Civil Engineering (CIVE)

CIVE 2130
Engineering Economics and Statistics
3

Covers fundamental engineering economic topics and introduces concepts of probability and statistics. Includes economic compound interest and discount rate factors, nominal and effective interest rates, cash flow diagrams, capitalized cost, net present worth analysis, equivalent uniform annual cost, internal rate of return, benefit-cost analysis, basic microeconomics, cost estimation, and cost indexes. Includes probability theories, random sampling, Gaussian distributions, Chi-Squared distributions, hypothesis testing, and analysis of variation.

CIVE 2450
Numerical Methods with Excel and VBA
3
* Prerequisite(s): MATH 2250

Discusses computational and symbolic methods for the solution of complex engineering problems. Introduces basic programming logic in visual basic. Discusses computer representation of numbers and algorithm error analysis. Covers the solution of multiple constraints. Covers use of Microsoft EXCEL and Visual Basic for Applications (VBA).

CIVE 3010
Introduction to Transportation Engineering
3
* Prerequisite(s): EGDT 1040, University Advanced Standing and (Formal Acceptance into the Civil Engineering Program or Departmental Approval)

Covers analysis and design of transportation systems and their components. Introduces technological, economic, and social aspects of transportation. Covers economic considerations, role of public policy, system planning, design, management, traffic flow models, intersection control, network analysis, and environmental impact. Lab access fee of $45 applies.

CIVE 3130
Structural Analysis
3
* 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 methods. Introduces design load distribution and load guidelines. Lab access fee of $45 applies.

CIVE 3140
Structural Steel Design
3
* 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. Lab access fee of $45 applies.

CIVE 3150
Reinforced Concrete Design
3
* 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. Lab access fee of $45 applies.

CIVE 3210
Geotechnical Engineering
3
* 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. Lab access fee of $45 applies.

CIVE 3320
Hydraulics and Hydrology
3
* Prerequisite(s): CIVE 2130, CIVE 3310, University Advanced Standing, and Matriculation into Civil Engineering Program
* Prerequisite(s) or Corequisite(s): ENGR 2450 or CIVE 2450

Covers weather patterns, precipitation measurement, distribution, and runoff. Focuses on pipe flow and open channel flows. Introduces storm hydrograph and peak flow analysis, flood design, reservoir and channel routing. Includes a design component. Lab access fee of $45 applies.

CIVE 3335
Hydrology and Hydraulics Lab WE
2
* Prerequisite(s): ME 3310, University Advanced Standing, and (Formal Acceptance into the Civil Engineering Program or Departmental Approval)
* Prerequisite(s) or Corequisite(s): CIVE 3320

Covers temperature, pressure, and flow measurement, along with calibration of thermal/ fluid 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. Lab access fee of $45 applies.

CIVE 3610
Environmental Engineering
3
* 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. Lab access fee of $45 applies.

CIVE 4010
Traffic Engineering
3
* 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. Lab access fee of $45 applies.

CIVE 4020
Highway Design
3
* 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. Lab access fee of $45 applies.

CIVE 4135
Civil Engineering Experimentation II WE
2
* Prerequisite(s): University Advanced Standing
* Prerequisite(s) or Corequisite(s): ENGR 2160

Focuses on testing of civil engineering materials such as soil, asphalt, concrete, and metals related to geotechnical, pavement, and structural aspects of civil engineering. This is a laboratory course with a writing component. Course lab fee of $25 applies. Lab access fee of $45 applies.

CIVE 4210
Foundation Design
3
* 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. Lab access fee of $45 applies.

CIVE 4220
Ground Improvement Methods
3
* Prerequisite(s): CIVE 3210 and University Advanced Standing

Focuses on the analysis, design, and application principles of ground improvement methods to address soil and rock engineering problems. Includes compaction theory and methods, deep dynamic compaction, compaction by explosion, vibro-compaction, stone columns, in-situ control tests, dewatering, preloading, mechanically stabilized (reinforced) earth.

CIVE 4310
Storm Water Management
3
* Prerequisite(s): ME 3310 and University Advanced Standing

Applies fluid mechanics and hydrology principles to the analysis and design of storm water management facilities. Covers environmental issues related to storm water management. Includes a design component. Lab access fee of $45 applies.

CIVE 4320
Open Channel Flow
3
* 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. Lab access fee of $45 applies.

CIVE 4510
Civil Engineering Seminar
1
* 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. Lab access fee of $45 applies.

CIVE 4610
Water and Wastewater
3
* 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. Lab access fee of $45 applies.

CIVE 4810
Civil Engineering Capstone I
3
* 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. Lab access fee of $45 applies.

CIVE 481R
Internship
1 to 3
* 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.

CIVE 4820
Civil Engineering Capstone II
3
* 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. Lab access fee of $45 applies.

CIVE 490R
Advanced Current Topics in Civil Engineering
1 to 3
* 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. Lab access fee of $45 applies.