

CIVIL AND ENVIRONMENTAL ENGINEERING

Civil engineers build the future. The exceptional diversity of professional practice in civil and environmental engineering presents many career opportunities for students.

The concern of civil engineers is infrastructure - the design, construction, management, alteration and utilization, which allows society to function. Civil engineers plan, design and construct, highways, waterway and railway systems, harbors and shipping facilities, systems for the treatment and distribution of water and for the collection and treatment of municipal and industrial waste, dams and hydroelectric works, airports and terminals, structures of every kind including buildings, bridges, towers, industrial plants, tunnels and subway systems, processes for the control of water and air pollution, and many other works of general benefit to society.

The professional curriculum in civil engineering is based on the pre-professional courses in mathematics, physical sciences and engineering sciences. On this foundation, required courses equip the student with the basic skills needed for the professional practice of civil engineering and provide the tools for more advanced study. Engineering theory and principles are developed in a way that will encourage their application to the practical solution of problems.

Educational Objectives

The Bachelor of Science in Civil Engineering degree program educates and prepares engineers who a few years after graduation will be:

1. Contributing to society through the practice of civil engineering in a variety of contexts, including the protection of public health and safety and the development of sustainable engineering solutions;
2. Effectively applying the technical knowledge, engineering principles, communication skills and personal attributes necessary to be adaptable and successful in the civil engineering profession;
3. Advancing within their profession, including attaining professional licensure and positions of leadership; and
4. Exhibiting life-long learning, including the pursuit of advanced degrees.

The curriculum is designed to enable students to satisfy the educational objectives in conjunction with the student outcomes. These outcomes state that graduates of the program will have:

- a. an ability to apply knowledge of mathematics, science, and engineering,
- b. an ability to design and conduct experiments, as well as to analyze and interpret data,
- c. an ability to design systems, components, or processes to meet desired needs within realistic constraints (such as economic, environmental, social, political, ethical, health, safety and sustainability),
- d. an ability to function on multi-disciplinary teams,
- e. an ability to identify, formulate and solve engineering problems,
- f. an understanding of professional and ethical responsibility,
- g. an ability to communicate effectively,

- h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context,
- i. a recognition of the need for, and an ability to engage in life-long learning, including an understanding of the importance of professional licensure,
- j. a knowledge of contemporary issues, and
- k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The School provides a curriculum that is effective and balanced among the major areas of civil engineering practice. Design capabilities are developed throughout the curriculum, culminating in a comprehensive senior design experience, incorporating much of the previous coursework. Some degree of specialization is provided through the choice of elective courses in structures, engineering mechanics, transportation engineering, soil mechanics and foundations, construction engineering and management, environmental engineering and water resources. There is a designated option for those students wishing to concentrate more heavily in the environmental area of practice. Program curricula requirements are outlined in the publication Undergraduate Program and Requirements. The general civil option and the environmental option are accredited together by the Engineering Accreditation Commission of the ABET under the criteria for civil and similarly named engineering programs.

Southern Plains Transportation Center

Oklahoma State University, and seven other universities are members of the Southern Plains Transportation Center (SPTC). The regional transportation center is a US DOT designated Region 6 University Transportation Center (UTC) and cooperative venture with the Oklahoma Department of Transportation (ODOT), and other transportation agencies, operators and suppliers. The mission of the Center is to develop and transmit knowledge through research, training, technical assistance, and technology transfer; and to enhance the transportation systems that touch the lives of the people of Oklahoma and the region.

Courses

CIVE 2041 Civil and Environmental Engineering Seminar

Prerequisites: Sophomore standing or department permission required.

Description: An introduction to the importance of communication, professional ethics, knowledge of contemporary issues, and the role these play in developing a broad education. Emphasis will be placed on understanding the impact of engineering solutions in a global and societal context. The various sub-disciplines within the fields of Civil and Environmental Engineering will also be presented.

Credit hours: 1

Contact hours: Lecture: 1

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 3413 Structural Analysis

Prerequisites: Minimum grade of "C" in ENSC 2143.

Description: Analysis of internal forces and deflections of structures subjected to static loading. Beams, trusses, and framed structures analyzed by appropriate classical methods. Classical methods and modern computer procedures for the analysis of statically indeterminate structures.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 3513 Structural Steel Design

Prerequisites: CIVE Professional School and CIVE 3413 with minimum grade of C.

Description: Introduction to the design of structural steel members and connections in accordance with AISC specifications. May not be used for degree credit with ARCH 3323.

Credit hours: 3

Contact hours: Lecture: 3 Lab: 2

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 3523 Reinforced Concrete Design

Prerequisites: CIVE Professional School and CIVE 3413 with minimum grade of C.

Description: Introduction to the design of reinforced concrete elements in accordance with the strength design requirements of the ACI Building code. May not be used for degree credit with ARCH 4123.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 3614 Engineering Surveying

Prerequisites: Minimum grade of "C" required in MATH 1715 or MATH 1613 or MATH 2123 or MATH 2144.

Description: Principles and techniques of vertical and horizontal measurements related to engineering and construction projects. Linear and angular measurements, differential leveling, traverses, topographic surveys, construction surveying, horizontal and vertical curves, earthwork quantities and design of route systems.

Credit hours: 4

Contact hours: Lecture: 3 Lab: 3

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 3623 Engineering Materials Laboratory

Prerequisites: Professional School.

Description: Introduction on material properties and related design criteria for common construction materials: structural steel, wood and timber, aggregates, portland cement and concrete, asphalt binder and concrete. Discussion on material specific topics on fabrication methods; mechanical and non-mechanical properties; use and applications; standards, testing and quality control measures; selection and design criteria. Laboratory exercises supplement lecture theory and provide "hands-on" experience in performing standard tests.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 3633 Transportation Engineering

Prerequisites: CIVE Professional School and CIVE 3614 with minimum grade of "C", and STAT 4073 minimum grade of "C" or concurrent enrollment.

Description: Planning, design and operations of transportation facilities. Vehicle characteristics and human factors in design. Traffic stream variables and their measurement techniques. Basic traffic flow models. Highway and street intersection capacity and level of service. Traffic control concepts. Transportation systems management. Application of statistical analysis and operations research to analyze transportation problems.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 3714 Introduction to Geotechnical Engineering

Prerequisites: Minimum grade of "C" in ENSC 2143, or department permission required.

Description: Physical and mechanical properties of soils, including grain size analysis, plasticity, permeability, consolidation, and shear strength. Use of physical and mechanical properties to calculate stresses in a soil mass, lateral earth pressures and bearing capacity. Laboratory tests conducted to determine the physical and mechanical soil properties needed for application in geotechnical design. Course previously offered as CIVE 3713.

Credit hours: 4

Contact hours: Lecture: 3 Lab: 3

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 3813 Environmental Engineering Science

Prerequisites: Minimum grade of "C" in MATH 2144 and CHEM 1414.

Description: Engineering aspects of the life support system; the carbon-oxygen cycle; cycling of nitrogen, sulfur and phosphorus; and the hydrologic cycle. Concepts of environmental pollution and degradation. Techniques for mitigation; water and wastewater treatment, solid and hazardous waste management, and air pollution abatement. Calculation of pollution potential and treatment system parameters.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 3833 Applied Hydraulics

Prerequisites: CIVE Professional School and minimum grade of "C" in ENSC 3233, and CHEM 1414, and PHYS 2014.

