

CIVIL AND ENVIRONMENTAL ENGR (CIVILENG)

CIVILENG 2000 Introduction to Infrastructure 3 Credits

An introduction to the civil infrastructure; social, political, historical, sustainability, and planning implications of infrastructure; introduction to each of the subdiscipline areas of civil and environmental engineering (transportation, environmental, construction, structural, and geotechnical); professional skills (e.g. report writing, oral communication, teamwork).

Components: Class

Prereqs/Coreqs: P. GENENG 1320 or consent of Department Chair

CIVILENG 2220 Civil and Environmental Engineering Computer Applications 2 Credits

Engineering problem solving using spreadsheets, MathCAD, and AutoCAD Civil 3D. Spreadsheet and MathCAD applications include graphing, curve fitting, interpolation, modeling, solving linear and non-linear equations, matrix methods, simultaneous equations, etc. Civil 3D applications include creation of topographic maps and determination of earthwork volumes.

Components: Class

Prereqs/Coreqs: P. (MATH 2640 or GENENG 1500) and GENENG 1320

CIVILENG 2630 Elements of Surveying 3 Credits

General use and care of surveying instruments; elevation determination, horizontal positioning; coordinate systems, topographic and construction surveys, introduction to boundary surveys, horizontal and vertical curves.

Components: Laboratory, Class

Prereqs/Coreqs: P. GENENG 1320 or INDUSTDY 1230; C: MATH 2530 or MATH 2450

CIVILENG 3020 Construction Engineering 3 Credits

Contracts, specifications, legal aspects and associated liabilities of construction documents, site management and planning, introduction to project scheduling and cost estimating, CPM, earthwork calculations and cross sections.

Components: Laboratory, Class

Prereqs/Coreqs: P. a "C-" or better in CIVILENG 2000, CIVILENG 2220, and CIVILENG 2630 or COMPUTER 1830

CIVILENG 3030 Construction Materials 3 Credits

Fundamentals of engineering materials; analysis of aggregate and blending techniques; influences of aggregate mineralogy; analytical instrumentation and testing; introduction to portland cement chemistry; theory and design of portland cement concrete mixtures; bituminous materials and mixes; influences of mix properties on pavement durability. Construction material design projects.

Components: Laboratory, Class

Prereqs/Coreqs: P. a "C-" or better in CIVILENG 2000, CIVILENG 2220, CIVILENG 2630 and GENENG 2340

CIVILENG 3140 Introduction to Structural Engineering 4 Credits

Introduction to code-based structural building design including building loads; load paths through buildings; design of floor beams made of wood, steel, or reinforced concrete; design of main wind force resisting systems including braced steel frames; and wood studs exposed to axial load and bending. Broader building design considerations including sustainability, risk, and constructibility are also introduced.

Components: Laboratory, Class

Prereqs/Coreqs: P. a C- or better in CIVILENG 2000, CIVILENG 2220, and CIVILENG 2630, and GENENG 2340 and MATH 2740

CIVILENG 3300 Fluid Mechanics 4 Credits

Fluid properties; statics; ideal and real fluid flow, energy, continuity and momentum equations, laminar and turbulent flow in closed conduits, free surface flow.

Components: Laboratory, Class

Prereqs/Coreqs: P. a "C-" or better in CIVILENG 2000, CIVILENG 2220 and CIVILENG 2630 and GENENG 2130 and MATH 2740

CIVILENG 3400 Field Methods in Agricultural Hydrology 1 Credit

Exploration of the water budget as it pertains to agro-ecosystems. Field explorations and in-class analysis of rainfall rates, evaporation, transpiration, infiltration, groundwater flow, groundwater quality, stream velocity and flowrate, edge-of-field runoff quantity and quality.

Components: Class, Laboratory

Cross Offering: AGRIC 3400

Prereqs/Coreqs: P. a "C-" or better in CIVILENG 2220 or COMPUTER 1830 or consent of instructor

CIVILENG 3410 Agro-Ecosystem Research 1-3 Credits

Training in research methods, use of scientific literature and evaluation of data; results presented in a written report and oral presentation.

