CIVIL ENGINEERING COURSE DESCRIPTIONS (from the CCNY Bulletin, presented in numerical order)

Undergraduate courses

CE 20900: Structural and Site Plans

CE 23100: Statics

CE 26400: Civil Engineering Data Analysis
Role of statistics and probability in civil engineering. Measurability and variability. Data collection. Descriptive analysis. Presentation of data in the context of civil engineering. Numerical descriptive statistics. Probability distributions and their application to civil engineering. Introduction to inferential statistics. Applications of civil engineering quality control. Linear correlation and regression analysis. Prereq.: CSC 10200; Pre- or coreq.: MATH 20300 (min C grade, ENGL 21007. 2 class, 3 lab hr./wk.; 3 cr.

CE 31600: Civil Engineering Decision and Systems Analysis

CE 32600: Transportation Planning
Introduction to transportation planning concepts and methods. Travel demand forecasting. Transportation economics. Quantitative techniques in transportation planning: discrete choice models, regression methods and optimization techniques. Societal impacts including environmental, land use, safety and quality of life issues. Project evaluation. Prereq: CE 26400; Pre- or co-req: CE 33500. 3 hr./wk.; 3 cr.

CE 32700: Transportation Systems Engineering
Principles and practice of transportation engineering. Introduction to traffic engineering. Design, constructibility and maintenance needs of highways, streets, rails, airports, transit, waterways and intermodal facilities. Introduction to latest technologies in transportation systems. Prereq: CE 26400, CE 20900, CE 33200. 3 hr./wk.; 3 cr.
CE 33200: Mechanics of Deformable Bodies
Stresses and strains in elastic and inelastic materials subjected to axial, torsional, and flexural loads and combinations of loads for statically determinate and indeterminate configurations. Deformations and deflections due to loads and temperature. Combined stresses. Mohr circles and principal stresses. Introduction to energy methods. Castigliano’s theorem. Stability of columns and critical loads. Testing of engineering materials. Stress-strain characteristics, including creep, shrinkage and hysteresis effects. Effects of temperature and impact loading on material properties. Prereq.: CE 23100 (min. C grade); Pre- or coreq.: CE 26400, MATH 39100. 3 class, 2 lab hr./wk.; 4 cr.

CE 33500: Computational Methods in Civil Engineering
Algorithmic formulation of the solution to civil engineering problems. Flowcharts. Solutions to algebraic and differential equations common to civil engineering. Matrix problems. Differentiation and integration. Optimization problems. Students will primarily use microcomputers and a programming language, spreadsheets and "macros" and symbolic calculations software. Prereq.: CSC 10200, CE 26400, CE 33200, MATH 39100 (min. C grade); Pre- or coreq.: MATH 39200. 2 class, 3 lab hr./wk.; 3 cr.

CE 34000: Structural Analysis
Loading systems. Structural determinacy, indeterminacy and stability. Analysis of two and three dimensional trusses and frames. Influence lines. Structural deflections. Methods of solving statically indeterminate structures. Introduction to structural safety and redundancy. Computer applications. Prereq.: CE 20900, CE 33200; Pre- or coreq.: CE 33500, MATH 39200. 2 class, 3 design hr./wk.; 3 cr.

CE 34500: Soil Mechanics

CE 35000: Fluid Mechanics
Study of behavior of viscous and non-viscous fluids at rest and in motion through development and application of the principles of fluid statics, continuity, energy, momentum, similitude, and dimensional analysis. Applications include flow in open and closed conduits, the boundary layer, dynamics of drag and measurement of velocity and discharge. Prereq.: CE 23100 (min. C grade), CSC 10200; pre- or coreq.: MATH 39100 (min. C grade). 3 hr./wk.; 3 cr.

CE 36500: Hydraulic Engineering
CE 37200: Environmental Impact Assessment
The National Environmental Policy Act (NEPA) and the impact assessment of engineering projects on human and environmental health. Structure of the natural environment and pollutants typically released by engineering projects to the atmosphere, soil, and surface and ground water. Federal regulations. Modeling of the transport and transformation of pollutants in the environment using material balances, equilibrium chemistry and specialized models. Prereq. for CE Students: CE 26400, CHEM 10401 (min. grade of C), CE 35000 (min. grade of C). Prereq. for ESE Students: CE 26400, CHEM 10401 (min. C grade), and choice of CE 35000 (min. C grade), ME 35600, or CHE 34100. 3 hr./wk.; 3 cr.