Description: Basic hydraulic principles and their application in civil engineering problems. Analyses of water distribution networks, open channels, storm-water management and wastewater collection systems, water pumps, hydraulic models, hydraulic measurements, treatment plant hydraulics and hydraulic structures.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 3843 Hydrology I

Prerequisites: CIVE Professional School and minimum grade of "C" in ENSC 3233, and CHEM 1414, and PHYS 2014.

Description: Basic principles of surface groundwater hydrology and their application in engineering problems. The hydrologic cycle, weather and hydrology, precipitation, evaporation, transpiration, subsurface waters, stream flow hydrographs, hydrologic and hydraulic stream routing, probability of hydrologic events, application of hydrologic models.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 3853 Environmental Engineering Laboratory

Prerequisites: CIVE Professional School and Minimum "C" in CIVE 3813.

Description: Performance of experiments with benchscale environmental engineering unit operations, review of chemical principles and analyses important to the evaluation of these and other environmental engineering applications. Emphasis on the development of experimental results that can be used in the design of full-scale units.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 4010 Civil Engineering Research

Prerequisites: Senior standing or consent of instructor.

Description: Research and investigation of civil engineering problems. Offered for variable credit, 1-4 credit hours, maximum of 12 credit hours.

Credit hours: 1-4

Contact hours: Other: 1

Levels: Graduate, Undergraduate

Schedule types: Independent Study

Department/School: Civil & Environ. Eng

CIVE 4013 Aquatic Chemistry

Prerequisites: CIVE Professional School with Minimum grade of C in CIVE 3813 and CHEM 1414.

Description: Application of chemical principles to environmental problems. Chemical kinetics, chemical equilibrium, acid-base chemistry, development of pc-pH diagrams, and coordination chemistry. Precipitation and dissolution reactions and oxidation-reduction reactions. May not be used for degree credit with CIVE 5013.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4033 GIS Applications for Water Resources

Prerequisites: CIVE Professional School.

Description: Application of theoretical and practical components of geographic information system for engineers. Digital mapping of water resources information, spatial coordinate systems and digital terrain analysis using digital elevation models. Analysis of a variety of spatial data in efficient and effective manner. Introduction of geospatial analytical algorithms to solve civil and environmental problems. May not be used for degree credit with CIVE 5033.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4041 Engineering Practice

Prerequisites: Admission to professional school required and enrolled in last two semesters of CIVE degree, or department permission required.

Description: Topics relevant to the professional practice of civil and environmental engineering will be introduced, to include management principles, project management, and the laws that impact the practice of engineering, such as OSHA and ADA. Emphasis will be placed on written communication skills to include resumes, letters of introduction, and job interviews. The advantages of professional registration and technical/ professional society membership will be presented as well as discussions of professional ethics, income taxes and investments. Course previously offered as CIVE 4042.

Credit hours: 1

Contact hours: Lecture: 1

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4043 Senior Design

Prerequisites: CIVE Professional School and minimum grades of "C" in each – CIVE 3513 and CIVE 3523 and CIVE 3623 and CIVE 3633 and CIVE 3714 and CIVE 3833; and within last two semesters of program completion.

Description: Major comprehensive design experience using the team approach. Industry practitioners provide design projects and analyze and critique results. Extends the undergraduate experience and provides the student with opportunities to analyze and design complex structures. May not be used for degree credit with CIVE 4143.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 4050 Special Topics in Civil & Environmental Engineering

Prerequisites: CIVE Professional School, permission of the instructor, and within last two semesters of program completion.

Description: New courses offered in CIVE that have yet to be assigned a permanent number.

Credit hours: 1-4

Contact hours: Other: 1

Levels: Undergraduate

Schedule types: Independent Study

Department/School: Civil & Environ. Eng

CIVE 4103 Construction Simulation**Prerequisites:** CIVE Professional School.**Description:** This course introduces students to effective ways of modeling construction processes and technologies. It provides an investigation of quantitative methods used for the design and analysis of construction operations to maximize productivity and minimize resource idleness. It includes discussions on queueing theory, line-of-balance techniques, linear programming and simulation. Comprehensive group projects that involve modeling and analyzing actual construction operations will be integral parts of this course. May not be used for degree credit with CIVE 5103.**Credit hours:** 3**Contact hours:** Lecture: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Civil & Environ. Eng**CIVE 4113 Construction Business Management****Prerequisites:** CIVE Professional School.**Description:** Fundamental theories and applied methods of financial management of construction companies. The spectrum of the present and future practice of business management at the construction company level. Basic construction business operations in the context of construction accounting, financial management, cash flow analysis, financial planning, and risk analysis. May not be used for degree credit with CIVE 5113.**Credit hours:** 3**Contact hours:** Lecture: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Civil & Environ. Eng**CIVE 4123 The Legal & Regulatory Environment of Civil Engineering****Prerequisites:** Professional School.**Description:** The U.S. and Oklahoma court systems. Tort law and labor law having an impact on engineering and construction. Union organization and activities. Government contracting and the laws governing it. Discussions of the Occupation Safety and Health Act and Americans with Disabilities Act. In-Depth look at environmental policy, laws, and regulations affecting engineering, including NEPA, CWA, SDWA, RCRA, CERCLA and CAA Water law. May not be used for degree credit with CIVE 5123.**Credit hours:** 3**Contact hours:** Lecture: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Civil & Environ. Eng**CIVE 4133 Construction Contracts and Specifications****Prerequisites:** CIVE Professional School.**Description:** The nature of contracts. Contract documents. Master format. Principles of specification writing. Contract types. Bonds and insurance. Bidding. Subcontracting. Disputes and disputes resolution. May not be used for degree credit with CIVE 5133.**Credit hours:** 3**Contact hours:** Lecture: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Civil & Environ. Eng**CIVE 4143 Environmental Engineering Design****Prerequisites:** CIVE Professional School and Minimum grade of C in CIVE 3833 and CIVE 3853 and CIVE 4833. Must be within last two semesters of degree completion.**Description:** Actors involved in the design of engineered environmental systems. Solving "real world" environmental engineering problems. Design experience using decision-making techniques, integrating and expanding upon current knowledge, and defending decisions made. Economic, environmental, social, and regulatory aspects of environmental engineering design. May not be used for degree credit with CIVE 4043 and CIVE 5953.**Credit hours:** 3**Contact hours:** Lecture: 2 Lab: 2**Levels:** Graduate, Undergraduate**Schedule types:** Lab, Lecture, Combined lecture and lab**Department/School:** Civil & Environ. Eng**CIVE 4153 Contract Administration****Prerequisites:** Professional School.**Description:** Methods and techniques of tracking and control of construction projects. Evaluation of current research findings to contract implementation. May not be used for degree credit with CIVE 5153.**Credit hours:** 3**Contact hours:** Lecture: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Civil & Environ. Eng**CIVE 4163 Construction Equipment Management****Prerequisites:** CIVE Professional School.**Description:** Analysis of construction equipment. Performance under various operating conditions. Application of engineering fundamentals to construction methods. Selection and costs of equipment, prediction of equipment production rates, and unit costs of work in place. May not be used for degree credit with CIVE 5163.**Credit hours:** 3**Contact hours:** Lecture: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Civil & Environ. Eng**CIVE 4183 Construction Estimating****Prerequisites:** CIVE Professional School and Senior standing.**Description:** The construction industry, its makeup, operation, estimating, and bidding procedures. Theory and practice of estimating materials, labor, equipment, and overhead costs for various types of construction. Emphasis on preliminary cost estimates during the conceptual design phase of a construction project. May not be used for degree credit with CIVE 5183.**Credit hours:** 3**Contact hours:** Lecture: 3**Levels:** Undergraduate**Schedule types:** Lecture**Department/School:** Civil & Environ. Eng

CIVE 4193 BIM for Construction

Prerequisites: CIVE Professional School and Sr. standing, and CIVE 4273 with minimum grade C or concurrent.

