

## **Civil Engineering Major Course Descriptions for information purposes only- Not an Official Copy. Please see university Catalog**

**CVEG 1011. Introduction to Engineering, Computer Science and Technology.**(1-0) Credit 1 semester hour. Introduction to basic engineering, computer science and technology concepts. Students will become aware of the various disciplines of engineering, computer science and technology, ethical and professional responsibilities in these fields, creativity and design. Co-requisite: CVEG 1021.

**CVEG 1021. Introduction to Civil Engineering Lab.** (0-3) Credit 1 semester hour. Introduction to civil and environmental engineering issues and concerns. Students will become familiar with the many sub-fields of the Civil and Environmental Engineering profession; ethical responsibilities; and concepts of design. Co-requisite: CVEG 1011 or equivalent course determined by department.

**CVEG 2001. Emerging Issues in Civil Engineering.** (0-2) Credit 1 semester hour. An overview of emerging issues and state-of-the-art technologies embraced by the Civil Engineering profession. The course will emphasize basic concepts in management, entrepreneurship, public policy, leadership, teamwork and team building, oral and written communication and the presentation of appropriate engineering design documentation. Prerequisites: CVEG 1011 and CVEG 1021 or approval of Department Head.

**CVEG 2043. Engineering Mechanics I.** (3-0) Credit 3 semester hours. Fundamental concepts and principles; vector algebra and applications; equilibrium of particles and rigid bodies in two and three dimensions, moments and couples; distributed forces, centroids, moments of inertia, friction, introduction to analysis of structures. Prerequisite: PHYS 2513.

**CVEG 2053. Engineering Mechanics II.** (3-0) Credit 3 semester hours. Kinematics and kinetics of particles and of rigid bodies as applied to engineering problems; Newton's laws of motion; work and energy; impulse and momentum; translations; rotation; plane motion; motion about a point; general motions; and periodic motions. Prerequisite: CVEG 2043.

**CVEG 2063. Mechanics of Materials.** (3-0) Credit 3 semester hours. Mechanical behavior of engineering materials, plane stress, plane strain, stress-strain relationship, shear and moment, torsion, flexural, column and combined loadings. Introduction to deflections; concepts of stresses at a point; stresses in pressured containers; and theories of failures and thermal stresses. Prerequisites: CVEG 2043 or CVEG 2454 and MATH 2024.

**CVEG 2454. Statics and Dynamics.** (4-0) Credit 4 semester hours. Fundamental concepts; equilibrium of particles and rigid bodies; centroids; moments of inertia; friction; introduction to analysis of structures. Kinematics and Kinetics of particles and of rigid bodies; equations of motion; work and energy; impulse and momentum. Prerequisite: PHYS 2513.

**CVEG 3023. Geotechnical Engineering.** (2-3) Credit 3 semester hours. Physical and mechanical properties of soil; moisture and its movement in soil; moisture density relationships; soil classification; settlement; consolidation; permeability; testing of soil physical and mechanical properties; and laboratory sessions. Prerequisites: CVEG 2001, CVEG 2063, ENGL 1043 or ENGL 1033, PHYS 2511, PHYS 2521 and COMM 1003.

**CVEG 3031. Construction Materials Laboratory.** (0-3) Credit 1 semester hour. Determination of mechanical properties of several engineering materials, including iron-carbon alloys, aluminum alloys, cement, concrete and its ingredients, wood, and composite materials, standards methods of testing and procedures; instrumentation and interpretation of results; and presentation of results in reports and report writing. Prerequisites: CVEG 2063, ENGL 1043 or ENGL 1033, PHYS 2511, PHYS 2521 and COMM 1003.

**CVEG 3043. Environmental Engineering.** (2-3) Credit 3 semester hours. Review of environmental chemistry and biology, introduction to environmental science and engineering, material balance, reaction kinetics, reactor design, introduction to solid and hazardous waste, water and wastewater quality characteristics, laboratory analysis of water and wastewater samples. Prerequisites: CHEM 1021, CHEM 1034 and MCEG 2013

**CVEG 3053. Transportation Engineering.** (2-3) Credit 3 semester hours. Theory and practices of plane, route, boundary, and topographic surveying with basic concepts in transportation engineering. Topics include site planning and design of air, surface, and water transportation facilities; an introduction into the major aspects of regulatory requirements and other issues; and laboratory sessions in the areas of operations and planning. Prerequisites: CHEG 2003, CVEG 2001 and MATH 2043.

**CVEG 3063. Hydraulics.** (2-3) Credit 3 semester hours. Fluid statics; pressure on submerged bodies; continuity equation; Bernoulli equation; principles of momentum and energy; fundamentals of hydraulic modeling; open channel flow; pressure conduit flow; flow measurement; laboratory sessions on selected topics. Prerequisites: CVEG 2053, CVEG 2063, ENGL 1043 or ENGL 1033, MATH 2043 and COMM 1003.

**CVEG 3073. Structural Analysis.** (3-0) Credit 3 semester hours. Analysis of determinate structures; reactions, member forces of trusses, shears and bending moments of beams and frames; influence lines; moving loads; deflections; analysis of indeterminate structures by approximate method and energy method; computer application. Prerequisite: CVEG 2063.

**CVEG 3083. Steel Design.** (2-3) Credit 3 semester hours. Analysis and design of tension and compression members, rolled steel beams, plate girders, riveted, welded and pinned joints; and an introduction to design trusses and multistory frames. Prerequisite: CVEG 3073.