Components: Class, Laboratory

Cross Offering: AGRIC 3410

CIVILENG 3530 Transportation Engineering 3 Credits

Introductory overview of transportation systems with emphasis on the highway mode of transportation. Topics include fundamentals of transportation economics, land-use and transportation interaction, elements of transportation planning, traffic operations, concepts of highway locations, and geometric design.

Components: Class

Prereqs/Coreqs: P. a "C-" or better in CIVILENG 2000, CIVILENG 2220, and CIVILENG 2630

CIVILENG 3740 Geotechnical Engineering I 4 Credits

Introduction to Geotechnical Engineering, a discipline that includes the study of Soil Mechanics and Foundation Engineering. Soil Mechanics topics of study include: exploration and classification of soils; index properties of soils; soil compaction; effective stress; stresses in soils; shear strength; flow of water in soils; compressibility of soils; lateral earth pressures; and geosynthetics. Foundation Engineering topics of study, which are the areas of expertise in the professional practice of Geotechnical Engineering, include introductions to: foundations and bearing capacity; stability of natural and constructed slopes; retaining walls; and case histories in Geotechnical Engineering. The laboratory component will expose the students to laboratory testing of soils performed as part of the professional practice of Geotechnical Engineering.

Components: Laboratory, Class

Prereqs/Coreqs: P. C- or better in GENENG 2340, CIVILENG 2000, CIVILENG 2220, and CIVILENG 2630

CIVILENG 3830 Leadership Competencies for Early-Career Engineers 2 Credits

Introduction to leadership competencies. Behaviors and traits of "rising star" engineers; Personal Leadership Portfolio; goal setting; personality types; inter-generational communication; conflict management; 360 review; "crucial" conversations; body language; emotional intelligence.

Components: Class

Prereqs/Coreqs: P. ENGLISH 1230

CIVILENG 3950 Civil Engineering Cooperative Education 2 Credits

Work experience in industry under the direction of the College of Engineering, Mathematics and Science Cooperative Education and Internship Program. During co-op the student is expected to be away from his/her studies at UW-Platteville and work for an industry for a semester and summer.

Components: Field Studies

CIVILENG 3970 Civil and Environmental Engineering Internship 1 Credit

Work experience in industry under the direction of the College of Engineering, Mathematics and Science Cooperative Education and Internship Program. NOTE: This program is separate and distinct from the cooperative education program and is principally designed to cover the summer work experience. Internship is designed to provide experiential learning experience to the student during the summer period. Credits do not fulfill graduation requirements.

Components: Field Studies

CIVILENG 4020 Construction Estimates and Costs 3 Credits

Methods of estimating, extending and pricing; use of blue prints, specifications and commercial cost sheets to bid a complete project; scheduling and pricing of labor.

Components: Laboratory, Class

Prereqs/Coreqs: P. a "C-" or better in CIVILENG 3020 or INDUSTDY 2540

CIVILENG 4030 Construction Equipment 2 Credits

Excavation methods and equipment; equipments costs; engineering fundamentals; analysis and design of equipment systems; drilling and blasting; material production and safety as they pertain to both heavy construction and surface mining methods.

Components: Class

Prereqs/Coreqs: P. a "C-" or better in CIVILENG 3020 or INDUSTDY 2540

CIVILENG 4040 Construction and Professional Management 3 Credits

Construction management decision making; engineering economic comparisons, scheduling, bidding techniques, introduction to labor agreements, safety and QA/QC.

Components: Class

Prereqs/Coreqs: P. a "C-" or better in CIVILENG 3020 or INDUSTDY 2540; C: MATH 4030

CIVILENG 4110 Intermediate Structural Engineering 3 Credits

A technical elective on classical structural analysis methods including virtual work, influence lines, and force-based and displacement-based methods of statically indeterminate analysis. Introduction to the stiffness method and background of structural analysis software. Introduction to use of structural analysis software. Introduction to bridge design with emphasis on vehicle loads and requirements of the Wisconsin Department of Transportation Bridge Manual.

