

CIVIL ENGINEERING (CIVILENG)

CIVILENG 6150 Reinforced Concrete Structures 3 Credits

This is a graduate level class on advanced design of RC members that aims to introduce advanced analysis and design skills for special reinforced concrete elements, which are beyond the scope of common undergraduate reinforced concrete design courses, yet essential for professional practitioner. Topics will include analysis of doubly reinforced RC sections and sections of irregular shapes with application of the strain compatibility approach, design for the combined shear and torsion stresses, full analysis, design, and detailing of continuous RC beams including deflection calculation, analysis and design of two-way slabs, slender columns, footings under eccentric load, and introduction to prestressed concrete.

Components: Class

Prereqs/Coreqs: P. Student must be in the Structural/GeoTech Emphasis area to enroll in course or Consent of the Program Coordinator/Instructor

CIVILENG 6230 Structural Steel Design with LRFD 3 Credits

The purpose of this course is to introduce students to the design of steel structures by the load and resistance factor design (LRFD) method. The newest steel specification requires a strength method (like LRFD) to be used. The allowable stress method (ASD) has been renamed the allowable strength method, and is based on many of the principles of LRFD design. A general overview of the new ASD method will be given, but the focus of the class will be on designing structures with LRFD. Students will learn to design tension and compression members, beams and beam-columns, and connections. A low-rise steel office building will be designed throughout the semester as a group design project. Familiarity with a structural analysis program (e.g., RISA-2D, STAAD, etc.) will be beneficial but not required.

Components: Class

Prereqs/Coreqs: P. Student must be in the Structural/GeoTech Emphasis area to enroll in course or Consent of the Program Coordinator/Instructor

CIVILENG 7220 Dynamics of Structures 3 Credits

Dynamic analysis of structures using simplified single-degree-of-freedom models, model analysis and static condensation. Assumptions used in numeric analysis methods will be explored in order to better understand the output from computer analysis. Application of dynamic analysis as implemented in the International Building Code.

Components: Class

Prereqs/Coreqs: P. Student must be in the Structural/GeoTech Emphasis area to enroll in course or Consent of the Program Coordinator/Instructor

CIVILENG 7260 Advanced Shallow Foundation Design with LRFD Applications 3 Credits

This course is designed to fully prepare a student with only an introductory course in soil mechanics to: analyze the bearing capacity of shallow foundations; to design shallow foundations to meeting bearing capacity and settlement requirements; to design reinforced concrete shallow foundations; and to apply Load and Resistance Factor Design (LRFD) principles to the design and analysis of shallow foundations.

Components: Class

Prereqs/Coreqs: P. Student must be in the Structural/GeoTech Emphasis area to enroll in course or Consent of the Program Coordinator/Instructor

CIVILENG 7270 Advanced Deep Foundation Design with LRFD Applications 3 Credits

This course is designed to fully prepare a student with a course in deep foundations to: analyze the bearing capacity of deep foundations; to design deep foundations to meet bearing capacity and settlement requirements; to design reinforced concrete deep foundations (drilled shafts); and to apply Load and Resistance Factor Design (LRFD) principles to the design and analysis of deep foundations.

Components: Class

Prereqs/Coreqs: P. CIVILENG 7260

CIVILENG 7280 Geosynthetics Engineering 3 Credits

This course is designed to fully prepare a student with only an introductory course in soil mechanics to recognize, design, and analyze the geosynthetic alternatives to traditional civil engineering project features such as: subsurface drainage systems; beddings and filters for erosion control systems; erosion control systems; temporary runoff and sediment control; roadways and pavement systems; embankments on soft foundations; stability of steep slopes; retaining walls and abutments; and landfill final cover and base liner systems.

Components: Class

Prereqs/Coreqs: P. Student must be in the Structural/GeoTech Emphasis area to enroll in course or Consent of the Program Coordinator/Instructor

CIVILENG 7290 Earth Retaining Structures: Design, Analysis and LRFD 3 Credits

This course is designed to fully prepare a student with only an introductory course in soil mechanics to recognize, design, and analyze concrete retaining walls, MSE walls, cantilever and anchored sheetpile walls, braced excavations, and cofferdams using conventional and Load and Resistance Factor Design (LRFD) concepts.

Components: Class

Prereqs/Coreqs: P. Student must be in the Structural/GeoTech Emphasis area to enroll in course or Consent of the Program Coordinator/Instructor

CIVILENG 7900 Thesis & Capstone Preparation 1 Credit

Prepares student for either the Thesis or Capstone experience. Focus is placed on the skills necessary to undertake the Thesis or Capstone work. This includes writing a project proposal that is supported by scholarly literature, preparing a project timeline, budgeting for the proposed project, recognizing project stakeholders, and identifying specific deliverables from the project. Course culminates in a written Thesis/Capstone proposal for committee approval.

Components: Research

Cross Offering: ELECTENG 7900, INDSTENG 7900, MECHENG 7900

Prereqs/Coreqs: P: Full admittance as a degree-seeking graduate student; C: MECHENG 5000

CIVILENG 7910 Thesis & Capstone Extension 1 Credit

Course is a 1-credit extension of a student's thesis research or capstone project design course. Cannot be taken until the maximum six credits of Thesis Research or Capstone Design Project have been completed. Will require approval of the Faculty Advisor and Program Coordinator before permission for this course will be granted and students allowed to register. Will not count toward degree requirements.

Components: Thesis Research

Cross Offering: ELECTENG 7910, INDSTENG 7910, MECHENG 7910

Prereqs/Coreqs: P: (CIVILENG 7990, ELECTENG 7990, INDSTENG 7990, or MECHENG 7990) OR (CIVILENG 7970, ELECTENG 7970, INDSTENG 7970, or MECHENG 7970)

CIVILENG 7970 Capstone Design Project 3 Credits

Students will draw upon and synthesize knowledge and skills learned throughout the program by applying it to an industry-sponsored project. Capstone work (minimum 150 hours) will be completed in partnership with industry and academic mentor/supervisors. A substantive work project deliverable demonstrating summative application of coursework taken in the program will be expected. The project is expected to be completed in the student's last semesters in residence. Three credits can be taken in a single semester. Can be repeated but only a total of six credits can be applied to degree completion. (Contact advisor for prior approval and registration instructions)

Components: Research

Cross Offering: ELECTENG 7970, INDSTENG 7970, MECHENG 7970

Prereqs/Coreqs: P: CIVILENG 7900, ELECTENG 7900, INDSTENG 7900, or MECHENG 7900

CIVILENG 7990 Thesis Research 3 Credits

Completion and defense of a carefully delineated scholarly work advancing an original point of view as a result of research. The topic chosen must reflect the student's area of emphasis and must be approved by a thesis committee. Three credits taken in a single semester. Can be repeated but only a total of six credits can be applied to degree completion. Thesis work is expected to be completed in the student's last semesters in residence. (Contact advisor for prior approval and registration instructions)

Components: Thesis Research

Cross Offering: ELECTENG 7990, INDSTENG 7990, MECHENG 7990

Prereqs/Coreqs: P: CIVILENG 7900, ELECTENG 7900, INDSTENG 7900, or MECHENG 7900