

# CIVIL ENGINEERING (CIVL)

---

**CIVL-COMP Senior Comprehensive Exam**  
(NULL credits) (Both Fall & Spring Semesters)  
NULL

**CIVL-2000 Computing in Civil Engineering**  
(1 credit) (Fall Semester)

Computing in Civil Engineering (1) (F) This course develops computation and numerical analysis skills for solving civil engineering problems. Students develop proficiency in iterative methods, optimization, and structured scientific programming. Discipline-specific and general-purpose computing applications are introduced for subsequent use in the civil engineering curriculum.

**CIVL-2150 Geomatics & Terrain Modeling Lab**  
(2 credits) (Both Fall & Spring Semesters)

Geomatics & Terrain Modeling Lab (2) (B) This is an introductory course in the collection of digital models. It includes field measurement of angles, distances, and elevations as well as digital collection of terrain data using total station and GNSS equipment. The student will use field data to create digital terrain models using design software. The course provides an introduction to horizontal curves, vertical curves, site grading, and watershed delineation among other topics.

**CIVL-3010 Soil Mechanics & Civil Eng Materials Lab**  
(2 credits) (Spring Semester)

Soil Mechanics and Civil Engineering Materials Laboratory (2) (S) Students explore aspects of soil mechanics and civil engineering material properties through statistically designed experimentation. Soil mechanics topics include determining soil index properties, grain size distribution, permeability, moisture density relations, shear strength, and consolidation of soils. Civil engineering material topics include engineering properties of concrete, asphalt, steel, and composites. Students perform lab work in teams and communicate results by oral presentations and written reports. (WC).

**Prerequisite(s):** ENGR-2320, ENGR-3150, CIVL-3120, and ENGL-1010.

**General Education Categories:** Written Communication

**CIVL-3020 Environmental & Hydraulic Engineeri Lab**  
(2 credits) (Fall Semester)

Environmental and Hydraulic Engineering Laboratory (2) (F) This is a lab-based course that complements Hydraulic Engineering and Environmental Engineering courses. Hydraulics topics include fluid properties, flow measurements, open channel flow, pipe flow, and hydraulic machinery, and applications of statistical design of experiments. Water and wastewater treatment topics include: BOD, total and suspended solids, water hardness, chlorination, alkalinity, coagulation, and jar testing. Students conduct experiments in teams and communicate experimental results by written reports and oral presentations. (WC)

**Prerequisite(s):** ENGL-1010, CIVL-3310, and ENGR-3150.

**General Education Categories:** Written Communication

**CIVL-3120 Soil Mechanics**  
(3 credits) (Fall Semester)

Soil Mechanics (3) (F) Course topics include principles of soil mechanics including weight-volume relationships, classification, compaction, effective stress, permeability and seepage, consolidation, shear strength, site exploration, introduction to lateral earth pressure, and slope stability.

**Prerequisite(s):** ENGR-2320.

**CIVL-3230 Hydraulic Engineering**  
(3 credits) (Spring Semester)

Hydraulic Engineering (3) (S) This course covers topics such as fluid statics and dynamics, open channel flow, transitions and controls, hydraulic structures, hydraulic machinery, and hydraulic modeling.  
**Prerequisite(s):** ENGR-3300.

**CIVL-3310 Environmental Engineering**  
(3 credits) (Spring Semester)

Environmental Engineering (3) (S) Course topics include environmental quality, water quality modeling, water & wastewater treatment systems, sludge processing, solid wastes, hazardous wastes, and environmental law.  
**Prerequisite(s):** ENGR-3300.

**CIVL-3510 Structural Mechanics**  
(3 credits) (Fall Semester)

Structural Analysis (3) (F) Course topics include reactions, shear and bending moment, plane and space trusses, influence lines, deflections, virtual work, energy methods, approximate analysis, consistent deformations method, slope deflection and moment distribution methods, and an introduction to matrix methods. Students will use the computer for analysis.