Description: The course focuses on advanced information systems used to control and predict project performance (cost and schedule) in construction. Building information Modeling is examined as a systems approach of integrating design and construction for the benefit of developing construction work packages, 4D simulations, clash detection, and the process of implementing BIM on an enterprise to project level. May not be used for degree credit with CIVE 5193.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4243 Use and Design of Geosynthetics

Prerequisites: CIVE Professional School and CIVE 3714 with minimum grade of C.

Description: Description of types of geosynthetics available for engineering uses. Pertinent engineering properties required to design for various functions, basic design methodology for geosynthetics for various functions, and construction and performance considerations. May not be used for degree credit with CIVE 5243.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4273 Construction Engineering and Project Management

Prerequisites: Admission to CIVE professional school required or graduate standing.

Description: Principles and practice of construction engineering and project management. Project planning, development of cost estimates and project schedules, construction methods and fundamental terminology used in the engineering and construction industry.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 2

Levels: Graduate, Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 4283 Numerical Methods in Geotechnical Engineering

Prerequisites: CIVE Professional School and CIVE 3714 with minimum grade of C.

Description: The course covers a brief review of some fundamental principles of finite element method and its application to problems in geotechnical engineering. Students will use computer programs to perform analysis of geotechnical earth structures including flow through porous media, unsaturated and expansive soils. May not be used for degree credit with CIVE 5283.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4293 Design and Analysis of Earth Retaining Structures

Prerequisites: CIVE professional school and CIVE 3714 minimum grade of C.

Description: Lateral earth pressure theories. Use of earth retaining structures in civil engineering construction. Design and analysis of gravity, sheet pile, soil nail, and MSE walls by hand calculation and with a computer program. May not be used for degree credit with CIVE 5293.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4303 Systems Analysis for Civil Engineers

Prerequisites: CIVE Professional School.

Description: Synthesis of systems modeling and simulation techniques, mathematical optimization procedures, and evaluation tools of multi-attributed systems including utility theory and decision analysis. Mathematical optimization techniques in the areas of resource allocation, transportation and water resources systems planning, structural design, construction management, and environmental and ecological problems. May not be used for degree credit with CIVE 5303.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4313 Highway Traffic Operations

Prerequisites: CIVE Professional School and CIVE 3633 with minimum grade of C.

Description: Level of service, capacity and service volume concepts. Operational characteristics of uninterrupted-flow and interrupted-flow of traffic facilities. The 1985 HCM procedures for analyzing the capacity of freeways, multi-lane and two-lane rural highways, urban arterials, signalized and unsignalized street intersections, and transit and pedestrian facilities. Administrative and planning actions for congestion management. Design alternatives and improvement strategies for effective use of urban arterial street width. May not be used for degree credit with CIVE 5313.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4323 Civil Infrastructure Systems

Prerequisites: Professional School and CIVE 3633 with minimum grade of "C".

Description: The course presents a unified approach to the management of civil infrastructure systems. Topics of discussion include various aspects of asset management analytical methods, data collection technologies, life cycle cost, prioritization and optimization, climate change and sustainability. Types of infrastructure considered in the course include pavements (roads and airports), bridges, drainage and sewer systems, water supply systems, and power supply facilities. May not be used for degree credit with CIVE 5323.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4343 Urban Transportation Planning

Prerequisites: CIVE Professional School and CIVE 3633 with minimum grade of C.

Description: Determinants of demand for transportation and models for demand forecasting. Performance characteristics of transportation systems and models for performance. Quantitative analysis of multimodal transportation networks including prediction of flow patterns and service quality. Evaluation of social, environmental, and political impacts of transportation decisions. Application of systems analysis techniques to the generation, evaluation, and selection of alternative transportation systems. May not be used for degree credit with CIVE 5343.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4363 Design and Planning of Airports

Prerequisites: CIVE Professional School and CIVE 3633 with minimum grade of C.

Description: Nature of civil aviation. Aircraft characteristics and performance related to airport planning and design. Air traffic control and navigation systems. Basics of airport planning and airport demand forecasting. Analysis of airport capacity and delays. Runway length requirements. Configuration and geometric design of runways, taxiways, holding aprons, and landing areas. Airport lighting, marking, and signing. Drainage and noise control. May not be used for degree credit with CIVE 5363.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4373 Design of Traffic Control Systems

Prerequisites: CIVE Professional School and CIVE 3633 with minimum grade of C.

Description: Traffic control systems design, available technological options, and range of agency needs. Design of vehicle detectors, controllers, communications links, signal display hardware, and wiring. Development of timing plans using computer simulation models. Freeway surveillance and control: ramp metering, incident detection, and motorist information systems. Preparation of contractual documents and construction supervision. May not be used for degree credit with CIVE 5373.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4383 Geometric Design of Highways

Prerequisites: CIVE Professional School and CIVE 3633 with minimum grade of C.

Description: Geometric, functional, and aesthetic aspects of roadway design. Alignment, sight distance, at-grade intersections, interchanges, and freeway systems. Design tools and techniques. May not be used for degree credit with CIVE 5383.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4403 Advanced Strength of Materials

Prerequisites: CIVE Professional School and CIVE 3413 with minimum grade of C.

Description: General states of stress and strain, theories of failure, energy principles, beam bending, shear center, torsion of prismatic shafts, beams on elastic foundations, plates and shells, elastic stability. May not be used for degree credit with CIVE 5403.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4413 Advanced Structural Analysis

Prerequisites: CIVE Professional School and CIVE 3413 with minimum grade of C.

Description: Advanced analysis of indeterminate frames, trusses and arches by classical, numerical, energy, and stiffness methods with emphasis on methods with emphasis on methods for hand computations and development of matrix analysis. May not be used for degree credit with CIVE 5413.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4513 Advanced Reinforced Concrete Design

Prerequisites: CIVE Professional School and CIVE 3523 with minimum grade of C.

Description: Advanced topics in reinforced concrete design with emphasis on frames, slabs and earthquake resistant structures. May not be used for degree credit with CIVE 5513.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4523 Advanced Steel Structure Design

Prerequisites: CIVE Professional School and CIVE 3513 with minimum grade of C.

