

CIVIL ENGINEERING (CE)

CE 5010. Seminar in Structures and Applied Mechanics. (0 Credits)

Presentations and discussions contributed by staff, students and outside speakers. Required every semester for all full-time students in the Structures and Applied Mechanics Area of Concentration in the Civil Engineering Field of Study.

May be repeated for a total of 3 credits

Grading Basis: Registered

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205010>)

CE 5020. Independent Graduate Study in Civil Engineering. (1-6 Credits)

Special problems in civil engineering as arranged by the student with a supervisory instructor of his or her choice.

May be repeated for a total of 12 credits

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205020>)

CE 5030. Seminar in Transportation and Urban Engineering. (0 Credits)

Extended discussions on presentations contributed by staff, students and outside speakers. Required every semester for all full-time students in the Transportation and Urban Engineering Area of Concentration in the Civil Engineering Field of Study.

Grading Basis: Registered

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205030>)

CE 5090. Advanced Topics in Civil Engineering. (1-3 Credits)

Classroom or laboratory courses as announced for each semester. For independent study see CE 5020.

May be repeated for a total of 12 credits

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205090>)

CE 5122. Advanced Mechanics of Materials. (3 Credits)

Stress and strain, combined stress, and theories of failure. Torsion of non-circular sections. Shear center, unsymmetrical bending, curved flexural members, and beams on elastic foundations. Energy methods. Plane theory of elasticity, plate bending, and pressurized cylinders.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205122>)

CE 5125. Reliability for Engineers. (3 Credits)

Fundamentals of reliability analysis. Load and resistance models, first order reliability methods, and probabilistic simulation techniques. Calibration of design codes. System reliability.

Enrollment Requirements: Recommended preparation: Basic knowledge or course taken on statistics and/or random processes.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205125>)

CE 5128. Elastic Stability. (3 Credits)

Buckling of elastic and inelastic columns; lateral buckling of beams; buckling of plates, rings and tubes; stability of frames.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205128>)

CE 5150. Structural Vibrations. (3 Credits)

Vibrating systems; application to design; discrete and continuous systems, free and forced vibrations; response to periodic and non-periodic loads; analytical and numerical techniques; earthquake loading; response spectra.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205150>)

CE 5151. Experimental Structural Dynamics. (3 Credits)

Characteristics of random data; vibration test hardware; data acquisition and analysis; and experimental modal analysis and system identification. Laboratory experiments will be used to enhance understanding of taught concepts.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205151>)

CE 5163. Fracture Mechanics. (3 Credits)

Focuses on fundamental concepts and applications of fracture mechanics. Topics include linear elastic fracture mechanics, elastic plastic fracture mechanics, computational fracture mechanics, fracture mechanisms in metals and non-metals, fracture testing, dynamic and time-dependent fracture, fatigue crack growth, interfacial fracture, fracture in advanced materials, and engineering applications.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205163>)

CE 5164. Finite Element Methods in Applied Mechanics I. (3 Credits)

(Also offered as ME 5520.) Formulation of finite elements methods for linear static analysis. Development of two and three dimensional continuum elements, axisymmetric elements, plate and shell elements, and heat transfer elements. Evaluation of basic modeling principles including convergence and element distortion. Applications using commercial finite element programs.

Enrollment Requirements: Not open for credit to students who have passed CE 5162.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205164>)

CE 5166. Finite Element Methods in Applied Mechanics II. (3 Credits)

(Also offered as ME 5521.) Formulation of finite elements methods for modal and transient analysis. Development of implicit and explicit transient algorithms. Stability and accuracy analysis. Formulation of finite element methods for material and geometric nonlinearities. Development of nonlinear solution algorithms. Applications using commercial finite element code.

Enrollment Requirements: Not open to students who have passed ME 5521.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205166>)

CE 5200. Operations Research in Civil and Environmental Engineering. (3 Credits)

Resource allocation subject to constraints. Facility location problems. Simplex method for linear programming. Introduction to integer programming and network flow problems.

Enrollment Requirements: Recommended preparation: CE 2251 or equivalent. May not be taken for credit after passing CE 4210.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205200>)

CE 5210. Environmental Engineering Chemistry - I. (3 Credits)

(Also offered as ENVE 5210.) Quantitative treatment of chemical behavior in environmental systems. Thermodynamics and kinetics of acid/base, complexation, precipitation/dissolution, sorption and redox reactions; degradation and partitioning of organic contaminants; software for speciation and partitioning computation.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205210>)

CE 5380. Bridge Structures. (3 Credits)

Common types of bridges; AASHTO bridge loads; design of composite plate girders; fatigue; design of bridge substructure; design project.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205380>)

CE 5383. Design of Bridges for Extreme Events. (3 Credits)

Highway bridges; AASHTO LRFD Bridge Design Specifications; seismic design; force-based and displacement-based design methods; vessel collision, truck collision, and ice loading. Bachelor's degree in civil engineering or relevant work experience is required for this course.

