

CIVIL ENGINEERING (CE)

CE 2110. Applied Mechanics I. (3 Credits)

Fundamentals of statics using vector methods. Resolution and composition of forces; equilibrium of force systems; analysis of forces acting on structures and machines; applications of friction; centroids; moment of inertia.

Enrollment Requirements: MATH 1132Q.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%202110>)

CE 2120. Applied Mechanics II. (3 Credits)

(Also offered as ME 2120.) Fundamentals of dynamics using vector methods. Rectilinear and curvilinear motion, translation, rotation, plane motion; work, energy, and power; impulse and momentum.

Enrollment Requirements: CE 2110; MATH 2110Q or MATH 2130Q. May not be taken for credit after PHYS 3101.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%202120>)

CE 2193. International Study. (1-6 Credits)

Special civil engineering topics taken in a foreign study program. Credits and hours by arrangement, up to a maximum of six credits. Consent of Department Head or Designee required, normally to be granted prior to the student's departure. May count toward the major with consent of the advisor and approved plan of study. May be repeated for credit with change in topic.

May be repeated for a total of 12 credits

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%202193>)

CE 2211. Engineering Economics I. (1 Credit)

Time value of money. Simple, compound, nominal, and effective interest rate. Present, future, and annual worth methods. Single payment, annuity series, gradient series. Rate of return method. Evaluation of alternative projects.

Enrollment Requirements: Open only to Civil and Environmental Engineering majors.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%202211>)

CE 2251. Probability and Statistics in Civil and Environmental Engineering. (3 Credits)

(Also offered as ENVE 2251.) Fundamentals of probability theory and statistics. Hypothesis testing, linear and multiple regression.

Enrollment Requirements: Recommended preparation: MATH 1131Q or 1151Q. May not be taken out of sequence after passing CE 3220 or 4210.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%202251>)

CE 2310E. Environmental Engineering Fundamentals. (3 Credits)

(Also offered as ENVE 2310E.) Concepts from aqueous chemistry, biology, and physics applied in a quantitative manner to environmental problems and solutions. Mass and energy balances, chemical reaction engineering. Quantitative and fundamental description of water and air pollution problems. Environmental regulations and policy, pollution prevention, risk assessment. Written and oral reports.

Enrollment Requirements: CHEM 1128Q or 1148Q.

Skill Codes: COMP. Environmental Literacy

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%202310E>)

CE 2410. Introduction to Geospatial Analysis and Measurement. (4 Credits)

Elementary plane surveying, geospatial coordinate systems, error and accuracy analysis, introduction to geographic information systems, theory and uses of global positioning systems, introduction to land-surface remote sensing in the context of civil and environmental engineering.

Enrollment Requirements: Recommended preparation: MATH 1060 or 1131.

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CE 2411. Introduction to Computer Aided Design. (1 Credit)

(Also offered as ENVE 2411.) Introduction to computer-aided design and drawing, emphasizing applications in civil and environmental engineering and landscape design. Introduction to fundamental CAD concepts and techniques, such as drawing commands, dimensioning, layers, editing techniques, and plotting, and additional software packages to create planimetric and topographic maps. Related topics include scale, coordinate geometry, and terrain representation.

Enrollment Requirements: Enrollment in the School of Engineering; this course and CE 2410 may not both be taken for credit.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%202411>)

CE 2500. Introduction to Geographic Information Systems. (4 Credits)

(Also offered as GEOG 2500.) Fundamental principles of geographic information systems (GIS). Topics include history of the field, components of a GIS, the nature and characteristics of spatial data, methods of data capture and sources of data, database models, review of typical GIS operations and applications. Laboratory exercises provide experience with common computer-based systems.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%202500>)

CE 2710. Transportation Engineering and Planning. (3 Credits)

Design of transportation facilities. Traffic flow and capacity analysis. Travel demand analysis and planning methods.

Enrollment Requirements: PHYS 1201Q or 1401Q or 1501Q. Prerequisite or corequisite: CE 2251 or STAT 1100Q; CE 2411 or ENVE 2411.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%202710>)

CE 3110. Mechanics of Materials. (3 Credits)

Simple and combined stress, torsion, flexure and deflection of beams, continuous and restrained beams, combined axial and bending loads, columns.

