CIVIL AND COASTAL ENGINEERING

Course Search
Not all courses are offered every semester. Refer to the schedule of courses for each term’s specific offerings.

Courses

CCE 4015 Civil Engineering Estimating 3 Credits
Prereq: CCE 4204 and 3EG classification

CCE 4204 Construction Equipment, Methods and Management 3 Credits
Theory and practice of construction operations, equipment utilization and construction methods. Analysis of costs. Optimizing crew and equipment. Heavy equipment costs. New emphasis on planning and executing a construction project.
Prereq: junior or senior standing, or instructor permission
Coreq: CGN 4101

CCE 4811 Construction Engineering Design 3 Credits
Simulation of comprehensive construction project involving all phases of planning, scheduling and control from start to finish, which involves making major decisions. Oral presentation at the end of course.
Prereq: CCE 4204, CGN 4102 and CES 4034

CEG 4011 Soil Mechanics 4 Credits
Physical properties of soils, compaction, flow of water through soil, distribution of stress within soil and consolidation. Laboratory.
Prereq: EGM 3520

CEG 4012 Geotechnical Engineering 3 Credits
Subsurface exploration settlements analysis, slope stability, earth pressure and an introduction to foundation design.
Prereq: CEG 4011

CEG 4104 Retaining Wall and Embankment Design 3 Credits
The application of soil mechanics to the design and analysis of various types of retaining structures and earthen embankments.
Prereq: CEG 4012

CEG 4111 Foundation Engineering Design 3 Credits
Comprehensive design of geotechnical system, focusing on design of complete project and utilizing CAD programs. Designs, drawings and oral presentations through group effort.
Prereq: CEG 4012

CES 3102 Mechanics of Engineering Structures 4 Credits
Introduces structural load, equilibrium, shear and bending moment diagrams, structural analysis software, classical methods for displacement determination, method of consistent deformations, slope deflection method, moment distribution method.
Prereq: EGM 3520

CES 4141 Matrix Structural Analysis 3 Credits
Determining structural loads, solving matrix equations, direct stiffness method, formulation of element matrices, transformations, modeling realistic frame and truss systems, introduces the finite element method, determining convergence, interpretation of results, model validation.
Prereq: CES 3102 and CGN 3421; EG classification or instructor permission

CES 4605 Analysis and Design in Steel 3 Credits
Elastic and plastic theories of design, application of computer software. Design of members subjected to tension, compression, flexure and torsion. Design of connections and rigid frames.
Prereq: CES 3102 and CGN 3501; EG classification

CES 4608 Advanced Steel Design 3 Credits
Advanced topics in the design of steel structural building systems, advanced column and beam design, base plate design, moment amplification, second-order analysis, bracing considerations, beam-columns, interaction equations, connection design, composite design, plate girders.
Prereq: CES 4605 and EG classification

CES 4702 Analysis and Design in Reinforced Concrete 3 Credits
Ultimate strength analysis and design of reinforced beams and columns, working stress design for flexure, design of footings and retaining walls.
Prereq: CES 3102 and CGN 3501C; EG classification

CES 4704 Advanced Reinforced Concrete 3 Credits
Advanced topics in the design of concrete building systems. Long columns and frames, floor and roof systems, including two-way slabs, continuous beams, spandrel beams, torsion, foundations, introduces prestressed concrete.
Prereq: CES 4702 and EG classification

CGN 2002 Introduction to Civil Engineering 1 Credit
Introduces beginning students to the broad field of civil engineering.

CGN 2328 Technical Drawing and Visualization 3 Credits
Two- and three-dimensional graphical methods of visualizing and communicating features of projects for construction involving parcel boundaries, topography, drainage, site modeling, site development, structures, buildings and objects using both traditional and computer-aided drafting and design techniques.
Prereq: minimum 2EG classification

CGN 3421 Computer Methods in Civil Engineering 4 Credits
Computer programming, use of computers, numerical methods as applied to civil engineering problems, and civil engineering software.
Prereq: 3EG classification

CGN 3501C Civil Engineering Materials 4 Credits
Studies the principal materials used for engineering purposes with special attention to mechanical properties and their importance to the engineer. Hands-on experience in testing of civil engineering materials.
Coreq: EGM 3520