**Prerequisite(s):** ENGR-2320.

**CIVL-3550 Building Cmpt & System Design**  
(3 credits) (Discretion of Department)

Building Component and System Design (3) (S) This course covers the design of structural components and systems commonly used in building construction including beams, columns, floors, roofs, and walls. Students explore the use of various materials such as wood, steel, reinforced concrete, masonry, and prefabricated architectural elements.

**Prerequisite(s):** ENGR-2320.

**CIVL-4140 Foundation Engineering**  
(3 credits) (Spring Semester)

Foundation Engineering (3) (S) This course covers the fundamentals of foundation design. It covers the following topics: soil improvements and ground modifications, soil exploration and sampling, bearing capacity, spread footings, mat foundations, settlement analysis, drilled shafts, and pile foundations.

**Prerequisite(s):** CIVL-3120.

**CIVL-4160 Transport Engineering**  
(3 credits) (Fall Semester)

Transportation Engineering (3) (F) This course introduces students to the fundamentals of transportation engineering. Topics in this course include: transportation systems, transportation planning and future developments, design and analysis of transportation facilities including traffic operations, highway geometry, and pavement engineering.

**Prerequisite(s):** CIVL-3120.

**CIVL-4210 Hydrology**  
(3 credits) (Fall Semester)

Hydrology (3) (F) This course covers watershed characterization, and how to apply probabilistic and statistical methods to conduct frequency analyses, model rainfall-runoff, analyze hydrographs, and model groundwater hydrology. Students are introduced to computer programs to conduct the analysis.

**Prerequisite(s):** ENGR-3300.

**CIVL-4320 Environmental Engineering II**

**(3 credits) (Fall Semester)**

Environmental Engineering II (3) (F) Methodologies for designing potable water and wastewater systems using state-of-the-art technology are treated in this course. Additionally, methods for solving problems dealing with water quality and air quality are included. Topics covered include water purification and distribution, wastewater systems, groundwater remediation, and emissions control. This course utilized computer-aided design software and includes a system design project.

**Prerequisite(s):** CIVL-3310.

**CIVL-4440 Contracts & Specifications**

**(3 credits) (Spring Semester)**

Contracts and Specifications (3) (S) In this course, students learn to develop and interpret contracts. Additionally, students develop an understanding of criteria for develop engineering specifications and drawings. Topics covered in the course include construction contracts; basic engineering estimating; construction administration, observation, safety, and warranty issues; and other related project and legal matters of concern to engineers.

**CIVL-4510 Steel Design**

**(3 credits) (Spring Semester)**

Steel Design (3) (S) Course topics include selection of sections, bolted and welded connections, trusses, bearings, lightgauge structural members, fatigue of structural members and introduction to plastic design.

**Prerequisite(s):** CIVL-3510.

**CIVL-4530 Reinforced Concrete**

**(3 credits) (Fall Semester)**

Reinforced Concrete (3) (F) Course topics include materials and specifications, axially and eccentrically loaded columns, strength beam theory, shear stresses, bond and development length, serviceability, and one-way slabs.

**Prerequisite(s):** CIVL-3510.

**CIVL-4600 Civil Engineering Design**

**(3 credits) (Spring Semester)**

Civil Engineering Design (3) (S) This is a capstone course in which students integrate previous engineering design and science courses to design a project. These projects can be in the areas of environmental, geotechnical, structures, water resources, or transportation engineering. In the course, students cover the major areas of project development such as problem definition, research, development and evaluation of design alternatives. Students also utilize project scheduling techniques and apply design standards and realistic constraints. Other topics covered include project management, effective team-working, engineering ethics, and computer aided design. Group design reports and individual oral presentations are required.

**Prerequisite(s):** Minimum of two Civil Technical Electives.

**CIVL-4700 Civil Engineering Seminar**

**(1 credit) (Fall Semester)**

Civil Engineering Seminar (1) (F) This seminar includes reports and presentations on current topics in civil engineering. Topics are related to business, public policy, leadership, and professional licensure.

Prerequisite Senior Standing. (OC)

**General Education Categories:** Oral Communication