Enrollment Requirements: CE 2110; enrollment in School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203110>)

CE 3120. Fluid Mechanics. (4 Credits)

(Also offered as ENVE 3120.) Statics of fluids, analysis of fluid flow using principles of mass, momentum and energy conservation from a differential and control volume approach. Dimensional analysis. Application to pipe flow and open channel flow. Laboratory activities and written lab reports.

Enrollment Requirements: CE 2110; MATH 2110Q and 2410Q; open only to students in the School of Engineering. Recommended preparation: CE 2120. Not open for credit to students who have passed ME 3250.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203120>)

CE 3193. International Study. (1-6 Credits)

Special advanced civil engineering topics taken in an international study program.

Enrollment Requirements: Consent of Department Head or Designee required, normally to be granted prior to the student's departure. May count toward the major with consent of the advisor and approved plan of study.

May be repeated for a total of 12 credits

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203193>)

CE 3220. Principles of Construction I. (3 Credits)

Concepts and techniques of construction, including construction process and procedures, contracts and delivery methods, scheduling, cost estimation, project control, project change management, and construction safety issues.

Enrollment Requirements: CE 2251, which can be taken concurrently; enrollment in School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203220>)

CE 3251. Civil and Environmental Engineering Applications of Probability and Statistics. (1 Credit)

Multiple regression. Analysis of variance. Student project applying probability or statistics in a civil or environmental engineering context.

Enrollment Requirements: STAT 1100Q; open only to CE and ENVE majors. This course and CE 2251 or ENVE 2251 may not both be taken for credit. Recommended preparation: MATH 1121 or 1131Q or 1151Q.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203251>)

CE 3300. Environmental Engineering Laboratory. (3 Credits)

(Also offered as ENVE 3200.) Aqueous analytical chemical techniques, absorption, coagulation/flocculation, fluidization, gas stripping, biokinetics, interpretation of analytical results, bench-scale design projects, written and oral reports.

Enrollment Requirements: CE 2251, CE/ENVE 2310E; enrollment in the School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203300>)

CE 3320. Water Quality Engineering. (3 Credits)

(Also offered as ENVE 3220.) Biological unit processes in wastewater treatment systems, disinfection, and bioremediation scenarios.

Applications to design of wastewater treatment systems.

Enrollment Requirements: CE 2251, CE/ENVE 2310E; enrollment in the School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203320>)

CE 3510. Soil Mechanics. (3 Credits)

Fundamentals of soil behavior and its use as a construction material. Effective stress principle, seepage and flow nets, consolidation, shear strength, limit equilibrium analysis. Written reports.

Enrollment Requirements: CE 3110, which can be taken concurrently; enrollment in the School of Engineering. Recommended preparation: CE 3120.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203510>)

CE 3520. Civil Engineering Materials Laboratory. (3 Credits)

Engineering properties of steel, Sieve and Hydrometer analysis, properties and performance of soil, Portland cement concrete, Bituminous cement concrete, and timber; laboratory measurement of properties; interpretation of results. Written reports.

Enrollment Requirements: CE 3110 and CE 3510, which may be taken concurrently; enrollment in School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203520>)

CE 3530. Engineering and Environmental Geology. (3 Credits)

(Also offered as EARTH 3710.) Application of geological principles to engineering and environmental problems. Topics include site investigation, geologic hazards, slope processes, earthquakes, subsidence, and the engineering properties of geologic materials. Course intended for both geoscience and engineering majors. Formerly offered as GSCI 3710.

Enrollment Requirements: Recommended preparation: EARTH 1050 or 1051.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203530>)

CE 3610. Introduction to Structural Analysis and Design. (3 Credits)

Structural loads and load combinations; analysis and design philosophies; analysis of statically determinate structures; influence lines; deflection of trusses, beams, and frames; introduction to indeterminate analysis; matrix analysis of structures; structural analysis and design software.

Enrollment Requirements: CE 3110, which may be taken concurrently; enrollment in the School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203610>)

CE 3630. Design of Steel Structures. (4 Credits)

Steel material and structural shapes; LRFD and ASD design philosophies; design of steel members for tension, compression, bending, and combined effects of axial forces and bending moments; design of simple connections; design project.

Enrollment Requirements: CE 3610; enrollment in the School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203630>)

CE 3640. Design of Reinforced Concrete Structures. (4 Credits)

Loads; design philosophies, current design codes to analyze and design reinforced concrete beams, columns, slabs, foundations for flexure, shear, axial loads and torsion; serviceability considerations; applications to buildings, design project.