Description: Advanced topics in steel design such as plastic design, plate girders, composite design, fatigue and fracture, stability and bracing design. May not be used for degree credit with CIVE 5523.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4533 Prestressed Concrete

Prerequisites: Professional School and CIVE 3523 with minimum grade of "C".

Description: Design of simple and continuous prestressed concrete beams. Behavior under overload. Calculation of prestress losses and deflections. May not be used for degree credit with CIVE 5533.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4563 Structural Dynamics

Prerequisites: CIVE Professional School and minimum grade of C in CIVE 3413 and ENSC 2123.

Description: Analysis of linear, elastic damped and undamped systems with single and multiple degrees of freedom undergoing free forced vibration. Lumped and distributed mass systems. Computational techniques to numerically integrate the equations of motion. May not be used for degree credit with CIVE 5563.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4573 Timber Design

Prerequisites: CIVE Professional School and CIVE 3513 or CIVE 3523 with minimum grade of C.

Description: Design of structural timber members, assemblies, and connections in accordance with ANSA/AF&PA, NDS specifications. Design, build, and test timber structure. May not be used for degree credit with CIVE 5573.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 2

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 4653 Asphalt Materials and Mix Design

Prerequisites: CIVE Professional School and CIVE 3623 with minimum grade of C.

Description: Principles of asphalt concrete mix design including material characteristics and performance. Evaluation of Superpave mix design methods. Asphalt cements, rubberized asphalt polymer asphalts, emulsions, cutbacks, and aggregates. Laboratory sessions focused on the engineering properties of the materials discussed. May not be used for degree credit with CIVE 5653.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 4673 Concrete Materials and Mix Design

Prerequisites: CIVE Professional School and CIVE 3523 with minimum grade C.

Description: Principles of concrete mix design, including material characteristics, strength and durability requirements, environmental effects and forensic analysis. ACI and PCA mix design procedures. Laboratory on theoretical and practical aspects of concrete technology. May not be used for degree credit with CIVE 5673.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 4693 Pavement Design and Analysis

Prerequisites: CIVE Professional School and minimum grade of C in CIVE 3633 and CIVE 3623.

Description: Principles of pavement design, including stress analyses, load and environmental effects, and material characteristics. AASHTO, PCA and AI methods of pavement design. Computer methods practical aspects of life cycle cost analyses and construction methods. May not be used for degree credit with CIVE 5693.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4711 Basic Soils Testing Laboratory

Prerequisites: Non CIVE majors only, ARCH 4143 for ARCH students.

Description: Laboratory measurements of the physical and mechanical properties of soils; grain size distribution, plasticity, permeability, compaction, compressibility, and shear strength.

Credit hours: 1

Contact hours: Lab: 3

Levels: Graduate, Undergraduate

Schedule types: Lab

Department/School: Civil & Environ. Eng

CIVE 4723 Foundation Engineering

Prerequisites: CIVE Professional School and CIVE 3714 with minimum grade of C.

Description: Types of structural foundations including footings, mats, rafts, piles and drilled shafts. Site characteristics, exploration programs, field data, test results, construction materials and methods as basis for selection of type of foundation and design. Geotechnical design procedures and considerations. May not be used for degree credit with CIVE 5723.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4733 Soil Mechanics

Prerequisites: Professional School and CIVE 3714 with minimum grade of "C".

Description: Application of soil mechanics principles and concepts in geotechnical areas of permeability and seepage, settlement analysis, bearing capacity, lateral earth pressures and retaining walls, slope stability, and metastable soils. May not be used for degree credit with CIVE 5713.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4743 Project Engineering and Management

Prerequisites: CIVE Professional School.

Description: Management of the design and construction of civil engineering projects. Topics include owner's study, formation of project teams, design coordination, construction, and project closeout. May not be used for degree credit with CIVE 5143.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4753 Engineering Soil Stabilization

Prerequisites: Professional School and CIVE 3714 with minimum grade of "C".

Description: Theoretical and practical aspects of engineering soil stabilization as a method for improving and upgrading low quality and unstable soils for engineering purposes. Use of lime, fly ash, portland cement, asphalt, and other physical and chemical admixtures. Application of deep foundation stabilization methods such as preloading, deep compaction, injection and reinforcement. May not be used for degree credit with CIVE 5753.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4773 Soil-Structure Interaction

Prerequisites: Professional School and CIVE 3714 with minimum grade of "C".

Description: The mechanical interaction effects between soils and structures using suitable engineering procedures such as finite differences and finite element methods. Civil engineering problems where interaction effects are most dominant including grade beams (beams on elastic foundation), axially- and laterally-loaded piles, cantilever, and anchored sheet pile walls. May not be used for degree credit with CIVE 5743.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4833 Unit Operations in Environmental Engineering

Prerequisites: CIVE Professional School and minimum grade of "C" in ENSC 3233 and CIVE 3813.

Description: Fundamental principles of water and wastewater treatment, including basic theory and development of design parameters. Application of these to the design of unit operations and processes in various treatment plants.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate, Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4863 Advanced Unit Operations in Environmental Engineering

Prerequisites: CIVE Professional School and CIVE 4833 with minimum grade of C.

Description: Theory and design of advanced physical-chemical water and wastewater treatment processes applied to municipal, industrial, and hazardous waste situations. May not be used for degree credit with CIVE 5863.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4873 Air Pollution Control Engineering

Prerequisites: CIVE Professional School and CIVE 4833 with minimum grade of C.

Description: Causes, effects, and control of atmospheric pollution. May not be used for degree credit with CIVE 5873 and CHE 5873.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4883 Introduction to Environmental Modeling

Prerequisites: CIVE Professional School and minimum grade of C in ENSC 3233 and CIVE 3813 and CIVE 3833.

Description: Intended as an introductory course for senior undergraduate students to the fundamentals of environmental modeling. Develops material necessary to construct models capable of identifying contaminant distributions at future times and space for water and air pollution applications. Advanced topics such as stochastic modeling, ecological risk assessment, neural modeling and spatial statistical analysis among others will be presented according to the backgrounds and interests of the enrolled students. May not be used for degree credit with CIVE 5833 and BAE 5343.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4913 Groundwater Hydrology

Prerequisites: CIVE Professional School and CIVE 3843 with minimum grade C.

Description: Theory of groundwater movement, storage, exploration and pumping tests. Design of groundwater recovery and recharge systems. May not be used for degree credit with CIVE 5913.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4923 Environ Risk Assessment

Prerequisites: Professional School and minimum grade of "C" in CIVE 3813 and STAT 4033 or STAT 4073 with minimum grade of "C".

Description: Environmental risk assessment and management. Applies elements of statistics, probability and environmental simulation to determine the public health and ecological risks from activities of humans. May not be used for degree credit with CIVE 5823.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4933 Water Treatment

Prerequisites: CIVE Professional School and CIVE 4833 with minimum grade of C.

Description: Theory, design, and operation of water treatment plants. Sizing of various unit processes. Water treatment plant control procedures. May not be used for degree credit with CIVE 5933.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4943 Risk and Failure Analysis of Dams

Prerequisites: CIVE Professional School.

