



UC Irvine

Department of Civil and
Environmental Engineering

CEE M.Eng Concentration Curriculum Overview

M.Eng in Civil and Environmental Engineering

Civil and environmental engineers of various sub-disciplines interested in how to achieve project sustainability goals through life-cycle assessment, energy efficiency, data analytics, pollution science, and environmental permitting.

Structural Engineers

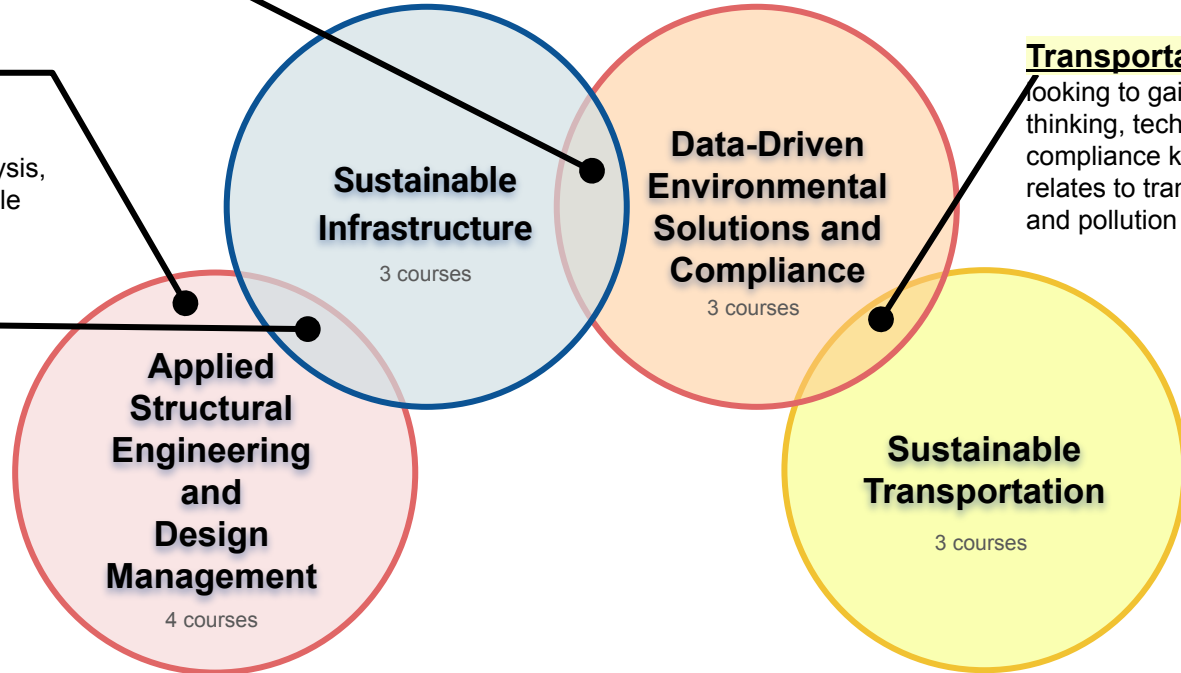
looking to advance their technical knowledge (equivalent to an MS) including nonlinear time history analysis, seismic and performance design while also gaining management training.

Structural Engineers

interested in sustainability topics in building design and work adjacent to architectural engineering. For instance, LEED certified buildings, and sustainability of construction practices.

Transportation Engineers

looking to gain more forward thinking, technical, and compliance knowledge as it relates to transportation systems and pollution impacts.



Exact course offerings are dependent upon cohort size and distribution of academic interest

