

## CEE Graduate Program Core Classes

The following 9-12 hours are generally considered required classes  
for a M.S. and Ph.D. in the identified program of study.

CEE Program	Subject	Course	Title	Course Description
Construction	CE	6703	Constr Eng Management	(Prerequisite: consent of major advisor). Three hours lecture. Construction contracts and law, cost estimating, and project scheduling.
Construction	CE	6743	Analysis Mitigat. Of C2D	(Prerequisite: consent of major advisor). Three hours lecture. Overview of the different techniques used to analyze and mitigate conflicts, claims, and disputes (C2D) in civil engineering projects.
Construction	IE	6173	Occup Safety Eng	(Prerequisite: Junior standing). Three hours lecture. Causes and prevention of industrial accidents. Analysis of hazardous processes and materials. Design of occupational safety systems and programs.
Construction	IE	6533	Project Mgt	(Prerequisites: Grade of C or better in IE 4613). Three hours lecture. Use of CPM, PERT, and GERT for planning, managing and controlling projects. Computer procedures for complex networks.
Environmental	CE	6843	Environ Engineering Chemistry	(Prerequisite: consent of major advisor). Three hours lecture. Introduction to advanced theoretical concepts in sanitary engineering analysis with special emphasis on inorganic, organic, and physical chemistry.
Environmental	CE	6873	Water & Wastewater Eng	(Prerequisite: consent of major advisor). Two hours lecture. One hour laboratory. Evaluation of municipal water and waste-water characteristics and flows; application of various unit processes/unit operations for the treatment of municipal water and wastewater.
Environmental	CE	8803	Un Pro-Op Env Eng I	(Prerequisite: consent of major advisor). Three hours lecture. Theory and application of physical and chemical unit processes and operations available for the treatment of water and wastewater.
Environmental	CE	8823	Un Pro-Op Env Eng II	(Prerequisite: consent of major advisor). Three hours lecture. Theory and application of biological processes available for the treatment of wastewater.
Geotechnical	CE	8443	Soil Behavior	(Prerequisite: consent of major advisor). Three hours lecture. Review of methods of testing to define response; rationale for choosing shear strength and deformation parameters for soils for design applications.
Geotechnical	CE	8463	Slopes & Embankments	(Prerequisite: consent of major advisor). Analysis and design of geotechnical systems placed on an angle from the horizontal.
Geotechnical	CE	8473	Theoretical Soil Mechanics	(Prerequisite: consent of major advisor). Three hours lecture. Modern interpretation of soil behavior for engineering applications. Extrapolation of actual conditions from standard testing results.
Materials	CE	6103	Pavement Mat & Des	(Prerequisite: consent of major advisor). Three hours lecture. Analysis design of both flexible and rigid pavement structures.
Materials	CE	8303	Mat'l Characterization	(Prerequisite: consent of major advisor). Three hours lecture. Characterization of advanced material behaviors for pavement subgrades, bases and surface courses, Street dependency, viscoelasticity, repeated load moduli, and stabilization are central behaviors of interest.
Materials	CE	8333	Pavement Rehabilitation	(Prerequisite: consent of major advisor). Three hours lecture. Field methods for evaluating pavement performance including surveys, profiling, and frictional resistance. Impulse deflection testing of structural integrity. Pavement preservation and rehabilitation techniques.

Materials	CE	8343	Adv Pavement Materials	(Prerequisite: consent of major advisor). Three hours lecture. Properties, behavior and performance of highway and airfield paving materials; principally asphalt and concrete. Quality control and assurance. Constitute material properties and specifications.
Structures	CE	6913	Matrix Struct Analysis	(Prerequisite: consent of major advisor). Matrix formulation and computer analysis of structures. Linear stiffness analysis of truss and frames structures.
Structures	CE	6963	Steel Structures	(Prerequisite: consent of major advisor). Three hours lecture. Loads on structures. Analysis and design of steel structures using the AISC specifications. Focus on beams and columns.
Structures	CE	6973	Concrete Structures	(Prerequisite: consent of major advisor). Three hours lecture. Loads on structures. Analysis, design, and study of concrete structures using the ACI specifications. Focus on beams and columns.
Structures	EM	6123	Intro Finite Element	(Prerequisite: Consent of Instructor). Three hours lecture. Introduction to the mathematical theory, formulation, and computer implementation of the finite element method. Application to one-and two-dimensional problems in engineering mechanics.
Transportation	CE	6143	Traffic Engineering	(Prerequisite: Grade of C or better in CE 3113, credit in ST 3123). Three hours lecture. Human and vehicular characteristics as they affect highway traffic flow; traffic regulation, accident cause and prevention; improving flow on existing facilities; planning traffic systems.
Transportation	CE	6153	Freight Transp Sys Analysis	(Prerequisite: consent of major advisor). Three hours lecture. Definition, taxonomy and emerging issues for multi-modal transportation systems with focus on freight transportation and mathematical models for complex logistics and supply chain systems.
Transportation	CE	8133	Traffic Flow Theory	(Prerequisite: consent of major advisor). Three hours lecture. An analysis of the engineering and mathematical principles of traffic flow.
Transportation	CE	8163	Public Transportation	(Prerequisite: consent of major advisor). Three hours lecture. Principles of efficient management, and planning of public transportation systems: capabilities and limitations, optimal scale and layout, design and operation of transit systems.
Water Resources	CE	6513	Engr. Hydrology	(Prerequisite: consent of major advisor). Three hours lecture. Hydrologic processes; rainfall-runoff analysis; groundwater flow; frequency analysis; hydrologic design.
Water Resources	CE	8573	Hydro-environmental Analysis	(Prerequisite: consent of major advisor). Three hours lecture. Environmental engineering aspects of physical/chemical/biological processes impacting conventional and toxic materials in surface waters. Characteristics of rivers/streams, lakes and estuaries related to environmental quality.
Water Resources	CE	8593	Environmental Hydrology	(Prerequisite: consent of major advisor). Three hours lecture. Discuss hydrologic cycle and its effects on water quality; principles and models for pollutant transport and transformations in surface runoff, in-stream, unsaturated soil, and groundwater.
Water Resources	CE	8923	Surf Wat Qual Mod	(Prerequisite: consent of major advisor). Development of the mathematical formulations describing the distribution of concentration of conservative and nonconservative pollutants describing the distribution of concentration of conservative in natural waters.