Civil Engineering (CIVE)

CIVE 3010
Introduction to Transportation Engineering
3:3:0 Fall
* Prerequisite(s): ENGR 2140, University Advanced Standing, and (Formal Acceptance into the Civil Engineering Program or Departmental Approval)
Focuses on the performance of pumps. Investigates the laboratory course with a writing component.

CIVE 3130
Structural Analysis
3:3:0 Fall
* Prerequisite(s): ENGR 2140, University Advanced Standing, and (Formal Acceptance into the Civil Engineering Program or Departmental Approval)
Focuses on analysis of determinate and indeterminate structural systems. Covers flexibility and moment distribution. Introduces design load distribution and load guidelines. Canvas Course Mats $105/Canvas.

CIVE 3140
Structural Steel Design
3:3:0 Spring
* Prerequisite(s): CIVE 3130, University Advanced Standing, and (Formal Acceptance into the Civil Engineering Program or Departmental Approval)
Focuses on design of structural steel components of a building. Covers tension members, compression members, beams, and connections using Load and Resistance Factor Design (LRFD). Includes a design component.

CIVE 3150
Reinforced Concrete Design
3:3:0 Fall
* Prerequisite(s): CIVE 3130, University Advanced Standing, and (Formal Acceptance into the Civil Engineering Program or Departmental Approval)
Focuses on design of reinforced concrete components of a structure. Covers beams, columns, slabs, and foundations according to the American Concrete Institute (ACI) 318 building code requirements. Includes a design component.

CIVE 3210
Geotechnical Engineering
3:3:0 Fall
* Prerequisite(s): ENGR 2140, University Advanced Standing, and (Formal Acceptance into the Civil Engineering Program or Departmental Approval)
Focuses on the study of soil properties, classifications, and behavior. Applies principles of mechanics to soil as an engineering material. Introduces consolidation and compaction theories, effective stresses, shear strength, and earth pressure and slope stability. Includes a design component.

CIVE 3320
Hydraulics and Hydrology
3:3:0 Spring
* Prerequisite(s): ENGR 2450, ME 3310, University Advanced Standing, and (Formal Acceptance into the Civil Engineering Program or Departmental Approval)
Focuses on concepts of hydraulics such as pipe and open channel flows. Covers weather patterns, precipitation measurement, distribution, and runoff. Introduces storm hydrograph and peak flow analysis, flood design, reservoir and channel routing. Includes a design component.

CIVE 3335
Civil Engineering Experimentation I
2:0:6 Fall
* Prerequisite(s): CIVE 3130 and University Advanced Standing
Covers temperature, pressure, and flow measurement, along with calibration of thermal/flow sensors in a lab setting. Focuses on experiments to investigate various phenomena in fluid flow, hydraulics, and hydrology. Investigates the performance of pumps. Includes a writing component.

CIVE 3610
Environmental Engineering
3:3:0 Fall
* Prerequisite(s): CHEM 1210, MATH 2250, University Advanced Standing, and (Formal Acceptance into the Civil Engineering Program or Departmental Approval)
Introduces the fundamentals of environmental engineering. Focuses on chemical, biological, and physical principles dealing with water, waste water, and solid waste management. Covers analyses of air, surface, and ground water quality. Includes a design component.

CIVE 4010
Traffic Engineering
3:3:0 Fall
* Prerequisite(s): CIVE 3010 and University Advanced Standing
Introduces elements of traffic engineering including: road use, traffic flow theories, traffic control devices, traffic data collection. Covers freeways and rural highways and principles of intersecting signalization, service level, and capacity. Includes a design component.

CIVE 4020
Highway Planning and Design
3:3:0 Spring
* Prerequisite(s): CIVE 3010 and University Advanced Standing
Covers classification of highways. Focuses on the process involved in design of highways and their elements. Introduces design of highway cross sections, intersections, and interchanges. Covers design of vertical and horizontal alignment and establishment of sight distances. Includes a design component.

