

Construction Management & Engineering (CM&E)

CM&E 111. Introduction to Construction Management and Engineering. 1 Credit.

This course provides an introduction to the roles and duties of construction professionals and the various career opportunities available to construction graduates. 1 lecture. F.

CM&E 194. Individual Study. 1-3 Credits.

CM&E 196. Field Experience. 1-15 Credits.

CM&E 199. Special Topics. 1-5 Credits.

CM&E 200. Construction Documents and Codes. 3 Credits.

This course provides an introduction to construction working drawings; methods and materials of construction; and building codes. Prereq: Pre-Construction Management or Construction Engineering majors only.

CM&E 203. Building Construction: Methods and Materials. 3 Credits.

This course provides an introduction to the fundamentals of building construction, materials, and methods for residential and commercial construction. Prereq: CM&E 200 and students must be admitted to the Construction Management program and be at least sophomore standing.

CM&E 204. Construction Surveying. 3 Credits.

An introduction to basic surveying procedures and operations for construction site layout, alignment, and dimension control. Fieldwork topics include the operation of automatic levels, laser levels, transit theodolites, total stations, and GPS receivers. 2 one-hour lectures and 1 three-hour fieldwork. Prereq: MATH 105, Construction Management or Construction Engineering majors and at least sophomore standing.

CM&E 205. Building Construction. 3 Credits.

Introduction to planning, design, and construction of residential structures, including cost estimating and project scheduling. Computer applications. 3 lectures. S.

CM&E 212. Construction Graphic Communications. 3 Credits.

This course provides an introduction to computer aided drafting (AutoCAD) for the creation of two-dimensional drawings related to the construction industry including a comprehensive final project layout using the techniques introduced in the course. Prereq: Construction Management or Construction Engineering major.

CM&E 240. Financial Cost Concepts for Construction Managers. 3 Credits.

This course provides an introduction to financial management and economic appraisal of construction projects. Topics include: accounting systems; financial documents; managing costs and cash flow; setting profit margins for bidding; time value of money; and economic evaluation of projects. Prereq: ECON 105, Construction Management or Construction Engineering major with at least sophomore standing.

CM&E 250. Construction Statics and Mechanics. 3 Credits.

This course provides an introduction to the principles of statics and strength of materials with a focus on the behavior of structural components and systems in the construction industry. Prereq: MATH 146 or higher, Construction Management major and at least sophomore standing.

CM&E 260. Soils and Foundations. 3 Credits.

This course provides a discussion of the aspects of engineering & physical properties of soils; stress; settlement; consolidation; slope stability; earth pressure; bearing capacity; drainage; pore pressure; and foundations. 2 lectures, 1 three-hour laboratory. Prereq: Construction Management majors only.

CM&E 291. Seminar. 1-3 Credits.

CM&E 292. Study Abroad. 1-15 Credits.

CM&E 294. Individual Study. 1-3 Credits.

CM&E 299. Special Topics. 1-5 Credits.

CM&E 301. Construction Technology and Equipment. 3 Credits.

This course provides a discussion of construction techniques; analysis of equipment costs; production; methods of equipment selection; earthwork; dewatering systems; and aggregate production. Prereq: CM&E 240, CM&E 260 or CE 316, admission to the Construction Management or Construction Engineering program and junior standing. S.

CM&E 305. Pre-Construction Management. 3 Credits.

Looks into the construction management process, giving insight to how the construction professional interacts with other industry professionals. Overview of estimating, scheduling, and administrative functions of a project and the collaborative efforts required. Prereq: Admission to the Construction Management or Construction Engineering program and at least junior standing.

CM&E 315. Specifications and Contracts. 3 Credits.

This course provides a discussion of various types of construction contracts; contract administration; specifications using CSI and AIA documents. 3 lectures. Prereq: Admission to Construction Management or Construction Engineering program and Junior standing. F.

CM&E 325. Fluid Mechanics for Technologists. 3 Credits.

Basic principles of fluid mechanics are introduced with an emphasis on topics pertinent to construction management students. Topics include fluid properties, fluid statics, fluid kinematics, energy and impulse-momentum considerations in fluid flow, pumping systems, steady uniform flow in open channels, fluid measurements, and forces on immersed bodies. Prereq: ME 221. S.

CM&E 370. Introduction to Cost Estimating. 2 Credits.

Includes plan reading, definitions of drawing symbols, and material takeoff for estimating quantities for a commercial construction project using the Construction Specifications Institute Technical Divisions 1 through 16. 2 lectures. Prereq: Junior standing. F.

CM&E 379. Study Tour Abroad. 1-6 Credits.

CM&E 380. Construction Estimating: Quantities and Costs. 3 Credits.

This course provides an introduction to the methods and techniques of conceptual and detailed construction estimating, including: quantity takeoffs; costs related to labor, materials, equipment, overhead and profit; and bidding strategies. Prereq: CM&E 200 and admission to the Construction Management or Construction Engineering program and at least junior standing.

CM&E 391. Seminar. 1-3 Credits.

CM&E 394. Individual Study. 1-3 Credits.

CM&E 397. Fe/Coop Ed/Internship. 1-4 Credits.

CM&E 399. Special Topics. 1-5 Credits.

CM&E 403. Scheduling and Project Control. 3 Credits.

This course provides a discussion on the theories, principles, and techniques of construction planning and scheduling with an emphasis on time management, costs, and resources through the preparation and analysis of network schedules. Prereq: CM&E 380, admission to the Construction Management or Construction Engineering program and at least senior standing. F {Also offered for graduate credit - see CM&E 603}.

CM&E 405. Construction Support Operations. 3 Credits.