Description: Analyzing, evaluating and managing risks to Dams and providing a rigorous, systematic, and thorough approach to sustain and support of safety aspects. Evaluating CUASI Data to support aspects of the environment near and around Dams. Using new technologies such as ArcInfo to provide solutions to problems. May not be used for degree credit with CIVE 5043.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4963 Open Channel Flow

Prerequisites: CIVE Professional School and CIVE 3833 with minimum grade of C.

Description: Open channel hydraulics, energy and momentum concepts, resistance, channel controls and transitions, flow routing and sediment transport. May not be used for degree credit with CIVE 5963.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 4973 Concrete Durability

Prerequisites: CIVE Professional School and CIVE 4673 with C or better.

Description: This course investigates the mechanisms, test methods, and evaluation procedures for the primary mechanisms for durability issues in concrete. Emphasis is placed on providing a practical and theoretical overview of the topics. Special topics may be covered with the interest of the students. May not be used for degree credit with CIVE 5273.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 2

Levels: Undergraduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 4983 Residuals & Solid Waste Management

Prerequisites: Professional School and CIVE 4833 with minimum grade of "C".

Description: Theory, design and operation of systems for handling, treatment, and disposal of process sludge (water treatment, wastewater treatment, industrial) and solid wastes. Potential material reclamation options. May not be used for degree credit with CIVE 5883.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5000 Master's Thesis

Description: A student studying for a master's degree will enroll in this course for a total of 6 credits if a thesis is to be written. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

Credit hours: 1-6

Contact hours: Other: 1

Levels: Graduate

Schedule types: Independent Study

Department/School: Civil & Environ. Eng

CIVE 5010 Civil Engineering Seminar

Prerequisites: Graduate standing and approval of major professor, or undergrad in professional school.

Description: Review of literature of major fields of civil engineering. Offered for variable credit, 1-3 credit hours, maximum of 15 credit hours.

Credit hours: 1-3

Contact hours: Other: 1

Levels: Graduate, Undergraduate

Schedule types: Independent Study

Department/School: Civil & Environ. Eng

CIVE 5013 Aquatic Chemistry

Prerequisites: Graduate standing, or admission to CIVE professional school required and CIVE 5813 or concurrent enrollment and CHEM 1515 or equivalent, or department permission required.

Description: Application of chemical principles to environmental problems. Chemical kinetics, chemical equilibrium, acid-base chemistry, development of pc-pH diagrams, and coordination chemistry. Precipitation and dissolution reactions and oxidation-reduction reactions.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate, Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5020 Civil Engineering Research

Prerequisites: Graduate standing and approval of major professor.
Description: Research and investigations other than thesis studies. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Civil & Environ. Eng

CIVE 5030 Engineering Practice

Prerequisites: Approval of adviser.
Description: Professional supervised civil engineering practice involving authentic projects for which the student assumes a degree of professional responsibility. Activities must be approved in advance by the student's adviser and may consist of engineering experience on-campus or off-campus, or both. Periodic reports, both oral and written, are required as specified by the adviser. Offered for variable credit, 1-6 credit hours, maximum of 9 credit hours.
Credit hours: 1-6
Contact hours: Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Civil & Environ. Eng

CIVE 5033 GIS Applications for Water Resources

Prerequisites: Graduate standing or professional school.
Description: Application of theoretical and practical components of geographic information system for engineers. Digital mapping of water resources information, spatial coordinate systems and digital terrain analysis using digital elevation models. Analysis of a variety of spatial data in efficient and effective manner. Introduction of geospatial analytical algorithms to solve civil and environmental problems.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Civil & Environ. Eng

CIVE 5043 Risk and Failure Analysis of Dams

Prerequisites: Graduate standing or professional school.
Description: Analyzing, evaluating and managing risks to Dams and providing a rigorous, systematic, and thorough approach to sustain and support of safety aspects. Evaluating CUASI Data to support aspects of the environment near and around Dams. Using new technologies such as ArcInfo to provide solutions to problems.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Civil & Environ. Eng

CIVE 5080 Engineering Problems

Prerequisites: Graduate standing.
Description: Problems of particular interest to graduate students in the field of civil engineering. This course meets the criteria for a creative component. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-3
Contact hours: Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Civil & Environ. Eng

CIVE 5103 Construction Simulation

Prerequisites: Graduate standing or admission to CIVE professional school required.
Description: This course introduces students to effective ways of modeling construction processes and technologies. It provides an investigation of quantitative methods used for the design and analysis of construction operations to maximize productivity and minimize resource idleness. It includes discussions on queueing theory, line-of-balance techniques, linear programming and simulation. Comprehensive group projects that involve modeling and analyzing actual construction operations will be integral parts of this course.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Civil & Environ. Eng

CIVE 5113 Construction Business Management

Prerequisites: Graduate standing or admission to CIVE professional school required.
Description: Fundamental theories and applied methods of financial management of construction companies. The spectrum of the present and future practice of business management at the construction company level. Basic construction business operations in the context of construction accounting, financial management, cash flow analysis, financial planning, and risk analysis.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Civil & Environ. Eng

CIVE 5123 The Legal and Regulatory Environment of Engineering

Prerequisites: Graduate standing or admission to CIVE professional school required.
Description: The U.S. and Oklahoma court systems. Tort law and labor law having an impact on engineering and construction. Union organization and activities. Government contracting and the laws governing it. Discussions of the Occupation Safety and Health Act and Americans with Disabilities Act. In-Depth look at environmental policy, laws, and regulations affecting engineering, including NEPA, CWA, SDWA, RCRA, CERCLA and CAA Water law.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Graduate, Undergraduate
Schedule types: Lecture
Department/School: Civil & Environ. Eng

CIVE 5133 Construction Contracts and Specifications

Prerequisites: Graduate standing or admission to CIVE professional school required.
Description: The nature of contracts. Contract documents. Master format. Principles of specification writing. Contract types. Bonds and insurance. Bidding. Subcontracting. Disputes and disputes resolution. Additional flat fee of 10.00 applies.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Civil & Environ. Eng

CIVE 5143 Project Engineering and Management

Prerequisites: Graduate standing or admission to CIVE professional school required.

Description: Management of the design and construction of civil engineering projects. Topics include owner's study, formation of project teams, design coordination, construction, and project closeout.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5153 Contract Administration

Prerequisites: Graduate standing or consent of instructor. Methods and techniques of tracking and control of construction projects.

Description: Evaluation of current research findings to contract implementation. May not be used for degree credit with CIVE 4153.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5163 Construction Equipment Management

Prerequisites: Graduate standing or admission to CIVE professional school required.

Description: Analysis of construction equipment. Performance under various operating conditions. Application of engineering fundamentals to construction methods. Selection and costs of equipment, prediction of equipment production rates, and unit costs of work in place.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5183 Construction Estimating

Prerequisites: Graduate standing and CIVE major.

Description: The construction industry, its makeup, operation, estimating, and bidding procedures. Theory and practice of estimating, materials, labor, equipment, and overhead costs for various types of construction. Emphasis on preliminary cost estimates during the conceptual design phase of a construction project. May not be used for degree credit with CIVE 4183.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5193 BIM for Constructions

Prerequisites: CIVE major and graduate standing.

