COLUMBIA | ENGINEERING
The Fu Foundation School of Engineering and Applied Science

CIVIL ENGINEERING AND ENGINEERING MECHANICS

The Department of Civil Engineering and Engineering Mechanics focuses on two broad areas of instruction and research. The first, the classical field of civil engineering, deals with the planning, design, construction, and maintenance of the built environment. This includes buildings, foundations, bridges, transportation facilities, nuclear and conventional power plants, hydraulic structures, and other facilities essential to society. The second is the science of mechanics and its applications to various engineering disciplines. Frequently referred to as applied mechanics, it includes the study of the mechanical and other properties of materials, stress analysis of stationary and movable structures, the dynamics and vibrations of complex structures, aero- and hydrodynamics, and the mechanics of biological systems. The Master of Science concentrations are:

Advanced Infrastructure Materials
Computational and Data-Driven Engineering Mechanics
Construction Engineering and Management
Construction Strategic Management, Entrepreneurship, and Leadership
Engineering Mechanics
Environmental Engineering and Water Resources
Forensic (Structural) Engineering
Geotechnical Engineering
Infrastructure Engineering
Real Estate Development, Construction, and Finance
Smart and Sustainable Cities
Structural Engineering
Transportation Engineering

The Master of Science coursework includes:

CIEN 9120 Independent studies in flight sciences.
By conference. Prerequisites: the instructor's permission. This course is geared toward students interested in flight sciences and flight structures. Topics related to aerodynamics, propulsion, noise, structural dynamics, aero elasticity, and structures may be selected for supervised study. A term paper will be required.

CIEE E4252 Foundations of Environmental Engineering.
Engineering aspects of problems involving human interaction with the natural environment. Review of fundamental principles that underlie the discipline of environmental engineering, i.e., constituent transport and transformation processes in environmental media such as water, air, and ecosystems. Engineering applications for addressing environmental problems such as water quality and treatment, air pollution emissions, and hazardous waste remediation.

CIEE E4257 Groundwater contaminant transport and remediation.
Sources and types of groundwater contamination. Groundwater hydrology. Groundwater contaminant fate and transport. Flow and transport in the unsaturated zone. Nonaqueous phase liquids and multiphase flow. Physical and numerical models for contaminant transport. Characterization and assessments of contaminated sites. Groundwater remediation alternatives. Regulations.

CIEN 9120 Independent studies in flight sciences.
Prerequisites: the instructor's permission.
This course is geared toward students interested in flight sciences and flight structures. Topics related to aerodynamics, propulsion, noise, structural dynamics, aeroelasticity, and structures may be selected for supervised study. A term paper will be required.

CIEN 9130 Independent studies in construction.
Prerequisites: Permission by department chair and instructor. Independent study of engineering and construction industry problems. Topics related to capital planning and financing, project management, contracting strategies and risk allocation, dispute mitigation and resolution, and infrastructure assessment and management may be selected for supervised study.

CIEN 9165 Independent studies in environmental engineering.
Prerequisites: (CIEE E4252) or equivalent.
Emphasizes a one-on-one study approach to specific environmental engineering problems. Students develop papers or work on design problems pertaining to the treatment of solid and liquid waste, contaminant migration, and monitoring and sampling programs for remediation design.

CIEN 9201 Civil engineering reports.
A project on some civil engineering subject approved by department chair.
CIEE E4163 Sustainable Water Treatment and Reuse. 3 points. Prerequisites: Introductory chemistry (with laboratory) and fluid mechanics. Fundamentals of water pollution and wastewater characteristics. Chemistry, microbiology, and reaction kinetics.

CIEN E3127 Structural design projects. *3 points*.
Prerequisites: (CIEN E3125) and (CIEN E3126) or CIEN E3125 and E3126 or instructor's permission. Design projects with various structural systems and materials.

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CIVIL ENGINEERING AND ENGINEERING MECHANICS FACULTY

GEORGE DEODATIS

SANTIAGO AND ROBERTA CALATRAVA FAMILY PROFESSOR IN CIVIL ENGINEERING AND CHAIR OF CIVIL ENGINEERING AND ENGINEERING MECHANICS

UPMANU LALL

ALAN & CAROL SILBERSTEIN PROFESSOR OF EARTH & ENVIRONMENTAL ENGINEERING, AND CIVIL ENGINEERING & ENGINEERING MECHANICS; DIRECTOR COLUMBIA WATER CENTER; CHAIR OF EARTH AND ENVIRONMENTAL ENGINEERING

ANDREW W. SMYTH

PROFESSOR OF CIVIL ENGINEERING AND ENGINEERING MECHANICS; CHAIR OF SMART CITIES CENTER AT COLUMBIA'S DATA SCIENCE INSTITUTE

SHARON DI

ASSISTANT PROFESSOR OF CIVIL ENGINEERING AND ENGINEERING MECHANICS

MARIA FENG

RENWICK PROFESSOR OF CIVIL ENGINEERING AND ENGINEERING MECHANICS

JACOB FISH

CARLETON PROFESSOR OF CIVIL ENGINEERING AND ENGINEERING MECHANICS