Enrollment Requirements: Bachelor's degree in civil engineering or relevant work experience.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205383>)

CE 5384. Accelerated Bridge Construction. (3 Credits)

Common ABC methods and technologies; prefabricated bridge elements; bridge systems including Self-Propelled Modular Transporters (SPMTs) and Lateral Slide Bridge Construction; construction methods and planning.

Enrollment Requirements: Bachelor's degree in civil engineering or relevant work experience.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205384>)

CE 5541. 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; term paper.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205541>)

CE 5542. 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; term paper.

Enrollment Requirements: This course and CE 4542 may not be both taken for credit.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205542>)

CE 5543. Advanced Foundation Design. (3 Credits)

Soil behavior in retaining systems, shallow foundations, deep foundations.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205543>)

CE 5560. Coastal Hazard Engineering. (3 Credits)

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

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205560>)

CE 5610. Advanced Reinforced Concrete Structures. (3 Credits)

Behavior and design of reinforced concrete for flexure, shear, torsion, bond, and axial loads; two way slabs; beam-column joints; general flexure theory; seismic considerations; review of design specifications.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205610>)

CE 5640. Prestressed Concrete Structures. (3 Credits)

Analysis, design, and behavior of pretensioned and post-tensioned concrete; simple and continuous span structures; time dependent behavior; review of design specifications.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205640>)

CE 5710. Case Studies in Transportation Engineering. (3 Credits)

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

Enrollment Requirements: Not open to students who have passed CE 4710.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205710>)

CE 5715. Sustainable Transportation. (3 Credits)

Assesses the role of the land-based transportation system in terms of how it affects the environmental, social and economic goals for a sustainable society. How the concept of sustainability can be used as a holistic framework for assessing the transportation and land use system. Strategies for reducing the environmental, social and economic footprint of the transportation/land use system and ways they can be implemented.

Enrollment Requirements: Recommended preparation: CE 2710.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205715>)

CE 5720. Street and Highway Design. (3 Credits)

Urban street and highway design: vertical and horizontal alignment, cross-section elements, traffic barriers, interchanges and intersections, pedestrian and bike facilities, traffic calming, community and roadside elements.

Enrollment Requirements: Recommended preparation: CE 2710 or equivalent. Not open for credit to students who have passed CE 4720.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205720>)

CE 5725. Transportation Safety. (3 Credits)

Human factors in traffic safety, economic costs of crashes, crash data collection and database management, elements of statistics and crash count distributions, exploratory analysis of crash count data, regression analysis of crash count data, before-after studies, network screening and diagnosis, roadway and roadside design, crash modification factors.

Enrollment Requirements: Recommended preparation: CE 2211, 2251 or equivalent.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205725>)

CE 5730. Transportation Planning. (3 Credits)

Transportation economics, urban transportation planning process, local area traffic management, evaluation of transportation improvements, land use and transportation interaction.

Enrollment Requirements: Recommended preparation: CE 2251 or equivalent, CE 2710 or equivalent. Not open for credit to students who have passed CE 4730.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205730>)

CE 5735. Public Transportation Systems. (3 Credits)

Characteristics of public transportation systems, public transport network planning, station spacing and design, public transportation and land use development, public transportation network design problems, and introduction to transit assignment.

Enrollment Requirements: Recommended preparation: CE 2251, 2710; CE 4210/5200 or equivalent.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205735>)

CE 5740. 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; term paper.

Enrollment Requirements: Recommended preparation: CE 2251, 2710, or equivalent. Not open for credit to students who have passed CE 4740.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%205740>)

CE 6725. Statistical and Econometric Methods for Transportation Data Analysis. (3 Credits)

Application of various statistical methods for analysis of transportation data, including linear regression, count data models, logistic regression, discrete outcome models, ordered probability models, random parameter models, and duration models among others.

Enrollment Requirements: Recommended preparation: CE 2251, CE 5720 or 5730 or 5740 or equivalent.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%206725>)

CE 6735. Transportation Network Analysis. (3 Credits)

Network modeling and graph theoretical applications to transportation systems. Algorithmic approaches to common network problems. System optimal and user equilibrium traffic assignment modeling and solution techniques.

Enrollment Requirements: Recommended preparation: CE 4210/5200 and CE 5730 or equivalent.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%206735>)

CE 6740. Traffic Engineering II. (3 Credits)

Driver, pedestrian and vehicle operating characteristics; microscopic and macroscopic representations of traffic flow; microscopic and macroscopic traffic stream models; safety analysis; traffic management; shock wave analysis; queueing analysis.

Enrollment Requirements: Recommended preparation: CE 5740 or equivalent.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%206740>)

CE 6920. Doctoral Teaching Practicum. (0-3 Credits)

(Also offered as ENVE 6920.) Offered by special arrangement. Practical experience in classroom teaching with mentoring from a member of the graduate faculty.

View Classes (<https://catalog.uconn.edu/course-search/?details&code=CE%206920>)