Enrollment Requirements: CE 3110; enrollment in the School of Engineering. Corequisite: CE 3610.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203640>)

CE 3995. Special Topics in Civil Engineering. (1-6 Credits)

Classroom or laboratory courses as announced for each semester. For independent study see Civil Engineering 4999.

Enrollment Requirements: Announced separately for each course; open only to School of Engineering students.

May be repeated for credit

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203995>)

CE 3997. Directed Research in Civil Engineering. (1-3 Credits)

Individualized or group research conducted under the supervision of the instructor.

Enrollment Requirements: Open only to students in the School of Engineering.

May be repeated for a total of 6 credits

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%203997>)

CE 4210. Operations Research in Civil and Environmental Engineering. (3 Credits)

Critical path method for scheduling and managing engineering project tasks. Resource allocation subject to constraints. Facility location problems. One and two-phase simplex method for linear programming. Optimization of non-linear problems. Introduction to integer programming and network flow problems.

Enrollment Requirements: CE 2251; MATH 2110Q; and enrollment in the School of Engineering. This course and CE 5200 may not both be taken for credit.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204210>)

CE 4220. Principles of Construction II. (3 Credits)

Time, cost, productivity, decision-making, and sustainability challenges in the construction industry. Advanced scheduling, construction sequencing, economic analysis, financial management, construction equipment and methods, risk management, and sustainability issues.

Enrollment Requirements: CE 2211 and 3220.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204220>)

CE 4310. Environmental Modeling. (3 Credits)

(Also offered as ENVE 4310.) Systematic approach for analyzing contamination problems. Systems theory and modeling will be used to assess the predominant processes that control the fate and mobility of pollutants in the environment. Assessments of lake eutrophication, conventional pollutants in rivers and estuaries and toxic chemicals in groundwater.

Enrollment Requirements: CE 2310E; CE 3120 or CHEG 3123; enrollment in School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204310>)

CE 4410. Computer Aided Site Design. (3 Credits)

Roadway and street network design and site development using computer software, including grading and earthwork, runoff and drainage structures.

Enrollment Requirements: CE 2410 or CE 2411 or ENVE 2411; enrollment in the School of Engineering. Recommended preparation: CE 2710

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204410>)

CE 4510. Foundation Design. (3 Credits)

Application of soil properties to design of foundations, retaining structures, excavation drainage, shallow footings, deep foundations, specifications, subsurface exploration.

Enrollment Requirements: CE 3510; enrollment in the School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204510>)

CE 4530. Geoenvironmental Engineering. (3 Credits)

(Also offered as ENVE 4530.) Subsurface contaminant fate and transport, site characterization, overview of soil remediation techniques.

Enrollment Requirements: ENVE 2310E; open to juniors or higher in the School of Engineering. Recommended preparation: CE 3510.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204530>)

CE 4541. Advanced Soil Mechanics. (3 Credits)

Introduction of soil as a multi-phase material; stress and strain analysis in soil; soil compression and consolidation; shear strength of sand and clay; critical state soil mechanics; advanced topics in complex constitutive relationships; introduction to fracture mechanics.

Enrollment Requirements: CE 3510 or equivalent; enrollment in the School of Engineering. Not open for credit for students who have passed CE 5541.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204541>)

CE 4542. Earthquake Engineering. (3 Credits)

Global tectonics and earthquake sources, seismic wave propagation, strong ground motion analysis, seismic hazards, site effects and liquefaction, seismic load to slopes, retaining structures and foundations, structure response to dynamic loads.

Enrollment Requirements: CE 3510 and 3610. Recommended preparation: CE/ENVE 3530/ERTH 3710. Not open for credit for students who have passed CE 5542.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204542>)

CE 4560. Coastal Hazard Engineering. (3 Credits)

Characteristics of wind hazards; characteristics of flooding and wave hazards; design of coastal infrastructures and resilience assessment. Group project and report.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204560>)

CE 4610. Advanced Structural Analysis. (3 Credits)

Analysis of indeterminate structures using force method and moment distribution method, matrix analysis of truss, beam, and frame structures using computer programming and graphical finite element software, particle dynamics, introduction of dynamic analysis of single degree of freedom structures under various loads.

Enrollment Requirements: CE 3610; enrollment in the School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204610>)

CE 4710. Case Studies in Transportation Engineering. (3 Credits)

Analysis of case studies in transportation and urban planning and design. Application of transportation engineering and planning skills. Oral and written group reports, group discussions, individual written papers.

