

Civil Engineering

Courses

CENG 1204 Civil Engineering 3D Design (Lab): 2 semester hours

Prerequisite: MATH 1030 or equivalent. This course is an introduction to computer-aided drafting using CAD software and sketching to generate two- and three-dimensional drawings and Civil 3D based on the conventions of engineering graphical communication; topics include spatial relationships, multi-view projections and sectioning, dimension, graphical presentation of data, and fundamentals of computer graphics.

CENG 2010 Surveying and GIS: 3 semester hours

Prerequisite: MATH 1800. This course introduces basic surveying measurements and computations for engineering project control, mapping, and construction layout; area computation; earthwork volume computation and balancing. Additionally, it will introduce coordinate geometry (COGO) design software including terrain and design surface modeling, surveying errors and leveling. It will cover methods and tools used for construction layout, as-built surveys, and industrial measurements. The course includes formal field work, data collection, and analysis. Two hours of lecture and two hours of labs per week.

CENG 3310 Environmental Engineering: 3 semester hours

Prerequisite(s): CHEM 1134 and MATH 1800. This course is an introduction to water pollution, air pollution, hazardous and solid waste, and their control. It will cover environmental impact statements and global pollution issues. This course requires formal laboratory experiments such as water quality testing and standards, and field trips. Two hours of lecture and two hours of labs per week.

CENG 3320 Construction Engineering Management: 3 semester hours

Prerequisite(s): MATH 1900, PHYSICS 2111/PHYSICS 2111L. This course is an introduction project administration, construction operations and methods, elements and properties of construction materials and components, project controls, construction estimating and interpretation of engineering drawings.

CENG 3321 Civil Engineering Materials Testing: 3 semester hours

Prerequisite(s): CHEM 1134 and CENG 2332. This is a material science course devoted to materials typically used in Civil Engineering design and construction. The course will cover mix design of concrete and asphalt, test methods and specifications of metals, concrete, aggregates, asphalt, and wood, physical and mechanical properties of metals, concrete, aggregates, asphalt, and wood. An integral part of the course is formal laboratory experiments to implement, analyze, and report laboratory results and field tests in accordance with industry standards. Two hours of lecture and two hours of labs per week.

CENG 3330 Transportation Engineering: 3 semester hours

Prerequisite(s): CENG 1024, CENG 2010, and MATH 1320. This course is an introduction to geometric and pavement system design, traffic capacity and flow theory, traffic control devices, techniques of transportation system planning, design, and operation.

CENG 3350 Structural Analysis: 3 semester hours

Prerequisite(s): ENGR 2310 and ENGR 2332. This course is an introduction to the analysis and deflection of statically determinant beams, columns, trusses, and frames. It will cover column analysis, structural determinacy and stability analysis of beams, trusses, and frames. Furthermore, it will introduce elementary statically indeterminate structures, loads, load combinations, and load paths, design of steel components, and design of reinforced concrete components.

CENG 3360 Fundamentals of Geotechnical Engineering: 3 semester hours

Prerequisite(s): MATH 1900, PHYSICS 2111/PHYSICS 2111L, ENGR 2332, and CENG 3370 (taken concurrently). This course is an introduction to the nature and origin of soils and rocks, engineering significance of geologic landforms and soil deposits, identification and engineering classification of soils, engineering behavior and properties of soils, and phase relations. It involves laboratory and field tests, effective stress, stability of retaining structures, and shear strength. It will cover bearing capacity, foundation type, consolidation and differential settlement, slope stability and soil stabilization. The formal laboratory experiments include implementation, analysis, and reports on the laboratory and field test in accordance with industry standards. Two hours of lecture and two hours of labs per week.

CENG 3370 Introduction to Fluid Mechanics: 3 semester hours

Prerequisite(s): MATH 2020, ENGR 2310, ENGR 2332 and concurrent enrollment in CENG 3360. An introduction to the basic concepts of fluid mechanics including the fundamental properties of fluids, fluid statics, kinematics of fluid motion, and similitude. The conservation of mass, energy, and momentum are introduced with applications to compressible and incompressible fluids. Laminar and turbulent boundary layers are introduced.

CENG 3380 Water Resource Engineering: 3 semester hours

Prerequisite(s): CENG 3370 and MATH 1320. This course is an introduction to the fundamental design principles and practice of water and wastewater treatment systems. The major topics include design and construction process, preliminary treatment, primary treatment, microbiology, secondary treatment, nitrogen removal, phosphorus removal, attached microbial growth, secondary settling, disinfection and post-aeration, tertiary treatment, and plant residuals management.

CENG 4000 Special Topics in Civil Engineering: 3 semester hours

Prerequisite(s): Consent of instructor. This course covers a special topic in civil engineering to be determined by recent developments in the field. May be repeated for credit provided the subject is different.

CENG 4330 Structural Design: 3 semester hours

Prerequisite(s): CENG 3350 and CENG 3321. This course introduces the determination of deflections by the method of virtual work, analysis of trusses, continuous beams, and frames by direct stiffness method, and approximate methods of analysis. It covers the design and behavior of reinforced concrete beams, one-way slabs, and columns.

CENG 4360 Roadway and Pavement Design: 3 semester hours

Prerequisite(s): CENG 3321, CENG 3350, CENG 3360. This course is an introduction to the design of highway and airport pavement systems, subgrades, subbases and bases, soil stabilization, flexible and rigid pavements; cost analysis and pavement selection; quality control; drainage; earthwork; pavement evaluation and maintenance.

CENG 4390 Advanced Geotechnical Engineering: 3 semester hours

Prerequisite(s): CENG 3360. This course covers the engineering response to loading, soil properties, earth pressures, shear strength, soil compaction and fabric, permeability, and consolidation and settlement analysis.

CENG 4980 Civil Engineering Senior Design I: 2 semester hours

Prerequisite(s): Senior standing. This course is the first of two-semester sequence course on capstone civil engineering design. It involves planning, designing, and analysis of a civil engineering project. It involves an integrated and realistic group project civil engineering profession. Realistic constraints, standards and codes, global impact will be applied in the design.

CENG 4990 Civil Engineering Senior Design II: 2 semester hours

Prerequisite(s): CENG 4980 and senior standing. This course is the second of two-semester sequence course on civil engineering capstone. Students will perform technical analysis and initial testing on the concepts developed in Senior Design I. Students are expected to develop a prototype for evaluating their design specifications, deliver formal presentation as well as a written report.