Description: The course focuses on advanced information systems used to control and predict project performance (cost and schedule) in construction. Building information modeling is examined as a systems approach of integrating design and construction for the benefit of developing construction work packages, 4D simulations, clash detection, and the process of implementing BIM on an enterprise to project level. May not be used for degree credit with CIVE 4193.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5203 Pavement Rehabilitation, Management and Safety

Prerequisites: Graduate standing or senior standing with instructor approval.

Description: Understand and perform pavement evaluations of function, structure, surface condition, and surface safety and learn various types of equipment for evaluating pavement function, structure, and surface condition and safety. Describe techniques for rehabilitation of flexible and rigid pavements, and overall objectives and major components of a pavement management system. Understand and explain the basic techniques of safety analysis based on pavement surface data.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5243 Use and Design of Geosynthetics

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3714.

Description: Description of types of geosynthetics available for engineering uses. Pertinent engineering properties required to design for various functions, basic design methodology for geosynthetics for various functions, and construction and performance considerations.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5253 Sensors and their Applications for Pavement

Prerequisites: Graduate standing or senior standing with instructor approval.

Description: Sensor Principles of Falling Weight Deflectometer (FWD), Rolling Weight Deflectometer (RWD) and Traffic Speed Deflectometer (TSD); 2D and 3D laser imaging as used in pavement surface condition survey; Laser rangefinders and accelerometers for pavement longitudinal profile; Friction and texture measurement of pavement surface; New software and mobile tools for presenting sensor data with HTML5; 3D visualization and database management with pavement sensor data; Inertial navigation system and high-precision gyro for pavement data positioning; LIDAR and its usage for infrastructure management.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5273 Concrete Durability

Prerequisites: CIVE 5673 Concrete Mixture Design and graduate standing or permission of instructor.

Description: This course investigates the mechanisms, test methods, and evaluation procedures for the primary mechanisms for durability issues in concrete. Emphasis is placed on providing a practical and theoretical overview of the topics. Special topics may be covered with the interest of the students.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 2

Levels: Graduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 5283 Numerical Methods in Geotechnical Engineering

Prerequisites: Graduate standing, or professional school and CIVE 3714 for undergraduates.

Description: The course covers a brief review of some fundamental principles of finite element method and its application to problems in geotechnical engineering. Students will use computer programs to perform analysis of geotechnical earth structures including flow through porous media, unsaturated and expansive soils.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5293 Design and Analysis of Earth Retaining Structures

Prerequisites: CIVE major and graduate standing.

Description: Lateral earth pressure theories. Use of earth retaining structures in civil engineering construction. Design and analysis of gravity, sheet pile, soil nail, and MSE walls by hand calculation and with a computer program. May not be used for degree credit with CIVE 4293.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5303 Systems Analysis for Civil Engineers

Prerequisites: Graduate standing or admission to CIVE professional school required.

Description: Synthesis of systems modeling and simulation techniques, mathematical optimization procedures, and evaluation tools of multi-attributed systems including utility theory and decision analysis. Mathematical optimization techniques in the areas of resource allocation, transportation and water resources systems planning, structural design, construction management, and environmental and ecological problems.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5313 Highway Traffic Operations

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3633.

Description: Level of service, capacity and service volume concepts. Operational characteristics of uninterrupted-flow and interrupted-flow traffic facilities. The 1985 HCM procedures for analyzing the capacity of freeways, multilane and two-lane rural highways, urban arterials, signalized and unsignalized street intersections, and transit and pedestrian facilities. Administrative and planning actions for congestion management. Design alternatives and improvement strategies for effective use of urban arterial street width.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5323 Civil Infrastructure Systems

Prerequisites: Graduate student.

Description: The course presents a unified approach to the management of civil infrastructure systems. Topics of discussion include various aspects of asset management: analytical methods, data collection technologies, life cycle cost, prioritization and optimization, climate change and sustainability. Types of infrastructure considered in the course include pavements (roads and airports), bridges, drainage and sewer systems, water supply systems, and power supply facilities. May not be used for degree credit with CIVE 4323.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5343 Urban Transportation Planning

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3633.

Description: Determinants of demand for transportation and models for demand forecasting. Performance characteristics of transportation systems and models for performance. Quantitative analysis of multimodal transportation networks including prediction of flow patterns and service quality. Evaluation of social, environmental, and political impacts of transportation decisions. Application of systems analysis techniques to the generation, evaluation, and selection of alternative transportation systems.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5363 Design and Planning of Airports

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3633.

Description: Nature of civil aviation. Aircraft characteristics and performance related to airport planning and design. Air traffic control and navigation systems. Basics of airport planning and airport demand forecasting. Analysis of airport capacity and delays. Runway length requirements. Configuration and geometric design of runways, taxiways, holding aprons, and landing areas. Airport lighting, marking, and signing. Drainage and noise control.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5373 Design of Traffic Control Systems

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3633.

Description: Traffic control systems design, available technological options, and range of agency needs. Design of vehicle detectors, controllers, communications links, signal display hardware, and wiring. Development of timing plans using computer simulation models. Freeway surveillance and control: ramp metering, incident detection, and motorist information systems. Preparation of contractual documents and construction supervision.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5383 Geometric Design of Highways

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3633.

Description: Geometric, functional, and aesthetic aspects of roadway design. Alignment, sight distance, at-grade intersections, interchanges, and freeway systems. Design tools and techniques.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5403 Advanced Strength of Materials

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3413.

Description: General states of stress and strain, theories of failure, energy principles, beam bending, shear center, torsion of prismatic shafts, beams on elastic foundations, plates and shells, elastic stability.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5413 Classical and Matrix Methods of Structural Analysis

Prerequisites: Graduate standing or admission to CIVE professional school, and CIVE 3413.

Description: Advanced analysis of indeterminate frames, trusses and arches by classical, numerical, energy, and stiffness methods with emphasis on methods for hand computations and development of matrix analysis.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5423 Matrix Analysis of Structures

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3413.

Description: Matrix analysis of two- and three-dimensional trusses and frames. Development of member stiffness matrices. Assemblage of structure matrices by direct stiffness method. Computer programs for structural analysis.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5433 Energy Methods in Applied Mechanics

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3413 and MATH 2233 or MAE 3323.

Description: Advanced structural mechanics from the standpoint of virtual work; energy principles and variational calculus applied to the analysis of structures, mechanisms, dynamics, and vibrations.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5453 Engineering Analysis

Description: Advanced, classical mathematical skills for engineers. Dimensional Analysis, General Tensor Analysis, Curvilinear Coordinates, Partial Differential Equations, Perturbation Theory, Integral Equations, Special Functions, Eigen Function Analysis, Integral Transform Methods, Variational Methods.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5473 Steel Plastic Design

Prerequisites: Graduate standing or CIVE 3413 Structural Analysis and instructor approval.

Description: This course is for incoming graduate students that are not familiar with LRFD AISC based steel design. Topics typically covered in the undergraduate course are covered with additional topics.

Credit hours: 3

Contact hours: Lecture: 3 Lab: 2

Levels: Graduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 5503 Computer-Aided Structural Analysis and Design

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3413, CIVE 3513, CIVE 3523 (or concurrent enrollment); or permission of instructor.

