M.S. in Civil Engineering (Geotechnical Engineering)

Candidates must satisfy a total of 30 credit hours (CH) with a minimum G.P.A. of 3.000 on a 4.000 scale.

All students must complete 15 credit hours (CH) of the core curriculum.

CEE 7340 Introduction to Solid Mechanics
Three dimensional stress and strain, failure theories, introduction to two-dimensional elasticity, torsion or prismatic members, beams on elastic foundation, introduction to plates and shells, and energy methods.
Prerequisites: CEE 2340 and MATH 2343.

CEE 7361 Matrix Structure Analysis and Introduction to Finite Elements Methods
A systematic approach to formulation of force and displacement method of analysis; representation of structures as assemblages of elements; computer solution of structural systems. *Prerequisite*: CEE 3350 or consent of instructor.

CEE 7364 Introduction to Structural Dynamics
Dynamic responses of structures and behavior of structural components to dynamic loads and foundation excitations; single- and multiple degree-of-freedom systems response and its applications to analysis of framed structures; introduction to systems with distributed mass and flexibility. *Prerequisites*: MATH 2343 and CEE 3350 or CEE 5361.

CEE 7385 Advanced Soil Mechanics
Physiochemical properties of soil and soil stabilization. Advanced theories of soil deformation and failure as applied to slope stability and lateral loads. Soil-water interaction in earthen dams. *Prerequisite*: CEE 4385.

CEE 7386 Foundation Engineering
Application of soil mechanics principles to the design and construction of shallow and deep foundations. Topics include subsurface investigation procedures to obtain soil parameters for design and construction of structure foundations, bearing capacity and settlement analyses, construction procedures and soil improvement techniques. *Prerequisite*: CEE 4385.

All students must complete 15 credit hours (CH) of specialization courses chosen from structural analysis, structural design, geotechnical engineering, transportation systems management, construction management, environmental engineering, and water resources courses:

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CEE 7(0,1,2,3,6)96 Thesis
Variable credit, but no more than six term hours in a single term and no more than four in each summer term. Registration in several sections may be needed to obtain the desired number of thesis hours. For example, four term hours of thesis would require enrollment in CEE 7196 and 7396.

CEE 7362 Engineering Analysis with Numerical Methods
Applications of numerical and approximate methods in solving a variety of engineering problems. Examples include equilibrium, buckling, vibration, fluid mechanics, thermal science, and other engineering applications.
Prerequisite: Permission of instructor.

CEE 7387 Geotechnical Earthquake Engineering

This course provides fundamental knowledge and practical application of soil dynamics and geotechnical earthquake engineering. This includes an overview of seismic hazards, the fundamentals of vibration, wave propagation in elastic medium, properties of dynamically loaded soils, earthquake-induced ground motion, ground response analysis, lateral earth pressure of retaining walls, liquefaction of soils, and seismic stability of earth embankments.

CEE 7388 Groundwater and Seepage

Examines fundamental principles of flow through porous media and related engineering problems. Topics include the saturated seepage theory and flow nets; the unsaturated flow theory; suction-saturation and saturation-hydraulic conductivity relationships; the principles of effective stress; laboratory and field testing methods for determining material characteristics; and numerical models for flow-related engineering problems.

CEE 7391 Special Projects (Topics on Geotechnical Engineering)

Intensive study of a particular subject or design project, not available in regular course offerings, under the supervision of a faculty member approved by the department chair.

CEE 8340 Theory of Elasticity

The study of stress, strain, and stress-strain relationships for elastic bodies. Classical solutions of two- and three-dimensional problems. The use of the Airy stress function is covered. *Prerequisite:* CEE 7340 or equivalent.

CEE 8364 Finite Elements in Structural and Continuum Mechanics

Theory and application of finite element; two- and three-dimensional elements; bending elements; applications of buckling and dynamic problems. *Prerequisite:* CEE 7361.

CEE 8366 Basic Concepts of Structural Stability

Unified approach to elastic buckling analysis of columns, plates, and shells using variational calculus (developed entirely in the course). *Prerequisite:* CEE 7340 or permission of instructor.