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Programs

The Civil Engineering and Construction department offers doctor of philosophy and master of science degrees in civil engineering and a master of science degree in environmental engineering. The College of Engineering and Architecture offers a Ph.D. degree in engineering with the possibility of specialization in civil engineering. Specialty areas within the department are described in this brochure. Other interdisciplinary areas are also encouraged for research. The academic and research emphasis are tailored to individual needs and interests. To complement the major area of study, additional courses are often selected from other disciplines. The programs are designed to advance technical knowledge, competence, and interdisciplinary understanding of the students and to prepare them for advancing within the profession.

The department has excellent facilities to conduct advanced research. Specialized facilities within the campus in other departments are also available for graduate research. The graduate faculty in the department are highly motivated and are involved in cutting edge research activities. External agencies funding some of the research activities in the department include, National Science Foundation, Department of Defense, National Institutes of Health, Department of Transportation, USEPA, USGS etc. Industries also support research activities in the department.

Admission to graduate programs is coordinated through the graduate school. Application materials may be obtained from the graduate school. Additional information about the department may be found on the departmental web site or by contacting the graduate program coordinator of the department. Teaching or research assistantships may be available to qualified students from the department.

Construction Management and Engineering (C)
The Construction Management and Engineering specialization within the Department of Civil Engineering and Construction provides an opportunity for graduate students to develop their professional skills through study of advanced topics related to construction engineering and management. The program prepares students to function effectively in engineering and management roles for the construction industry. Courses in the program cover those topics important to construction firms, construction management consultants, design and consulting firms, and government agencies.

Environmental Engineering (E)
Students interested in graduate studies in environmental engineering may choose coursework and research in the area of wetland remediation, wastewater treatment, industrial waste management, solid waste management, hazardous waste management, site remediation, water quality modeling and management, or air pollution control. Examples of past and current research include studying the nutrient loads on lakes, examining the use of wetlands for removal and sequestering pollutants, developing methods for phosphorus removal at wastewater treatment plants, examining the effectiveness of advanced aeration systems, and investigating water and wastewater treatment.

Geotechnical Engineering (G)
Students interested in graduate studies with geotechnical engineering emphasis may conduct research in the area of multi-scale modeling of soil response, constitutive modeling of soils, rate effects, soil dynamics and earthquake engineering, soil-structure interaction, finite element modeling, discrete element modeling, geoenvironmental engineering, laboratory modeling, experimental evaluation of soil behavior and characterization of microstructure and molecular interactions in clays. Examples of past and current research include quantitative evaluation of microstructure and molecular interactions during swelling in expansive clays using electron microscopy and various spectroscopy techniques, modeling clay-water interactions, developing discrete element models for clays, modeling effect of loading rate on response of clays, constitutive models for granular soils and finite element simulations of liquefaction during earthquakes and mitigation.

Materials Engineering (M)
Students interested in pursuing graduate studies will take courses that overlap with the structural, geotechnical and other areas with emphasis on mechanics, constitutive modeling and numerical modeling. Research emphasis in this area includes design, processing and multi-scale modeling of mechanical behavior in new and advanced composite materials and their responses under varying environmental conditions. Applications of such materials range from structural, surface transportation to biomedical. Current research also includes biomimetic processing, nanocomposites, structural composites for cold regions and new materials of interest to surface transportation facilities.

Structural Engineering/Mechanics (S)
Graduate students interested in structural engineering/mechanics may conduct research in diverse areas such as composite materials, high-performance ceramics, failure analysis and fatigue, constitutive modeling, continuum mechanics, computational mechanics, biomechanics, and cementitious materials. Examples of the past and current research include durability of graphite fiber composites, concrete mix for dowel bar retrofit, continuum damage mechanics, structural design of internally illuminated traffic signs, and the modeling of human artery with damage.

Transportation Engineering (T)
Students interested in graduate studies with transportation emphasis may choose courses and research in infrastructure management, pavement design and performance, traffic engineering, transportation planning, transportation systems, airports, and for railroads. Examples of past research include modeling and analysis of arterials, pavement management, economic impact of transportation construction, visualization of engineered structures, GIS applications, airport-aircraft compatibility, finite element application for pavement analysis and performance, highway work-zone modeling, traffic simulation, and infrastructure management.

Water Resources Systems and Engineering (W)
Students interested in graduate studies with water resources emphasis may choose courses and conduct research in areas such as surface or groundwater hydrology, hydraulic engineering, water quality, and/or water resources systems. Examples of current and past research include urban runoff quantity and quality analysis and modeling, impact of wetlands on floods, computer modeling of water resource systems, groundwater pollution analysis and modeling, well-head protection area analysis, stochastic modeling of hydrologic variables, and GIS applications in hydrologic and non-point source pollution modeling.