Description: Major comprehensive design experience. Promotion of a design office atmosphere in using a team approach. Industry practitioners provide design projects and critique results. Analysis and design of complex structures and preparation of contract documents and drawings. Emphasis on modern computer-based computation and presentation tools.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5513 Advanced Reinforced Concrete Design

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3523.

Description: Advanced topics in reinforced concrete design with emphasis on frames, slabs, and earthquake-resistant structures.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5523 Advanced Steel Structure Design

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3513.

Description: Advanced topics in steel design such as plastic design, plate girders, composite design, fatigue and fracture, stability, and bracing design.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5533 Prestressed Concrete

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3523.

Description: Design of simple and continuous prestressed concrete beams. Behavior under overload. Calculation of prestress losses and deflections. May not be used for degree credit with CIVE 4533.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5543 Bridge Design

Prerequisites: CIVE 3513 AND CIVE 3523.

Description: Structural design of steel and concrete highway bridges, including bridge types, parts of a bridge, loads and load distribution, analysis, design, and bridge rating. Emphasis on topics of special interest to students.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5563 Structural Dynamics

Prerequisites: Graduate standing or admission to CIVE professional school required and ENSC 2123 and CIVE 3413.

Description: Analysis of linear, elastic damped and undamped systems with single and multiple degrees of freedom undergoing free and forced vibration. Lumped and distributed mass systems. Computational techniques to numerically integrate the equations of motion. Course previously offered as CIVE 6433.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5573 Timber Design

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3523 or CIVE 3513.

Description: Design of structural timber members, assemblies, and connections in accordance with ANSA/AF&PA, NDS specifications. Design, build, and test timber structure.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 2

Levels: Graduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 5653 Asphalt Materials and Mix Design

Prerequisites: CIVE 3623 or consent of instructor.

Description: Principles of asphalt concrete mix design including material characteristics and performance. Evaluation of Hveem and Marshall mix design methods. Asphalt cements, rubberized asphalt polymer asphalts, emulsions, cutbacks, and aggregates. Laboratory sessions focused on the engineering properties of the materials discussed.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3

Levels: Graduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 5673 Concrete Materials and Mix Design

Prerequisites: Senior or graduate standing.

Description: Principles of concrete mix design, including material characteristics, strength and durability requirements, environmental effects and forensic analysis. ACI and PCA mix design procedures. Laboratory on theoretical and practical aspects of concrete technology.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3

Levels: Graduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 5693 Pavement Design and Analysis

Prerequisites: CIVE 3633 or consent of instructor.

Description: Principles of pavement design, including stress analyses, load and environmental effects, and material characteristics. AASHTO, PCA and AI methods of pavement design. Computer methods. Practical aspects of life cycle cost analyses and construction methods.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5713 Soil Mechanics

Prerequisites: CIVE 3713 and CIVE 4711.

Description: Application of soil mechanics principles and concepts in geotechnical areas of permeability and seepage, settlement analysis, bearing capacity, lateral earth pressures and retaining walls, slope stability, and metastable soils. May not be used for degree credit with CIVE 4733.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5723 Foundation Engineering

Prerequisites: CIVE 3713 and CIVE 4711.

Description: Types of structural foundations including footings, mats, rafts, piles and drilled shafts. Site characteristics, exploration programs, field data, test results and construction materials and methods as basis for selection of type of foundation and design. Geotechnical design procedures and considerations.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5733 Rock Mechanics in Engineering Design and Construction

Prerequisites: Undergraduate courses in soils and geology.

Description: Stresses, strength variations, and deformational behavior of rock. Engineering classification of rock. Methods of field and laboratory measurement of the engineering properties of rock. Rock mechanics consideration in the design and construction of engineering works.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5743 Soil-Structure Interaction

Prerequisites: CIVE 3713 and senior or graduate standing in civil engineering.

Description: The mechanical interaction effects between soils and structures using suitable engineering procedures such as finite differences and finite element methods. Civil engineering problems where interaction effects are most dominant including grade beams (beams on elastic foundation), axially- and laterally-loaded piles, cantilever, and anchored sheet pile walls. May not be used for degree credit with CIVE 4773.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5753 Engineering Soil Stabilization

Prerequisites: CIVE 3713 and CIVE 4711.

Description: Theoretical and practical aspects of engineering soil stabilization as a method for improving and upgrading low quality and unstable soils for engineering purposes. Use of lime, fly ash, portland cement, asphalt, and other physical and chemical admixtures. Application of deep foundation stabilization methods such as preloading, deep compaction, injection and reinforcement. May not be used for degree credit with CIVE 4753.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5813 Environmental Laboratory Analysis

Prerequisites: Graduate standing or permission of instructor.

Description: Analytical procedures for water and waste water contaminants. Emphasis on the chemical theory of procedures, analytical work and an understanding of the significance or need for such laboratory data for surface and groundwater management and water and wastewater treatment processes and design.

Credit hours: 3

Contact hours: Lecture: 2 Lab: 3

Levels: Graduate

Schedule types: Lab, Lecture, Combined lecture and lab

Department/School: Civil & Environ. Eng

CIVE 5823 Environmental Risk Assessment and Management

Prerequisites: Graduate standing or permission of instructor.

Description: Environmental risk assessment and management. Applies elements of statistics, probability and environmental simulation to determine the public health and ecological risks from activities of humans. May not be used for degree credit with CIVE 4923.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5833 Introduction to Environmental Modeling

Prerequisites: Graduate standing or permission of instructor.

Description: Intended as an introductory course for graduate and senior undergraduate students to the fundamentals of environmental modeling. Develops material necessary to construct models capable of identifying contaminant distributions at future times and space for water and air pollution applications. Advanced topics such as stochastic modeling, ecological risk assessment, neural modeling and spatial statistical analysis among others will be presented according to the backgrounds and interests of the enrolled students. In part, the course is designed as the "Physical Science" component for MS students in the Environmental Sciences program.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate, Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5863 Advanced Unit Operations in Environmental Engineering

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 4833, or permission of instructor.

Description: Theory and design of advanced physical-chemical water and wastewater treatment processes applied to municipal, industrial, and hazardous waste situations.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate, Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5873 Air Pollution Control Engineering

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 4833, or permission of instructor.

Description: Causes, effects, and control of atmospheric pollution. Same course as CHE 5873.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate, Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5883 Residuals and Solid Waste Management

Prerequisites: Graduate standing or admission to CIVE professional school required, or permission of instructor.

Description: Theory, design and operation of systems for handling, treatment, and disposal of process sludge (water treatment, wastewater treatment, industrial) and solid wastes. Potential material reclamation options. May not be used for degree credit with CIVE 4983.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5913 Groundwater Hydrology

Prerequisites: Graduate standing or admission to CIVE professional school required and 3843, or permission of instructor.

Description: Theory of groundwater movement, storage, exploration and pumping tests. Design of groundwater recovery and recharge systems.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5933 Water Treatment

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 4833, or permission of instructor.