**CVEG 3156. Civil Engineering Internship I.** (0-0) Credit 6 semester hours. An internship program of work experience with an approved engineering oriented firm, agency or consulting firm or engineering public service agency serving the civil engineering profession. A comprehensive written report of the work-learning experience is required. Prerequisite: Approval of Department Head.

**CVEG 4013. Reinforced Concrete.** (3-0) Credit 3 semester hours. Properties of concrete and reinforcement; design methods; codes; load; flexure, shear, bonds, and deflections; analysis and design of beams and columns; introduction to design of footings, slabs, and retaining walls; and introduction to computer-aided design. Prerequisites: CVEG 3031 and CVEG 3073

**CVEG 4043. Environmental Engineering Design.** (3-0) Credit 3 semester hours. Synthesis of environmental engineering fundamentals into an integrated system design which includes the design of physical, chemical, and biological unit operations and processes in water and wastewater treatment. Prerequisite: CVEG 3043.

**CVEG 4053. Transportation Engineering Design.** (3-0) Credit 3 semester hours. Introduction of the transportation design process through a series of comprehensive transportation design projects. Emphasis is placed on the utilization of existing facilities and creation of efficient new facilities through transportation systems management techniques. Energy, environment, mobility and community impacts are considered as measures of effectiveness in the design process. Prerequisite: CVEG 3053.

**CVEG 4063. Water Resources Engineering.** (3-0) Credit 3 semester hours. Control and utilization of water; flood control; water distribution systems; open channel flows; and hydraulic structures. Prerequisite: CVEG 3063 or Equivalent.

**CVEG 4093. Systems Engineering.** (3-0) Credit 3 semester hours. Introduction to systems analysis and design; problem modeling; optimization; linear programming; dynamic programming; network analysis; critical path; economic analysis; and decision theory. Prerequisites: CHEG 2003 and MATH 3685.

**CVEG 4103. Special Topics.** (3-0) Credit 3 semester hours. Selected current and emerging topics in Civil Engineering depending on need determined by the department. Prerequisites: Senior Standing and Approval of Department Head.

**CVEG 4113. Energy and Environment.** (3-0) Credit 3 semester hours. Introduction to climate and climate change, the carbon cycle, air and water pollution from energy systems, impacts and implications of energy use for human health, current energy and energy-related environmental policies to foster the development of sustainable energy technologies, fuels, and practices, energy alternatives for the future and their impact on the local and global environment. Prerequisite: CHEG 3113.

**CVEG 4123. Hydrology.** (3-0) Credit 3 semester hours. Hydrologic cycle; precipitation; run-off; infiltration; hydrological analysis; unit hydrograph; statistical methods; surface and ground water; flood forecasting; flood routing; flood control; and computer applications. Prerequisite: CVEG 3063 or Equivalent.

**CVEG 4143. Engineering Construction.** (3-0) Credit 3 semester hours. Modern construction methods; history, organization management, planning, and machinery; importance of working drawings programming and economy of good planning; and importance of inspection and checks, including visits to worksites and reports on such visits. Prerequisite: CVEG 3031 or Equivalent.

**CVEG 4156. Civil Engineering Internship II.** (0-0) Credit 6 semester hours. An internship program of advanced work experience with an approved engineering oriented firm, agency, or consulting firm, or engineering public service agency providing practical work experience of the profession on the job. A comprehensive written report of the work-learning experience is required. Prerequisite: Approval of Department Head.

**CVEG 4223. Waste Management.** (3-0) Credit 3 semester hours. Evolution, legislative trends and regulations for solid and hazardous waste management; sources, characteristics and engineering principles of solid and hazardous waste; and treatment and disposal methods for solid and hazardous wastes. Prerequisite: CVEG 3043.

**CVEG 4233. Water Quality Modeling.** (3-0) Credit 3 semester hours. Water quality overview; movement of contaminants in the environment; contaminant interactions with soil, air, and water; and mathematical models to describe the movement of contaminants in various bodies of water including rivers, lakes, oceans and groundwater. Prerequisite: CVEG 3043.

**CVEG 4243. Fundamentals of Air Pollution and Control.** (3-0) Credit 3 semester hours. Fundamentals of air pollution; regulatory aspects; effects and sources of air pollution; atmospheric physics and chemistry; simple air quality models; and basics of air pollution control. Prerequisite: CVEG 3043.

**CVEG 4473. Senior Design and Professionalism I.** (1-4) Credit 3 semester hours. This is the first course of a two-semester capstone experience (CVEG 4483 must immediately follow 4473 or sequence must restart with 4473) involving engineering design of an industrial or advanced team project. Elements of ethics and professionalism in engineering practice are integrated into the project experience. The project will include application of relevant engineering codes and standards, as well as realistic constraints. Design achievements are demonstrated with written reports, and oral presentations. Prerequisites: CVEG 3023, CVEG 3043, CVEG 3053, CVEG 3063, and CVEG 3073.

**CVEG 4483. Senior Design and Professionalism II.** (1-4) Credit 3 semester hours. A continuation of CVEG 4473 with required design modifications of the team projects necessary to produce a working prototype of the designs initiated in Senior Design and Professionalism I. Design project deliverables include an oral presentation, a written report, and a formal demonstration of prototype, or model, of the design. Elements of professionalism reinforce the importance of engineering ethics, corporate culture, life-long learning, and globalization. Prerequisite: CVEG 4473. CVEG 4483 must immediately follow CVEG 4473 or sequence must restart with CVEG 4473.

**CVEG 4991-4992-4993. Independent Study.** (0-0) Credit 1, 2, or 3 semester hours. Readings, research, and/or field work in selected topics. Prerequisite: consent of advisor.