Components: Class

Prereqs/Coreqs: P. CIVILENG 3140 with a C or better

CIVILENG 4150 Reinforced Concrete Structures 3 Credits

A technical elective on design of reinforced concrete structures. Code-based design of a variety of common reinforced concrete elements including: beams, one-way slabs, non-slender columns, retaining walls, spread footings, and slabs-on-ground. Course concepts include (but are not limited to) design for strength and serviceability, shear and moment behavior of non-rectangular cross-sections and cross-sections with compression steel, interaction curves for members with axial load and moment, maximum and minimum limits for reinforcement, anchorage of reinforcement, detailing of reinforcement, and incorporation of holistic design considerations such as sustainability, aesthetics, economy, and constructability.

Components: Class

Prereqs/Coreqs: P. a 'C' or better in CIVILENG 3140

CIVILENG 4160 Foundation Design 3 Credits

Design of shallow foundations (such as concrete footings) and deep foundations (such as pile foundations and drilled shafts) considering bearing capacity, settlement, and constructability. Subsurface exploration planning and determination of appropriate soil properties. Introduction to ground improvement methods (such as micropiles, vibro-compaction, dynamic compaction, vertical drains, stone columns, deep soil mixing.)

Components: Class

Prereqs/Coreqs: P. a "C" or better in CIVILENG 3740 and a "C-" or better in CIVILENG 3140

CIVILENG 4230 Steel Design 3 Credits

A technical elective on design of steel structures. Code-based design of a variety of common steel elements including metal decking sheets, joists, beams, columns, and bracings. Course concepts include (but are not limited to) design for strength and serviceability of moment and braced frames, beam-column design, bolted and welded connections (pinned and rigid), base plate, and incorporation of holistic design considerations such as sustainability, aesthetics, economy, and constructability.

Components: Discussion, Laboratory, Class

Prereqs/Coreqs: P. a "C" or better in CIVILENG 3140

CIVILENG 4250 Wood Structures 3 Credits

A technical elective course on design of wood structures, Code-based design of a variety of common wood elements including: wood connectors; sawn and glulam beams, columns and beam columns; plywood; and wood diaphragms and shear walls. Course concepts include (but are not limited to) anisotropic properties of wood; seismic design; and incorporation of holistic design considerations such as sustainability, aesthetics, economy, and constructability.

Components: Class

Prereqs/Coreqs: P. a "C" or better in CIVILENG 3140

CIVILENG 4500 Highway Engineering 3 Credits

Comprehensive design of contemporary highway projects. Emphasis on improving utilization of existing facilities and creating efficient new facilities through transportation system management techniques. Consideration of geometric and intersection design and standards; roadside design; earthwork computations; design of parking facilities; environmental, mobility and community impacts as measures of effectiveness.

Components: Class

Prereqs/Coreqs: P. a "C" or better in CIVILENG 3530

CIVILENG 4520 Pavement Design and Analysis 3 Credits

Design methodologies for highway pavement structures; theoretical and applied aspects of flexible and rigid pavement design; soil conditions, base, subbase and pavement materials; frost action; economic considerations.

Components: Laboratory, Class

Prereqs/Coreqs: P. a "C" or better in CIVILENG 3530 and a "C-" or better in CIVILENG 3030 and CIVILENG 3740

CIVILENG 4550 Traffic Engineering 3 Credits

Elements of traffic engineering including road user, vehicle and roadway system; traffic flow theory; traffic studies and data collection; traffic control devices; principles of intersection signalization; capacity and level of service analysis for freeways, rural highways and intersections using state-of-the-art software for traffic operations and management.