Description: Theory, design, and operation of water treatment plants. Sizing of various unit processes. Water treatment plant control procedures.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate, Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5953 Biological Waste Treatment

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 4833 or permission of instructor.

Description: Fundamentals of microbial systems applied to waste treatment processes. Standard suspended-growth and fixed biofilm wastewater and sludge suspensions and treatment system design calculations.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate, Undergraduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 5963 Open Channel Flow

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 3833, or permission of instructor.

Description: Open channel hydraulics, energy and momentum concepts, resistance, channel controls and transitions, flow routing, and sediment transport.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 6000 PhD Research Dissertation

Description: Independent research under the direction of a member of the graduate faculty by students working beyond the level of Master of Science degree. Offered for variable credit, 1-16 credit hours, maximum of 30 credit hours.

Credit hours: 1-16

Contact hours: Other: 1

Levels: Graduate

Schedule types: Independent Study

Department/School: Civil & Environ. Eng

CIVE 6010 Seminar

Prerequisites: Consent of instructor and approval of the student's advisory committee.

Description: Analytical studies with suitable reports on problems in one or more of the subfields in civil engineering by students working beyond the level of Master of Science degree. Offered for variable credit, 1-6 credit hours, maximum of 12 credit hours.

Credit hours: 1-6

Contact hours: Other: 1

Levels: Graduate

Schedule types: Independent Study

Department/School: Civil & Environ. Eng

CIVE 6403 Theory of Elasticity

Prerequisites: Graduate standing or admission to CIVE professional school required, or permission of instructor.

Description: Stress, strain, and deformation analysis of two- and three-dimensional elastic continua. Propagation of stress waves through elastic continua.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 6413 Plate and Shell Structures

Prerequisites: Graduate standing or admission to CIVE professional school required and CIVE 5403, or permission of instructor.

Description: Bending of thin plate structures to include rectangular and circular plates. Analysis of orthotropic plates by classical and numerical methods. Introduction to shell bending theory.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 6434 Finite Element Analysis

Prerequisites: Graduate standing and permission of instructor.

Description: Finite elements: formulation techniques, weighted residuals, variational techniques, shape functions and element types, isoparametric elements, convergence criteria, error analysis, and programming techniques. Applications to solid mechanics, structures, fluid mechanics, and heat transfer are discussed.

Credit hours: 4

Contact hours: Lecture: 4

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 6553 Natural Hazards Engineering

Prerequisites: Graduate standing and CIVE 5563.

Description: Performance of structural systems exposed to extreme loadings from natural hazard events. The response, analysis, and design of structures exposed to earthquakes, wind, flood, and fire loadings are considered. Advanced analytical, computational, and experimental techniques. Current building code specifications.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 6843 Stochastic Methods in Hydrology

Prerequisites: Graduate standing and STAT 4073 or STAT 4033.

Description: Stochastic and statistical hydrologic analyses of surface water and ground water systems. Analyses of urban and rural drainage and detention systems. Same course as BAE 6313.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

CIVE 6923 Industrial Wastes Engineering

Prerequisites: Graduate standing or permission of instructor.

Description: Theory and methods of waste minimization, waste product reduction or reuse; process changes and treatment of residuals to reduce volume and toxicity of industrial wastes.

Credit hours: 3

Contact hours: Lecture: 3

Levels: Graduate

Schedule types: Lecture

Department/School: Civil & Environ. Eng

Undergraduate Programs

- Civil Engineering, BSCV (<http://catalog.okstate.edu/engineering-architecture-technology/civil-environmental-engineering/civil-bscv>)
- Civil Engineering: Environmental, BSCV (<http://catalog.okstate.edu/engineering-architecture-technology/civil-environmental-engineering/civil-engineering-environmental-bscv>)

Graduate Programs

The School of Civil and Environmental Engineering offers three programs leading to post-baccalaureate degrees—the Master of Science degree in civil engineering, the Master of Science degree in environmental engineering and the Doctor of Philosophy degree. The Master of Science degree is characterized by a technical specialization in a particular

area of study. The Doctor of Philosophy degree is designed to prepare students for research and for the teaching profession in engineering.

Major areas of study in the School are applied mechanics, structural analysis, design, transportation, materials, construction engineering and management, geotechnical engineering, water resources and environmental engineering. Research in all major fields is continuously pursued. Master of Science in Civil Engineering candidates may choose either to specialize or to engage in a broadly based program of study, in accordance with an approved and purposeful plan of study.

Admission Requirements

Candidates for the Master of Science or Doctor of Philosophy degree should have graduated from a civil engineering curriculum accredited by ABET. Graduates from other curricula and schools should submit transcripts to the head of the School of Civil and Environmental Engineering for evaluation. Admission to the Master of Science in environmental engineering degree program is permitted for students who meet the minimum prerequisites as established by the School of Civil and Environmental Engineering.

Degree Requirements

All degree programs follow an approved plan of study that must be submitted at a designated time. All programs are characterized by the flexibility available in a study plan that is designed to satisfy the particular needs of the student, while conforming to the general requirements implied by the title of the degree and specified by the University.

The Master of Science degree in either civil or environmental engineering requires the completion of at least 30 credit hours beyond the bachelor's degree, including a research thesis for which no more than six credit hours may be granted. The non-thesis option (32 credit hours) described in the Graduate College section may be permitted at the discretion of the student's advisory committee.

The Doctor of Philosophy degree requires the completion of at least 90 credit hours of coursework beyond the bachelor's degree, including not more than 30 credit hours for the research thesis. In addition, the candidate must meet the equivalency of the language requirement (six hours) in selected areas at the discretion of his or her committee to facilitate his or her research. Generally, official admission as a candidate for the Doctor of Philosophy degree in any program offered by the School will not be granted until a member of the Graduate Faculty in the School agrees to serve as major (or thesis) adviser for the prospective candidate.

Faculty

Norbert (Norb) Delatte, PhD—Professor and Head

Professor and M. R. Lohmann Chair: Norbert (Norb) Delatte, PhD, PE, F.ASCE, F.ACI

Dean, College of Engineering, Architecture and Technology, Professor and Donald & Cathey Humphreys Chair: Paul J. Tikalsky, PhD, PE, F.ASCE, F.ACI

Professor and Gilbert, Cooper, W&W Steel Chair: Tyler Ley, PhD, PE, F.ACI

Professor and Decker Dawson Chair: C. (Kelvin) Wang, PhD, PE

Professors: S.A. Ahmed, PhD, PE; Gouranga Banik, PhD, PE, F.ASCE;

Stephen A. Cross, PhD, PE; John N. Veenstra, PhD, PE

Associate Professors: Rifat Bulut, PhD; Robert Emerson, PhD, PE; Bruce Russell, PhD, PE; Gregory G. Wilber, PhD, PE

Assistant Professors: Julie Hartell, PhD; Mark Krzmarzick, PhD, PE; David Lampert, PhD, PE; Qiang Li, PhD, PE; Yong Wei Shan, PhD, PE; Mohamad Soliman, PhD

Adjunct Professors: Garry Gregory, PhD, PE; Boris Dan Hernandez, PhD; Enos Stover, PhD, PE; Brian Wintle, PhD, PE

Lecturer: Joe Echelle