Enrollment Requirements: CE 2710; enrollment in the School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204710>)

CE 4720. Street and Highway Design. (3 Credits)

History of street and highway design; land-use context, street design data collection and analysis, speed, safety and street network characterization; pedestrian and bikers in design, cross-section and alignment design.

Enrollment Requirements: CE 2710; enrollment in the School of Engineering. Recommended preparation: CE 4410. This course and CE 5720 may not both be taken for credit.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204720>)

CE 4730. Transportation Planning. (3 Credits)

Transportation economics, urban transportation planning process, evaluation of transportation improvements, transportation systems management.

Enrollment Requirements: CE 2211, CE 2251, and CE 2710; enrollment in the School of Engineering. This course and CE 5730 may not both be taken for credit.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204730>)

CE 4740. Traffic Engineering I. (3 Credits)

Traffic flow characteristics; traffic control devices; traffic signs and markings; traffic data collection; traffic signal timing and operation; capacity of streets, intersections, and highways; traffic impact studies; traffic simulation.

Enrollment Requirements: CE 2210 or 2251, CE 2710; enrollment in the School of Engineering. This course and CE 5740 may not both be taken for credit.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204740>)

CE 4750. Pavement Design. (3 Credits)

Analysis and design of flexible and rigid pavements; testing and characterization of paving materials.

Enrollment Requirements: CE 3110 and 3520; enrollment in the School of Engineering. This course and CE 5750 may not both be taken for credit.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204750>)

CE 4810. Engineering Hydrology. (3 Credits)

(Also offered as ENVE 4810.) Hydrologic cycle: precipitation, interception, depression storage, infiltration, evapotranspiration, overland flow, snow hydrology, groundwater and streamflow processes. Stream hydrographs and flood routing. Hydrologic modeling and design. Computer applications. Design project.

Enrollment Requirements: CE 3120 or ENVE 3120 or CHEG 3123; enrollment in the School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204810>)

CE 4820. Hydraulic Engineering. (3 Credits)

(Also offered as ENVE 4820.) Design and analysis of water and wastewater transport systems, including pipelines, pumps, pipe networks, and open channel flow. Introduction to hydraulic structures and porous media hydraulics. Computer applications.

Enrollment Requirements: CE 3120 or both CHEG 3123 and CHEG 3124; enrollment in the School of Engineering.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204820>)

CE 4896. Thesis in Civil Engineering. (1-3 Credits)

Introduction to research through literature review and preparation of a research proposal, execution of the research proposal, preparation of written report and oral defense.

Enrollment Requirements: Open only to students in the School of Engineering.

May be repeated for a total of 3 credits

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204896>)

CE 4900W. Civil Engineering Projects I. (2 Credits)

Issues in the practice of civil and environmental engineering: management, business, public policy, leadership, importance of professional licensure, professional ethics, procurement of work, law/contracts, insurance/liability, global/societal issues (e.g., sustainable development, product life cycle), and construction management. Students working singly or in groups prepare proposals for civil engineering design projects, oral presentation and written reports.

Enrollment Requirements: ENGL 1007 or 1010 or 1011 or 2011.

Prerequisite or corequisite: CE 2251; CE 2410, CE 2411, or ENVE 2411; CE 2710; CE 3610; CE 3510; ENVE 2310E; and ENVE 3120. Open only to senior Civil Engineering majors.

Skill Codes: COMP: Writing Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204900W>)

CE 4920W. Civil Engineering Projects II. (2 Credits)

Design of civil engineering projects. Students working singly or in groups implement previously developed proposals for civil engineering design projects from first concepts through preliminary proposals, sketches, cost estimations, design, evaluation, consideration of realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability, oral presentation and written reports.

Enrollment Requirements: CE 4900W and ENGL 1007 or 1010 or 1011 or 2011. Open only to junior and senior Civil Engineering majors.

Skill Codes: COMP: Writing Competency

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204920W>)

CE 4997. Independent Research in Civil Engineering. (1-3 Credits)

Independent research conducted under the supervision of the instructor.

Enrollment Requirements: Open only to students in the School of Engineering.

May be repeated for a total of 6 credits

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204997>)

CE 4999. Independent Study in Civil Engineering. (1-6 Credits)

Individual study in specialized area of civil engineering as mutually arranged between student and instructor.

Enrollment Requirements: Open only to students in the School of Engineering.

May be repeated for a total of 12 credits

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%204999>)