE 411 Introduction to Civil Engineering Management Overview of the civil engineering profession and the importance of infrastructure to society. The course will emphasize the planning, design, construction and maintenance of public works. New York City will serve as the laboratory for field visits and course projects. 3 credits. Prerequisite: permission of instructor.

CE 412 Stochastic Concepts in Civil Engineering Introduction to probabilistic methods and stochastic concepts in civil engineering. Elements of applied probability and statistics. Engineering applications involving economic decisions under uncertainty. Realistic and common civil engineering examples and problems in transportation, structures, materials, soils and water resources. 3 credits. Prerequisites: Ma 224 and Ma 240.

CE 414 Solid Waste Management Engineering aspects of solid waste collection, transport and disposal, including sanitary landfill design, incineration, composting, recovery and re-utilization of resources. Optimization techniques of facility-siting and collection route selection, and economic evaluation of factors affecting selection of disposal methods. 3 credits. Prerequisites: Ch 160 and permission of CE faculty.

CE 421 Matrix Methods of Structural Analysis In-depth treatment of matrix methods. Application to linear as well as nonlinear analysis of plane and space structures. Discussion of current techniques. Computer applications. 3 credits. Prerequisites: CE 122, Ma 240.


CE 424 Plates and Shells Discretized grid-work and grillage analysis by matrix techniques. Development of the classical thin plate theory. Mathematical and numerical solutions of the plate equation. Introduction to thin shell theory. Practical applications such as cylindrical shell roofs, spherical shell with an edge ring and various cases of shells of revolution. 3 credits. Prerequisite: CE 122.

CE 425/EID 425 Structural Dynamics Dynamic behavior and design of structures subjected to time-dependent loads. Included in the load systems are earthquakes, blasts, wind and vehicles. Shock spectra and pressure impulse curves. Special applications in blast mitigation design. 3 credits. Prerequisite: CE 122.

CE 426 Advanced Structural Design Discussion of principal design codes (AISC, ACI and AASHTO) as they relate to ASCE Standards, International Building Code (IBC) and NYC Building codes Advanced materials behavior. Strength and serviceability requirements. Design of composite girders and slabs. Limit state response and formation of plastic hinges in steel and concrete structures. Structural upgrade and retro-fit of existing structures. 3 credits. Prerequisite or co-requisite: CE 341.

CE 427 Behavior and Design of Prestressed Concrete Structures Behavior and design of prestressed members in flexure, shear, bond and torsion; continuous beams; columns; prestressed systems; loss of prestress. Emphasis is placed on ultimate strength design and the background of latest ACI code. 3 credits. Prerequisite: CE 341.

CE 431 Advanced Foundation Engineering Analysis and design of foundations subjected to vibratory loading, beams on elastic foundation (vertical subgrade modulus), laterally loaded piles (with software applications), Wave Equation Analysis of Piles (with software application of WEAP). 3 credits. Prerequisites: CE 131 and permission of instructor.

CE 432 Special Topics in Lateral Earth Pressure and Retaining Structures Analysis of cellular cofferdams, reinforced earth-retaining structures, slurry walls and retaining structures subjected to earthquake loading, soil nailing. 3 credits. Prerequisites: CE 131 and permission of instructor.

CE 441 Water and Wastewater Technology Design. Estimation of domestic, commercial and industrial flows. Design of structures and systems for water and wastewater treatment. Design projects include hydraulic and process design of oxidation ponds, screening, grit removal, sedimentation tanks, secondary biological treatment, other physicochemical processes and outfall design. 3 credits. Prerequisite: permission of instructor.

CE 447 Stream and Estuary Hydrology of the stream flow, floods, infiltration and movement, precipitations, evaporation, water cycle related to air mass displacement. Applications to steel and concrete structures. Special applications in blast mitigation design. 3 credits. Prerequisite: CE 142.


CE 499 Thesis/Project Master’s candidates are required to conduct, under the guidance of a faculty advisor, an original investigation of a problem in civil engineering, individually or in a group, and to submit a written thesis describing the results of the work. 6 credits for full year.