CE 40100: Review of Engineering Fundamentals
Review of core requirements including: engineering math, chemistry, computational methods, economics and ethics. Review of civil engineering fundamentals including statics, dynamics, strength of materials and fluid mechanics. General engineering fundamentals including: Material science, thermodynamics and electrical circuits. Testing of student competence in all these topics. The course will be offered on a Pass/Fail basis. Prereq.: upper junior or senior standing. 4.5 hr./wk for 10 weeks.; 1 cr.

CE 40500: Civil Engineering Management
Introduction to civil engineering management. Development of a project team for effective delivery; project delivery roles. Roles, rights and obligations of civil engineers. Ethical and professional responsibilities of civil engineers. Project life cycle analysis. Project costs and financing. Project administration; change orders, claims and dispute resolution. Group project. Prereqs: CE 34000, CE 31600. 3 hr./wk.; 3 cr.

CE 43500: Dynamics of Civil Engineering Systems

CE 44000: Finite Element Analysis of Structures

CE 44100: Reinforced Concrete
Principles of reinforced concrete design. Proportioning concrete mixes. Safety factors as influenced by uncertainties in the design and construction processes and as they relate to public safety. Design of singly and doubly reinforced beams, T-beams, and one-way slabs. Cracking, deflection and serviceability criteria. Design of columns subjected to combined axial load and bending. Prereq.: CE 26400, CE 34000. 2 class, 3 design hr./wk.; 3 cr.
CE 44200: Structural Design
Analysis and design of beams, girders, tension and compression members, and other components of structural frames. Rational basis of safety factors and specifications and their public safety ramifications. Load and Resistance Factor Design. Prereq.: CE 26400, CE 34000. 2 class, 3 design hr./wk.; 3 cr.

CE 45100: Environmental Water Resources

CE 47400: Environmental Engineering
Physical, chemical and microbiological characterization of water, wastewater, air pollution and solid waste. Remediation objectives and regulatory constraints. Conventional unit operations and processes for potable water, domestic wastewater and air pollution control and solid waste management. Handling of process sidestreams. Prereq: CE 36500 and CE 37200. 2 lect., 3 lab hr./wk.; 3 cr.

CE 48200: Water and Wastewater Treatment Design
Determination of design parameters and preliminary design of conventional water and wastewater treatment operations and processes using bench-scale experiments and commercially available computer software. The topics include aeration, sedimentation, disinfection chemistry and kinetics, activated carbon adsorption for removal of soluble organics, precipitation and ion-exchange for hardness removal of domestic wastewaters. Prereq.: CE 47400. 2 class, 3 design hr./wk.; 3 cr.

CE 50500: Construction Project Management
Overview of the project management cycle; anatomy of a project from briefing and conception to commissioning and operations; phase out. Project funding and cash flow. Construction planning, project scheduling and site control. The construction management process; interactive roles of promoter, engineer/architect and builder/contractor. Computer applications using Primavera Project Planning software. Prereq.: CE 33500. 3 hr./wk.; 3 cr.

CE 50900: Senior Design Project
Major culminating design experience emphasizing multi- and interdisciplinary collaboration, and incorporating engineering standards and realistic constraints that include the following considerations: economic, financial, environmental, sustainability, constructability, ethical, health and safety, social and political. Pre- or coreq.: CE 32600, CE 32700, CE 47400 and CE 44100. 4 hr./wk.; 3 cr.

CE 51001: Independent Study (1 cr)
For transfer students who transfer in with Math 202, to be taken in lieu of ENGR 101.
The student identifies a full-time faculty member of the department to work with, develops a brief proposal of the work, and then pursues a program of independent study under the direction of the faculty member. The program may be within any specialization, it must include some design, and it may also consist of an experimental investigation or an analytical study. A final engineering report describing the work done and the outcomes must be submitted to the Department at the end of the study. To register for this, students must obtain a permission form from the chairman. Prereq.: departmental approval. 1 cr.
CE 51003: Independent Study (3 cr)
A specialization elective for students specializing in structures, environmental or transportation engineering. The student identifies a full-time faculty member of the department to work with, develops a brief proposal of the work, and then pursues a program of independent study under the direction of the faculty member. The program must be within the student’s specialization, and may consist of an extensive design project, an experimental investigation, or an analytical study. A final engineering report describing the work done and the outcomes must be submitted to the Department at the end of the study. To register for this, students must obtain a permission form from the chairman. Prereq.: CE 340 and departmental approval. 3 cr.

