CEE M.Eng Concentration Curriculum Overview

M.Eng, CEE Concentration:

Sustainable Data-Driven Infrastructure in CEE

	Fall	Winter	Spring	Summer
Engineering Leadership and Entrepreneurship	**ENGR 201P Eng. Leadership Entrep: Innovation**	**ENGR 205P Technical Project Management**	**ENGR 207P People Management and Communication**	
ProSeminar	**X**	**X**	**X**	
Sustainable Infrastructure	**CEE 201P Life Cycle Assessment Methods**	**CEE 202P Green Building Design**	**CEE 203P Supply-Chain Emissions Accounting**	
Data Science in Civil and Environmental Engineering	**CEE 207P Intro. to Data Science Program. and Optim.**	**CEE 208P Data Analytics for CEE**	**CEE 210P Smart Cities** (applies to both areas)	
Or up to 3 electives from the general elective list with approval.				
Capstone project		**X**	**X**	Optional

M.Eng Core: Eng. Leadership and Entrepreneurship

All MEng students take these courses.

ENGR 201P Engineering Leadership and Entrepreneurship: Innovation

Catalog Description: Teaches concepts on how to develop innovate/disruptive ideas through actual delivery and adoption. Focuses on the critical thinking skills, the process of developing an idea into a product/service, and teaching a framework to foster adoption of the idea and product.

ENGR 205P Technical Project Management

Catalog Description: Project management is the most effective method of delivering products within cost, schedule, and resource constraints. Students will gain a strong working knowledge of the basics of technical project management, particularly, managing scope, planning, budgeting, resourcing, and risk management.

ENGR 207P People Management and Communication

Catalog Description: Students will gain knowledge on the strategies to effectively manage people. This includes improving recruitment and retention, training, managing conflicts, motivating people, giving feedback, and effective communication to manage each direct report.

M.Eng CEE, Sustainable Infrastructure Courses

CEE 201P Life Cycle Assessment Methods (Outlines)

Catalog Description: Introduction and application of life cycle assessment methods for characterizing resource consumption and environmental emissions of products and civil infrastructure systems. Life cycle inventory development, system boundaries and scoping, calculation of environmental impact indicators.

CEE 202P Green Building Design

Catalog Description: Application of life cycle assessment methods to green and sustainable building design. Overview and application of building sustainability rating and certification systems using the LEED framework. Assessment and comparison of different building types.

CEE 203P Organizational Pollutant Emissions Accounting

Catalog Description: Application of life cycle assessment methods to account for emissions from the supply chain of products and infrastructure systems. Calculation and proper interpretation of Scope 1, 2, and 3 emissions categories and emissions footprint metrics.

M.Eng CEE, Data Science in Civil and Envir. Eng. Courses

CEE 207P Intro. to Data Science Programming and Optimization (Outlines)

Catalog Description: Basics of object-oriented programming; data analysis using scientific programming packages; best programming practices; civil and environmental engineering analysis and design of linear systems; introduction to the analysis and design of non-linear systems in civil engineering.

CEE 208P Data Analytics for Civil Engineers

Catalog Description: Quantitative research methods and statistical techniques for analyzing and viewing civil and environmental engineering data. Descriptive statistics, hypothesis testing, linear and logical regression, clustering and introduction to machine learning.

Fall Quarter 2024

Time	Monday	Tuesday	Wednesday	Thursday	Friday
12:00 PM					
12:30 PM					
1:00 PM			**ENGR 211P** **ProSeminar** (1:00-1:50pm)		
1:30 PM					
2:00 PM					
2:30 PM					
3:00 PM					
3:30 PM					
4:00 PM	**CEE 207P** **Intro. to Data Science** **Program. and Optim.** (4:00-5:20pm)				
4:30 PM					
5:00 PM		**ENGR 210P** **Capstone Design** (5:00-6:20pm) *Occasionally*		**ENGR 210P** **Capstone Design** (5:00-6:20pm) *Occasionally*	
5:30 PM					
6:00 PM	**ENGR 201P** **Leadership &** **Entrepreneurship** (6:00-7:50pm)		**CEE 201P:** **Life Cycle Assessment** **Methods** (6:00-8:50pm)		
6:30 PM					
7:00 PM					
7:30 PM					
8:00 PM					
8:30 PM					
9:00 PM					

M.Eng CEE, Data Science in Civil and Envir. Eng. **Electives**

MEng CEE students focusing on Data Science in CEE* can take these courses.

CEE 2xxP Data Analytics for Building Energy Operations Optimization **May be offered in the future.**

Catalog Description: Application of data science and machine learning techniques to improving the operations of commercial building energy management systems. Investigate opportunities for improving system visibility, energy efficiency, reducing operational emissions, and energy costs.

CEE 2xxP Data Analytics for Flexible Electricity Distribution Systems **May be offered in the future.**

Catalog Description: Application of data science and machine learning techniques to improving the management of power flow and resilience of electricity distribution systems with increasing levels of distributed electricity generation resources, loads, and storage.

CEE 214 GIS for Civil and Environmental Engineering

Catalog Description: Explore Geographic Information Systems' applications in civil and environmental engineering, covering data formats, queries, spatial analysis, cartography, and GIS models. Learn through examples from environmental science, hydrology, weather, natural hazards, urban development, and transportation.

CEE 291 Remote Sensing of the Environment

Catalog Description: Learn remote sensing principles and their hydrological applications, including sensor systems, image processing, classification, and data science methods for image analysis. Explore examples of hydrologic processes like precipitation, soil moisture, and vegetation through remote sensing.

*Any MEng CEE student can take these courses upon approval.

M.Eng CEE, Electives by Area (Outlines)

Structural Engineering Area

CEE 231 - Foundation Engineering

CEE 247 - Structural Dynamics

CEE 250 - Finite Element Method in Structural Engineering

CEE 254 - Advanced Reinforced Concrete Behavior & Design

CEE 255 - Advanced Structural Steel Design

Transportation Engineering Area

CEE 211P - Sustainable Transportation

CEE 212P - Transportation Policy and Technology

CEE 210P - Smart Cities

Water Resources Engineering Area

CEE 263P - Wastewater Treatment Process Design

CEE 269 - Beach Dynamics

CEE 270 - Flood Risk and Modeling

Environmental Engineering Area

CEE 266P - Biological Processes for Bioremediation

CEE 263A - Advanced Biological Processes

CEE 264 - Carbon and Energy Footprint Analysis of Water

General Engineering

ENGR 230P - Introduction to Machine Learning

ENGR 235P - Eng. Design and Simulation: Tools and Process