
STRUCTURAL ENGINEERING AND STRUCTURAL MECHANICS

DEPARTMENT OF CIVIL AND MATERIALS ENGINEERING



UIC

UNIVERSITY OF
ILLINOIS AT CHICAGO

PROGRAM DESCRIPTION

The Department of Civil and Materials Engineering has programs of study in structural engineering and structural mechanics leading to the **Master of Science** and **Doctor of Philosophy in Civil Engineering** degrees. Graduate study and research in structural engineering and structural mechanics includes static and dynamic analysis of linear and nonlinear structures including modal analysis, behavior of structural materials, and the design of structural systems in concrete and steel. The curriculum provides a strong basis for advanced work in professional practice, research, and teaching.

Education in structural engineering and structural mechanics at UIC addresses both current and potential problems. Research is focused on the failure process of concrete structures; bridge rehabilitation and rating; health monitoring system; linear and nonlinear finite element analysis; structural dynamics and seismic response of structures; concrete fracture, damage, and creep; and microstructures of materials.

DEGREE REQUIREMENTS

The specific M.S. and Ph.D degree requirements are the same for all civil engineering students. Refer to the Departmental and Graduate College Degree requirements for details. Generally, M.S. students require completion of 36 semester hours of coursework (9-10 courses). Some students elect the thesis option that requires a minimum 24 hours of course work (6-7 courses, three at 500-level) and 12 hours of thesis credits. Beyond the M.S degree, Ph.D students require a minimum of 28 semester hours (7 courses) of course work and 36 semester hours of dissertation research. The specific research topic for M.S thesis or Ph.D dissertation is selected under the guidance of a faculty advisor. Commonly, the graduate students select their courses under the guidance of a faculty advisor. Courses are offered in the late afternoon/evening to accommodate working professionals in the Chicago area.

COURSES

Structural Engineering Design Courses:

CME 400	Advanced Design of Reinforced Concrete Structures
CME 401	Advanced Design of Metal Structures
CME 406	Bridge Design
CME 409	Structural Analysis II
CME 410	Design of Prestressed Concrete Structures
CME 500	Design of Concrete Plate and Shell Structures
CME 510	Advanced Design of Prestressed Concrete Structures
CME 520	Earthquake Engineering of Concrete Structures

Structural Mechanics and Dynamics Courses:

CME 434	Finite Element Analysis I
CME 435	Theory of Vibrations I
CME 532	Theory of Plates
CME 534	Finite Element Analysis II
CME 536	Nondestructive Testing of Concrete
CME 539	Elastic Instability I
CME 544	Structural Dynamics
CME 554	Nonlinear Finite Element Analysis

Mechanics of Solids Courses:

CME 430	Theory of Elasticity I
CME 431	Introduction to Continuum Mechanics
CME 433	Fracture Mechanics and Failure Analysis I
CME 530	Theory of Elasticity II
CME 531	Nonlinear Continuum Mechanics
CME 533	Fracture Mechanics and Failure Analysis II
CME 537	Plasticity I
CME 541	Mechanics of Composite Materials
CME 543	Experimental Fracture Mechanics

RESEARCH

The University of Illinois-Chicago is a Research I University with over **\$250 million in annual research expenditures**. The research facilities in Structural Engineering at UIC are state of the art. The laboratories are outfitted with the latest research instrumentation. All students doing a thesis option are required to perform research in their chosen area under the supervision of their faculty advisor. Research programs of the faculty are outlined in their respective web pages.

FINANCIAL ASSISTANCE

Financial support from traineeships and research assistantships are available. Full time graduate students are typically supported by external grants by structural engineering faculty.



FACULTY

Farhad Ansari, Ph.D., Professor and Department head: Structural Health Monitoring (SHM); Smart Sensors; and Nondestructive Testing.

Robert Bryant, Ph.D., Associate professor: Structural Mechanics.

Alexander Chudnovsky, Ph.D., Professor: Theoretical and experimental fracture mechanics, critical phenomena, probability and statistics in engineering applications, reliability and failure analysis.

Mohsen A. Issa, Ph.D., P.E., S.E., FACI, Professor: Building and Bridge Structures, Bridge Rating and Rehabilitation, Structural Monitoring Systems, Fast Track Construction of Bridge Decks, High Performance Concrete, Advanced Composites, Size Effect, and Surface Fractal Characterization in Fracture of Cementitious Materials.

Donald G. Lemke, Ph.D., Associate professor: Dynamics and Vibration, Rotor Dynamics, Vehicle Dynamics, Engineering Design and Optimization, and Forensics Engineering.

Craig Foster, Ph.D., Assistant professor: Multiscale and Stabilized Finite Element Methods for Fluids and Solids, Fluid-structure Interaction, Computational Micro-mechanics, Nonlinear Continuum Mechanics and Constitutive Modeling.

Ming L. Wang, Ph.D., Professor: Experimental Mechanics, Fiber Reinforced Composites, Construction Materials, Recycled Waste Materials, Structural Dynamics, Earthquake Engineering, Structural Monitoring, Structural Damage Assessment, Random Vibrations.

Chien H. Wu, Ph.D., Professor: Configurational evolutions and forces in material structures, Diffusion in solids, phase transformations and interfacial phenomena, Eshelby stress and its thermodynamic conjugate, Elasticity, stability and fracture mechanics, Continuum mechanics, nonlinear elasticity and very large deformations of nonlinear membranes, and Linear and nonlinear vibrations, and theory of plates and shells.

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