M.Eng CEE Concentration

Potential* Full Curriculum 2025-26

Offered in
2025-2026

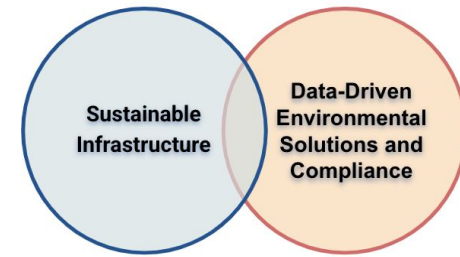
Course Categories	Fall	Winter	Spring
Sustainable Infrastructure	CEE 201P Life Cycle Assessment Methods	CEE 202P Green Building Design	CEE 209P Applied Sustainability Topics in CEE Practice
Data-Driven Environmental Solutions and Compliance	CEE 207P Intro to Data Analytics and Data Science for CEE	CEE 213P Air Pollution Science and Control	CEE 215P Environmental Permitting and Impact Reporting
Sustainable Transportation	CEE 212P Transportation Policy and Technology	CEE 211P Sustainable Transportation	CEE 210P Smart Cities
Applied Advanced Structural	CEE 234P Adv. Structural Modeling and Commercial Software	CEE 235P Adv. Structural Design and Earthquake Simulation	CEE 236P Practical Soil-Structure Interaction for Infrastructure
Alternative and/or Additional Courses, <u>cohort size permitting</u>			CEE 203P Supply-Chain Emissions Accounting
	CEE 214 GIS and Data Analytics for CEE	CEE 208P Data Analytics for Civil Engineers	
	CEE 247 Structural Dynamics	CEE 255 Adv. Structural Steel Design	CEE 237P BIM and Structural Project Mgmt

***Exact course offerings are dependent upon cohort size and distribution of academic interest**

Sample Plan of Study

**Offered in
2025-2026**

Courses in Applied Data-Driven Sustainable Infrastructure



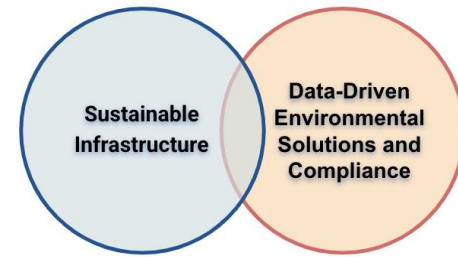
	Fall	Winter	Spring
Engineering Leadership and Entrepreneurship	ENGR 201P Eng. Leadership Entrep: Innovation	ENGR 205P Technical Project Management	ENGR 207P People Management and Communication
Sustainable Infrastructure	CEE 201P Life Cycle Assessment Methods	CEE 202P Green Building Design	CEE 209P Applied Sustainability Topics in CEE Practice
Data-Driven Environmental Solutions and Compliance	CEE 207P Intro to Data Analytics and Data Science for CEE	CEE 213P Air Pollution Science and Control	CEE 215P Environmental Permitting and Impact Reporting
Capstone	--	Capstone Project with a company and/or faculty member	

***Exact course offerings are dependent upon cohort size and distribution of academic interest**

Sample Plan of Study

**Offered in
2025-2026**

Courses in Applied Data-Driven Sustainable Infrastructure



This course sequence is designed for engineers looking to integrate sustainability and environmental impact assessment into infrastructure design and decision-making. Students will develop expertise in life cycle assessment, pollutant emissions accounting, air quality management, green building design, and regulatory compliance. The curriculum blends technical analysis with applied case studies, preparing engineers to address environmental challenges in both industry and government roles.

Courses emphasize hands-on application through data-driven problem-solving, industry-standard tools, and regulatory frameworks such as LEED, CEQA, and NEPA. A culminating course on applied sustainability brings together knowledge from prior coursework, featuring case studies led by industry and agency practitioners to demonstrate real-world implementation of sustainability strategies in civil and environmental engineering practice.

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Sample Plan of Study

Planned for 2026-27, come join the cohort!

Courses in

Applied Adv. Structural Engineering and Design Mgmt

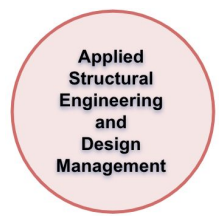
Applied
Structural
Engineering
and
Design
Management

	Fall	Winter	Spring
Engineering Leadership and Entrepreneurship	ENGR 201P Eng. Leadership Entrep: Innovation	ENGR 205P Technical Project Management	ENGR 207P People Management and Communication
Applied Advanced Structural	CEE 234P Adv Structural Modeling with Commercial Software	CEE 235P Applied Structural Seismic Design and Evaluation	CEE 236P Practical Soil-Structure Interaction for Infrastructure
Core Structural Technical Topics and Design Mgmt	CEE 247 Structural Dynamics Or CEE 250 FEA	CEE 255 Adv. Structural Steel Design	CEE 237P BIM and Structural Design Management Or CEE 254 Adv. RC Design Or CEE 231/232 Adv. Found./Geotech EQ
Capstone	--	Capstone Project with a company and/or faculty member	

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Sample Plan of Study

Planned for 2026-27, come join the cohort!