CGN 3510 Introduction to Sustainable Engineering 3 Credits
Overview of the principles of sustainability as they relate to civil and environmental engineering issues. Discussions and projects facilitate a basic understanding of the production-consumption model and life cycle assessment.
Prereq: EG standing
CGN 3710 Experimentation and Instrumentation in Civil Engineering 3 Credits
Fundamentals and applications of measuring systems commonly used in civil engineering. Topics include recording techniques, strain, force, displacement, flow, temperature, humidity and PH measurements.
Prereq: PHY 2049

CGN 4101 Civil Engineering Cost Analysis 3 Credits
Prereq: 3EG classification or instructor permission

CGN 4160 Civil Engineering Practice 4 Credits
Fundamentals of civil engineering professional practice: project management, construction delivery processes, business concepts, public policy, administration and leadership.
Prereq: EGM2511 or equivalent
Coreq: CGN 2328

CGN 4503 Pavement Design 3 Credits
Function and material requirements of different elements of flexible and rigid pavement systems; characterization of soils, materials, traffic loads, and environment for design; flexible and rigid pavement design; new developments.
Prereq: CGN 3501C

CGN 4600 Public Works Engineering and Management Practices 3 Credits
Public works profession, organization, administration and management of operating divisions with emphasis on role of engineer.

CGN 4806 Transportation-Water-Materials Design 3 Credits
Simulation of a design project experience through the completion and presentation of a comprehensive roadway project design. Students work in multi-disciplinary groups to complete a system design that includes traffic, materials, hydrologic and geotechnical considerations.
Prereq: senior standing

CGN 4905 Special Problems in Civil Engineering 1-4 Credits
Selected problems or projects in the student’s major field of engineering study.
Prereq: undergraduate coordinator permission

CGN 4910 Structures-Geotechnical-Construction Comprehensive System Design 3 Credits
Simulation of a design office experience through the completion and presentation of a comprehensive building design. Students work in multi-disciplinary groups to complete a system design that includes structural, geotechnical and construction management considerations.
Prereq: instructor permission

CGN 4949 Co-op Work Experience 1 Credit
Co-op work experience in a related field. (S-U)
Prereq: EG classification

CWR 3201 Hydrodynamics 4 Credits
Classification and properties of fluids, hydrostatics, and conservation of mass, momentum and energy in fluid flow. Potential flow, similitude and physical modeling. Laminar and turbulent pipe flow. Introduces turbomachines.
Prereq: EGM 3400 and MAP 2302

CWR 4114 Surface Hydrology 3 Credits
Occurrence and distribution of water by natural processes, including atmospheric thermodynamics, precipitation, runoff, infiltration, water losses, flood routing and catchment characteristics, analysis and methods of runoff prediction.
Prereq: CWR 4202

CWR 4120 Groundwater 3 Credits
Introduces groundwater hydraulics, including hydrologic cycle, Darcy’s equation, Dupuit assumption, well hydraulics, regional flow, freshwater-saltwater interface, flow in the unsaturated zone, fate and transport of contaminants and contaminant plume model.
Prereq: CWR 4202

CWR 4202 Hydraulics 3 Credits
Fundamental equations for pipe and open conduit flow. Development of design oriented formulas for pipes and open channels. Introduces hydrology.
Prereq: CWR 3201 or instructor permission

CWR 4306 Urban Stormwater Systems Design 3 Credits
Surface-water system design including: time of concentration, peak runoff rate, open-channel flow, gravity storm sewer, culvert, stormwater pumping, filtration systems, hydrograph generation, flood routing, site layout, site grading and permitting.
Coreq: CWR 4202

CWR 4542 Water Resources Engineering 3 Credits
Study of water resources engineering applications including hydrology and statistics, groundwater, hydraulic machinery, dams and reservoirs, water quality, water quality modeling, water and waste-water treatment and water law and institutions.
Prereq: CWR 4202

EGN 4912 Engineering Directed Independent Research 3 Credits
Provides firsthand, supervised research with a faculty advisor or postdoctoral or graduate student mentor. Projects may involve inquiry, design, investigation, scholarship, discovery or application. (S-U)

EGS 1005 Prep for Success 1-4 Credits
Freshman success course that includes academic preparation in calculus, chemistry, student success and technical communications. (S-U)
Prereq: EG student

ENV 4514C Water and Wastewater Treatment 3 Credits
Design of water and wastewater treatment units.