CIVE 4135
Civil Engineering Experimentation II
2:0:6 Fall
* Prerequisite(s): CIVE 3130 and University Advanced Standing
Covers foundation classifications. Applies fundamentals of soil mechanics to analysis and design of soil structure systems. Covers shallow and deep foundations, piles and caissons, and retaining structures. Includes a design component.

CIVE 4210
Foundation Design
3:3:0 Fall
* Prerequisite(s): CIVE 3210 and University Advanced Standing
Covers foundation classifications. Applies fundamentals of soil mechanics to analysis and design of soil structure systems. Covers shallow and deep foundations, piles and caissons, and retaining structures. Includes a design component.

CIVE 4310
Storm Water Management
3:3:0 Spring
* Prerequisite(s): ME 3310 and University Advanced Standing
Applies fluid mechanics and hydraulics to the analysis and design of storm water management facilities. Covers environmental issues related to storm water management. Includes a design component.

CIVE 4320
Open Channel Flow
3:3:0 Fall
* Prerequisite(s): CIVE 3320 and University Advanced Standing
Covers analysis of open channel flow systems. Introduces natural and designed channels, steady and unsteady flows, uniform and non-uniform flows and flow transitions. Includes lectures and design projects.
### Civil Engineering Seminar

**CIVE 4510**  
Civil Engineering Seminar  
1:1:0  
* Prerequisite(s): University Advanced Standing  
* Prerequisite(s) or Corequisite(s): CIVE 4810  
Introduces various civil engineering careers and related industries. Emphasizes the importance of life-long learning and active participation in professional societies and communities through lectures given by practicing engineers using their own experiences. Introduces various engineering codes of ethics. Intended as a culminating seminar for graduating seniors to prepare for their engineering careers.

### Water and Wastewater

**CIVE 4610**  
Water and Wastewater  
3:3:0  
* Prerequisite(s): CIVE 3320 and University Advanced Standing  
Introduces municipal water and wastewater treatment and distribution practices. Applies physical, chemical, and biological principles to design and operation of water and wastewater distribution systems.

### Civil Engineering Capstone I

**CIVE 4810**  
Civil Engineering Capstone I  
3:3:0  
* Prerequisite(s): University Advanced Standing, Formal Acceptance into Civil Engineering Program, and Department Approval  
Serves as a comprehensive two-semester civil engineering design experience with practical constraints. Focuses on applying civil engineering principles and the design process along with economic analysis and project management methods to a real-world project, and present the findings to other engineers and the public. Capstone I and II must be taken in consecutive semesters.

### Internship

**CIVE 481R**  
Internship  
1 to 3:1 to 3:0  
* Prerequisite(s): Matriculation to civil engineering program, Instructor Approval, and University Advanced Standing  
Provides opportunities to apply classroom theory while students work as employees in a job that relates to their careers. Students communicate regularly with a coordinator. Credit is determined by the number of hours a student works during the semester and completion of individually set goals. May apply for up to 3 credits; may be graded as credit/no credit.

### Civil Engineering Capstone II

**CIVE 4820**  
Civil Engineering Capstone II  
3:3:0  
* Prerequisite(s): CIVE 4810 and University Advanced Standing  
Serves as a second semester of the two-semester design experience from conception to modeling or prototype. Focuses on applying civil engineering principles and the design process along with economic analysis and project management methods to a real-world project, and present the findings to other engineers and the public. Capstone I and II must be taken in consecutive semesters.

### Advanced Current Topics in Civil Engineering

**CIVE 490R**  
Advanced Current Topics in Civil Engineering  
1 to 3:1 to 3:0  
* Prerequisite(s): University Advanced Standing and (Formal Acceptance into the Civil Engineering Program or Department Approval)  
Provides exposure to emerging topics and technologies of current interest in civil engineering. Varies each semester depending upon the state of technology. May be repeated for a maximum of 6 credits toward graduation without prior written department approval.