Components: Class

Prereqs/Coreqs: P. a "C" or better in CIVILENG 3530; C: MATH 4030

CIVILENG 4560 Pavement Maintenance and Rehab 2 Credits

Evaluation of pavement distresses and the maintenance techniques used for their repair. Survey and evaluation methods, maintenance equipment and procedures, rehabilitation techniques, and identification of the most cost-effective option. Maintenance management software will be used to evaluate options. Guest speakers will be used for selected topics.

Components: Class

Prereqs/Coreqs: P. a "C" or better in CIVILENG 3530 and a "C-" or better in CIVILENG 3030

CIVILENG 4630 Geographic Information Systems 3 Credits

Basic GIS concepts in cartography and digital mapping, geodetic datums and control, map projections and coordinates, databases, topology, spatial queries/analysis, digital orthophotography, digital elevation models, and applications. Use of state-of-the-art software and World Wide Web components for GIS.

Components: Laboratory, Class

Prereqs/Coreqs: P. a "C-" or better in CIVILENG 2000 and CIVILENG 2220 and CIVILENG 2630

CIVILENG 4640 Site Design and Stormwater Management 3 Credits

Comparison of conventional to low-impact sustainable land development practices in terms of technical (e.g. stormwater quantity and quality, erosion control, transportation), economic, and social aspects. Skills gained include site design software, WINSLAMM, and oral and written communication.

Components: Class

Prereqs/Coreqs: P. 'C-' or better in both ENVENG 3340 and CIVILENG 3300

CIVILENG 4680 Cycling Infrastructure in the Netherlands 3 Credits

This 16 day bicycling International Short Term Study Abroad course is designed for civil and environmental engineering students interested in experiencing and dissecting the components of the world famous Netherlands cycling infrastructure. It will provide the opportunity for students to develop their bicycle design capabilities for creating safe and efficient cycling infrastructure. Details include investigation of the physical infrastructure as well as the historical, social, cultural, policy, economic, travel behavior, inter-modal connections, as well as the health and environmental impacts that allow the bicycle to be essential part of Dutch living. Additionally, students will interact daily with Windesheim University of Applied Sciences (partner international institution to UW-Platteville) mobility and traffic engineering faculty and students. Students will work in multi-disciplinary teams with on-site visits, group discussions, projects, and social encounters. These teams will complete a service learning project for an international partner.

Components: Field Studies

GE: International Education

Prereqs/Coreqs: P. CIVILENG 2000, sophomore standing and 2.5 cumulative gpa or consent of the instructor

CIVILENG 4730 Geotechnical Engineering II 3 Credits

Soil strength; water in soil; slope stability; lateral earth pressures; retaining walls; geosynthetics and their applications; case studies and contemporary topics.

Components: Class

Prereqs/Coreqs: P. a "C" or better in CIVILENG 3740, and C: (GEOLOGY 3130 or GEOLOGY 1140)

CIVILENG 4930 Civil and Environmental Engineering Design Project 3 Credits

Open-ended comprehensive design in student's area of specialization. Discussion and experience in project management, work as a team, written reports and presentations, computer aided design and ethics.

Components: Laboratory, Class

Prereqs/Coreqs: P. Civil Eng major and "C-" or better in at least six of (CIVILENG 3020, CIVILENG 3030, CIVILENG 3140, CIVILENG 3300, CIVILENG 3530, CIVILENG 3740 and ENVENG 3340), or Env Eng major and "C-" or better in CIVILENG 3300, CIVILENG 3740 and ENVENG 3340

CIVILENG 4940 Undergraduate Research 1-3 Credits

Introduction to research methods in civil engineering, literature review, data analysis, and design. A written report will be submitted to the sponsoring faculty member.

Components: Research

Prereqs/Coreqs: P. CIVILENG 2000 and permission of department chair

CIVILENG 4980 Current Topics in Engineering 1-4 Credits

In-depth study of a current topic of interest to the engineering profession. The topic to be covered will be identified in the course title.

Components: Class

CIVILENG 4990 Independent Study 1-3 Credits

Advanced study in area of specialization selected by student and approved by faculty member.

Components: Independent Study