Courses in

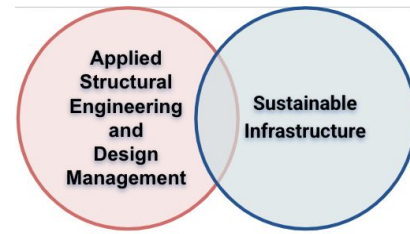
Applied Adv. Structural Engineering and Design Mgmt

This plan of study is designed for engineers who want to deepen their technical expertise and prepare to step into leadership roles. The courses focus on advanced practical skills like nonlinear modeling, time history analysis, performance-based seismic design, and bridge engineering, all with an emphasis on real-world applications. In addition to people and technical project management courses, this sequence offers a Building Information Modeling (BIM) course to prepare graduates for managing structural design projects. **This set of courses is all about preparing engineers to tackle the challenges of modern infrastructure, combining technical know-how with project management savvy.**

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Sample Plan of Study

Planned for 2026-27, come join the cohort!



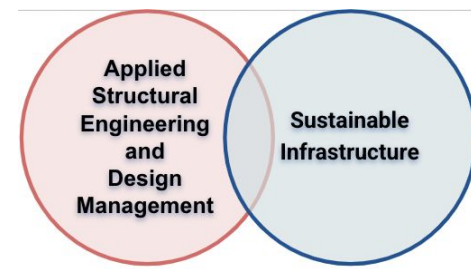
Courses in Sustainable Structural Design and Mgmt

	Fall	Winter	Spring
Engineering Leadership and Entrepreneurship	ENGR 201P Eng. Leadership Entrep: Innovation	ENGR 205P Technical Project Management	ENGR 207P People Management and Communication
Sustainable Infrastructure	CEE 201P Life Cycle Assessment Methods	CEE 202P Green Building Design	CEE 2xxP Applied Sustainability Topics in CEE Practice
Core Structural Technical Topics and Design Mgmt	CEE 247 Structural Dynamics	CEE 255 Adv. Structural Steel Design	CEE 237P BIM and Structural Design Management
Capstone	--	Capstone Project with a company and/or faculty member	

***Exact course offerings are dependent upon cohort size and distribution of academic interest**

Sample Plan of Study

Planned for 2026-27, come join the cohort!



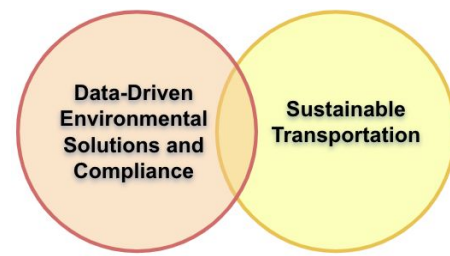
Courses in Sustainable Structural Design and Mgmt

This course series equips engineers with some advanced technical topics in addition to managerial skills in structural design considering sustainability, and digital project delivery. Students will develop skills in earthquake-resistant design, and the behavior of structural steel systems, with applications to real-world building and infrastructure projects.

Courses in life cycle assessment and green building design provide a sustainability foundation, while BIM and structural design management focus on digital workflows, interdisciplinary coordination, and constructability. Through project-based learning and software applications, students gain the practical skills needed for complex structural engineering challenges in modern, sustainable construction.

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Sample Plan of Study

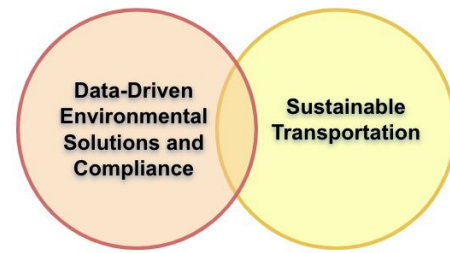


Courses in Sustainable Transportation in CEE

	Fall	Winter	Spring
Engineering Leadership and Entrepreneurship	ENGR 201P Eng. Leadership Entrep: Innovation	ENGR 205P Technical Project Management	ENGR 207P People Management and Communication
Sustainable Transportation	CEE 212P Transportation Policy and Technology	CEE 211P Sustainable Transportation	CEE 210P Smart Cities
Data-Driven Environmental Solutions and Compliance	CEE 207P Intro to Data Analytics and Data Science for CEE	CEE 213P Air Pollution Science and Control	CEE 215P Environmental Permitting and Impact Reporting
Capstone	--	Capstone Project with a company and/or faculty member	

***Exact course offerings are dependent upon cohort size and distribution of academic interest**

Sample Plan of Study



Courses in Sustainable Transportation in CEE

This course sequence equips engineers with the skills to analyze and design transportation systems that balance sustainability, emerging technologies, and environmental impact. Students will develop expertise in life cycle assessment, green building design, and pollutant emissions accounting while gaining specialized knowledge in smart city transportation systems, sustainable mobility solutions, and transportation policy.