CE 52000: Traffic Engineering
Analysis of road user, vehicle and roadway characteristics as they affect the traffic engineering function. Traffic studies, capacity and level of service analysis, traffic control and intersection design. Prereq.: CE 32600 and CE 32700. 3 hr./wk.; 3 cr.

CE 52500: Geometric Design of Facilities
Functional design of traffic facilities including plans and profiles, intersection and other interchange areas, parking, etc. Computer aided design methods and procedures using Eagle Point and PDS interfacing AUTOCAD. Prereq.: CE 32700. 3 hr./wk.; 3 cr.

CE 52600: Rail System Design
Design of light and heavy rail facilities for passenger and freight operations. Track structure. Alternative technologies for construction, guidance and communications. Maintenance of way. Prereq.: CE 32700. 3 hr./wk.; 3 cr.

CE 53000: Advanced Strength of Materials
Introduction to elements of elasticity including basic ideas of stress, strain, and constitutive relations. Theories of failure and fracture. Analysis of unsymmetrical bending. Shear center and shear flow. Torsion. Twisting of thin-walled sections. Buckling criteria. Prereq.: CE 33200, CE 33500, MATH 39200. 3 hr./wk.; 3 cr.

CE 54000: Highway Engineering
The design of highway alignment and route location. Basic elements of highway design, including pavement type, earthwork and drainage. Importance and consequences of maintenance and engineering economics; life-cycle cost analysis. Prereq.: CE 32600 and CE 32700. 3 hr./wk.; 3 cr.

CE 54100: Highway and Airport Construction
Overview of highway and airport engineering and construction; highways vs. airports; urban vs. rural highways. Construction planning, organization and cost estimating; construction scheduling using computer packages, e.g., Primavera; construction tracking. Construction operations: mobilization, removal, disposal, placement; management of equipment, material, labor, money; cash flow accounting. Construction specifications: quality assurance/quality control (QA/QC); investigation of environmental impacts and mitigation measures. Site investigation and project preparation. Prereq.: CE 32600 and CE 32700. 3 hr./wk.; 3 cr.
CE 54500: Urban Transportation
Historical development of urban transportation. Alternative modal operating characteristics, capacity and productivity. Societal goals, costs, financing, and current issues. Conventional public transit for hire modes, U.S. and other countries. Prereq.: CE 32600. 3 hr./wk; 3 cr.

CE 55000: Advanced Reinforced Concrete

CE 56600: Engineering Hydrology

CE 57100: Water Quality Analysis
Acid-base titration curves and acid-base indicators, alkalinity and the carbonate system, buffer intensity and design, optical methods of analysis, the spectrophotometer and Beer’s law, colorimetric analysis of phosphate, colorimetric analysis of ammonia, chelation analysis of iron, calcium carbonate equilibria, solubility product determination, Chemical Oxygen Demand, determination of forms of aqueous chlorine, reactions of aqueous chlorine with ammonia, adsorption on activated carbon, kinetics of ferrous iron oxidation. Prereq.: CE 47400. 2 class, 2 lab hr./wk.; 3 cr.

CE 58300: Air Pollution and Control
The effects of air pollution on humans and on the environment. The Clean Air Act and its Amendments. Mobile and industrial sources of air pollution and emission inventories of pollutants across the US and in NY. Pollution prevention vs. pollution control. Air pollution control from industrial, mobile and area sources, to meet needed removal efficiency, with an emphasis on control of gaseous and particulate air pollution from industrial sources. Prereq.: CE 47400, Math 39100 (min C. grade). 3 hr./wk.; 3 cr..

CE 58400: Solid Waste Management
CE 59000: Foundation Engineering

CE 59800: Topics in Civil Engineering*
Topics chosen for their particular or current interest to undergraduate students. Prereq.: departmental approval. 3 hr./wk.; 3 cr.

CE 59900: Topics in Civil Engineering Design*
Topics chosen for their particular or current interest to undergraduate students. Prereq.: departmental approval. 2 class, 3 design hr./wk.; 3 cr. *Various courses designated CE 59800 and CE 59900 will be offered whenever there is sufficient student demand as evidenced by pre-registration forms or petitions.