CWR 4114 Surface Hydrology 3 Credits
Occurrence and distribution of water by natural processes, including atmospheric thermodynamics, precipitation, runoff, infiltration, water losses, flood routing and catchment characteristics, analysis and methods of runoff prediction.
Prereq: CWR 4202

CWR 4120 Groundwater 3 Credits
Introduces groundwater hydraulics, including hydrologic cycle, Darcy’s equation, Dupuit assumption, well hydraulics, regional flow, freshwater-saltwater interface, flow in the unsaturated zone, fate and transport of contaminants and contaminant plume model.
Prereq: CWR 4202

CWR 4202 Hydraulics 3 Credits
Fundamental equations for pipe and open conduit flow. Development of design oriented formulas for pipes and open channels. Introduces hydrology.
Prereq: CWR 3201 or instructor permission

CWR 4306 Urban Stormwater Systems Design 3 Credits
Surface-water system design including: time of concentration, peak runoff rate, open-channel flow, gravity storm sewer, culvert, stormwater pumping, filtration systems, hydrograph generation, flood routing, site layout, site grading and permitting.
Coreq: CWR 4202

CWR 4542 Water Resources Engineering 3 Credits
Study of water resources engineering applications including hydrology and statistics, groundwater, hydraulic machinery, dams and reservoirs, water quality, water quality modeling, water and waste-water treatment and water law and institutions.
Prereq: CWR 4202

EGN 4912 Engineering Directed Independent Research 3 Credits
Provides firsthand, supervised research with a faculty advisor or postdoctoral or graduate student mentor. Projects may involve inquiry, design, investigation, scholarship, discovery or application. (S-U)

EGS 1005 Prep for Success 1-4 Credits
Freshman success course that includes academic preparation in calculus, chemistry, student success and technical communications. (S-U)
Prereq: EG student

ENV 4514C Water and Wastewater Treatment 3 Credits
Design of water and wastewater treatment units.

OCE 3016 Introduction to Coastal and Oceanographic Engineering 3 Credits
Introduces important coastal and oceanographic processes. Geophysical fluid motions; waves and tides; air-sea interaction; pollutant transport; coastal hydraulic and sedimentary processes. Not intended for engineering majors.

TTE 4004C Transportation Engineering 4 Credits
Overview of the significance of highway transportation to the social and economic underpinnings of society. Introduces road vehicle performance, geometric design of highways, traffic flow and queuing theory, highway capacity and level of service analysis, traffic control and analysis at signalized intersections, and travel demand and traffic forecasting.
Prereq: 3EG classification

TTE 4106 Urban Transportation Planning 3 Credits
Overview of the four-step urban transportation planning process; includes analytical techniques for estimating future travel demand and state-of-the-art approaches.
Prereq: TTE 4004C
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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
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<tr>
<td>TTE 4201</td>
<td>Traffic Engineering</td>
<td>3</td>
<td>General review of the fundamentals of traffic engineering with emphasis on field studies and data analysis.</td>
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<tr>
<td>TTE 4203</td>
<td>Highway Capacity Analysis</td>
<td>3</td>
<td>Provide students with detailed instruction on the procedures defined within the 2010 Highway Capacity Manual (HCM), including analytical chapters for uninterrupted and interrupted flow.</td>
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<tr>
<td>TTE 4300</td>
<td>Transportation Systems Analysis</td>
<td>3</td>
<td>Systems analysis in transportation planning and engineering, including supply, demand, equilibrium, evaluation and decision analysis.</td>
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<tr>
<td>TTE 4824</td>
<td>Transportation Facility Design</td>
<td>3</td>
<td>Simulates a comprehensive design of a transportation facility, specifically an arterial-freeway interchange. Utilizes state and national-level design manuals in preparation of standard plans. Applies the theoretical background gained in supporting classes, in areas such as traffic analysis, roadway design, roadway drainage and pavement design. Some review of this material is provided, as well as introduction of several new concepts. Emphasizes teamwork skills and technical communication skills.</td>
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**Prereq:** TTE 4004C