M.S. in Civil Engineering
(Structural 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 of prismatic members, beams on elastic foundation, introduction to plates and shells, and energy methods. *Prerequisites:* CEE 2340 and MATH 2343.

CEE 7361 Matrix Structural 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/ME 3350 or CEE/ME 5361.

CEE 7375 Advanced Concrete Design
Behavior, analysis and design of concrete slender columns, two-way slab systems, and deep beams. Yield line analysis for slabs. Design and behavior of shear walls, retaining walls, and foundation systems. *Prerequisite:* CEE 4350 or equivalent.

CEE 7377 Advanced Steel Design
Behavior and design of steel structures including general methods of plastic analysis, plastic moment distribution, steel frames, unbraced and braced frames, and composite construction. *Prerequisite:* CEE 4350 or equivalent.

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

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 CEE 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 7365 Introduction to Construction Management
Construction practice techniques and current technological tools are examined. Included are cost estimating, bidding, contract and contract bonds, risk and umbrella excess insurance, labor law and labor relations. Building codes and regulations are examined. Business methods with respect to managing project time and cost, including typical forms used in construction, are addressed.

CEE 7373 Prestressed Concrete

Theory and application of prestressed concrete members, time-dependent deflections, and continuous prestressed beams. *Prerequisite:* CEE 4350 or equivalent.

CEE 7385 Advanced Soil Mechanics

Physicochemical 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.

CEE 7391 Special Projects (Topics on Structural 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. Use of the Airy stress function is covered. *Prerequisite:* CEE 7340 or equivalent.

CEE 8364 Finite Element Methods 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.

CEE 8368 Theory of Plate Behavior

Analysis of flat plates subjected to normal loading, inplane loading, and thermal stresses. Plates of various shapes, thick plates, and anisotropic plates are analyzed for both small and large deflections. *Prerequisite:* CEE 7340 or permission of instructor.