The curriculum integrates technical methods with policy and regulatory frameworks, covering topics such as connected and automated vehicles, mobility services, emissions reduction strategies, and land use planning. Through hands-on projects, data-driven analysis, and case studies, students will apply engineering and policy concepts to real-world challenges in sustainable and intelligent transportation systems.

***Exact course offerings are dependent upon cohort size and distribution of academic interest**

Course Descriptions

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

CEE 201P Life Cycle Assessment Methods

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.

CEE 209P Applied Sustainability Topics in CEE Practice

Catalog Description: Eng. applications for sustainable infrastructure. Three modules led by practitioners, each addressing a sustainability challenge. Case studies, problem-solving projects, assignments applying prior coursework. Focus on real-world engineering practices in civil and environmental sustainability.

M.Eng CEE, **Data-Driven Env. Solutions and Compliance**

CEE 207P Intro. to Data Science Programming and Optimization

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 213P - Air Pollution Science and Control

Catalog Description:

Sources, dispersion, effects of air pollutants. Emission factors, inventories, meteorology, air chemistry, modeling, impact assessment, monitoring, control strategies. Air pollutant formation, pollution control measures. Design air quality management plan mirroring regulatory agency practices.

CEE 215P - Environmental Permitting and Impact Reporting

Catalog Description:

Regulatory frameworks, CEQA, NEPA. Environmental documents: Initial Studies, EIRs, EAs. Mitigation measures, legal challenges. Case studies, project-based exercises, industry guest lectures. Emphasis on practical applications, real-world environmental reviews, compliance, and permitting processes.

M.Eng CEE, Sustainable Transportation

CEE 210P Smart Cities

Catalog Description: Engineering methods and concepts associated with smart cities: data acquisition, data analysis/science, systems analysis, systems engineering. Emerging and future transportation applications: connected, automated, and electric vehicles and shared-use mobility services such as ride-hailing, ride-pooling bikesharing, and micromobility.

CEE 211P Sustainable Transportation.

Catalog Description: Overview of the impacts of transportation on the environment, with an emphasis on air pollution from motor vehicles, but including broader impacts such as regional air quality, noise, human health, water and solid waste pollution, land use, and global climate change. Introduction to regulatory and economic policies that have been and could be used to make transportation systems sustainable.

CEE 212P Transportation Policy and Technology

Catalog Description: The process of planning, designing, and managing the transportation system from the perspective of current and emerging transportation policies and technologies. Focus on technical and institutional perspectives on issues such as urban design, autonomous vehicles, mobility and accessibility, innovative modes and services, evolving networks and land use patterns, induced demand, transport safety.

M.Eng CEE, Adv. Applied Structural Engineering

CEE 234P - Adv Structural Modeling with Commercial Software

Catalog Description: Nonlinear analysis and modeling, including pushover and nonlinear time history analyses, using industry-standard commercial software. Material and component monotonic and cyclic modeling, foundation representation, damping model considerations for time history analyses, other advanced topics in structural modeling and analysis.

CEE 235P Applied Structural Seismic Design and Evaluation

Catalog Description: Contemporary and emerging structural design/assessment methods, Performance based seismic design, hazard analysis, engineering response assessment, prediction of collapse, damage and loss modeling. Project involving performance assessment of multistory buildings.

CEE 236P Practical Soil-Structure Interaction for Infrastructure

Catalog Description: Address practical challenges in implementing soil-structure interaction in geo-structural design. Topics include foundational principles of geotechnical engineering, dynamic soil-structure interaction, foundation design, seismic effects, and numerical modeling techniques, and implications on superstructure design.

CEE 237P BIM and Structural Design Management

Catalog Description: Understanding integration of Building Information Modeling (BIM) into structural design workflows. Focus on project coordination, collaboration with other contractors, and effective management of design data to streamline construction processes and ensure project success including plan reading and interpretation.

Quarter Schedule **Example**

Time	Monday	Tuesday	Wednesday	Thursday	Friday
12:00 PM					
12:30 PM	Generally, courses are scheduled to accommodate working professionals				
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)		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

NOTE, this list needs to be updated, please check with

Concentration Director Joel Lanning, PhD, PE

or

Concentration Director Brian Tarroja, PhD, PE

CEE 266P - Biological Processes for Bioremediation

CEE 267P - 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