This course provides an introduction to construction safety, construction quality control management, and labor productivity. Prereq: STAT 330. {Also offered for graduate credit - see CM&E 605}.

CM&E 409. Highway Construction. 3 Credits.

This course discusses the employment of the mechanistic-empirical design framework to the design and construction of rigid and flexible highway pavements, including: sub-grade, base courses, surface courses, evaluation criteria (soil, climate, traffic, material & drainage), and construction/maintenance costs. Prereq: CM&E 260. S {Also offered for graduate credit - see CM&E 609}.

CM&E 413. Construction Capstone. 2 Credits.

This capstone course provides students with hands-on real-world design and construction applications concerning an actual construction project. Meets jointly with CM&E 489 and CE 489. Prereq: Senior standing.

CM&E 420. Labor Productivity in Construction. 3 Credits.

This course focuses on the study of issues related to labor productivity; labor contracts and regulations; and labor resources. 3 lectures. Prereq: CM&E 315. Senior standing. S.

CM&E 421. Electrical and Mechanical Construction. 3 Credits.

This course provides an introduction to electrical and mechanical systems, the design and construction procedures used, code-based requirements, interaction with general construction and structural components, and spatial requirements. Prereq: PHYS 211 or PHYS 251 or PHYS 252 and admission to the Construction Management program and at least senior standing. S.

CM&E 430. Land Development. 3 Credits.

This course provides an introduction to the practical applications of the planning, design, and construction phases of the land development process. Prereq: CM&E 204, CM&E 212 and admission to the Construction Management program and at least senior standing. F {Also offered for graduate credit - see CM&E 630}.

CM&E 450. Steel Design and Construction. 3 Credits.

This course provides a discussion of the selection and design of structural steel systems and methods of construction assembly. 3 lectures. Prereq: CM&E 250 and admission to the Construction Management program and senior standing. F.

CM&E 453. Concrete Design and Construction. 3 Credits.

This course provides an introduction to the fundamental concepts of concrete construction from both design and construction perspectives. 2 one-hour lectures, 1 three-hour laboratory. Prereq: CM&E 250 and CM&E 260 and admission to the Construction Management program and senior standing. S.

CM&E 460. Infrastructure Management. 3 Credits.

This course provides an introduction to the methodologies, tools, and techniques of infrastructure management. Course topics focus on performance measures; deterioration modeling; life-cycle costs; optimization; budgeting; financial management; and policy analysis. Prereq: Junior standing. {Also offered for graduate credit - see CM&E 660}.

CM&E 465. Bridge Engineering and Management. 3 Credits.

This course provides an introduction to the planning, design, construction, and management concepts of structural steel and reinforced concrete bridges, Including: application of AASHTO LRFD specifications and latest developments in bridge management systems. Prereq: Admission to the Construction Management or Construction Engineering program and senior standing. {Also offered for graduate credit - see CM&E 665}.

CM&E 470. Information Technologies for Construction Managers. 3 Credits.

This course provides an introduction to the applications and techniques of information technologies used in construction. Topics to include: operational concepts and computer software packages for estimating, scheduling, data management, CAD and automation. Prereq: CM&E 200 and CM&E 212. {Also offered for graduate credit - see CM&E 670}.

CM&E 475. Design of Site Erosion Control. 3 Credits.

This course provides an introduction to construction site erosion mechanisms; site hydrology and sediment transport; the selection, design, and maintenance of erosion control devices; and erosion control standards and regulations. Prereq: CE 309.

CM&E 488. Construction Management Capstone. 3 Credits.

This course focuses on applying knowledge and skills learned in the previous courses, BIM, and other software programs to prepare a bid proposal and an on-site construction management plan for a building project. Prereq: Admission to the Construction Management or Construction Engineering program and at least senior standing.

CM&E 489. Construction Design Capstone. 3 Credits.

This course focuses on the design and construction aspects of an actual construction project. Prereq: Senior standing in Construction Engineering.

CM&E 491. Seminar. 1-5 Credits.**CM&E 492. Study Abroad. 1-15 Credits.****CM&E 494. Individual Study. 1-5 Credits.****CM&E 496. Field Experience. 1-15 Credits.****CM&E 499. Special Topics. 1-5 Credits.****CM&E 603. Scheduling and Project Control. 3 Credits.**

This course provides a discussion on the theories, principles, and techniques of construction planning and scheduling with an emphasis on time management, costs, and resources through the preparation and analysis of network schedules. F {Also offered for undergraduate credit - see CM&E 403}.

CM&E 605. Construction Support Operations. 3 Credits.

This course provides an introduction to construction safety, construction quality control management, and labor productivity. {Also offered for undergraduate credit - see CM&E 405}.

CM&E 609. Highway Construction. 3 Credits.

This course discusses the employment of the mechanistic-empirical design framework to the design and construction of rigid and flexible highway pavements, including: sub-grade, base courses, surface courses, evaluation criteria (soil, climate, traffic, material & drainage), and construction/maintenance costs. S {Also offered for undergraduate credit - see C&ME 409}.

CM&E 630. Land Development. 3 Credits.

This course provides an introduction to the practical applications of the planning, design, and construction phases of the land development process. F {Also offered for undergraduate credit - see CM&E 430}.

CM&E 660. Infrastructure Management. 3 Credits.

This course provides an introduction to the methodologies, tools, and techniques of infrastructure management. Course topics focus on performance measures; deterioration modeling; life-cycle costs; optimization; budgeting; financial management; and policy analysis. Prereq: Junior standing. {Also offered for undergraduate credit - see CM&E 460.}

CM&E 665. Bridge Engineering and Management. 3 Credits.

This course provides an introduction to the planning, design, construction, and management concepts of structural steel and reinforced concrete bridges. Including: application of AASHTO LRFD specifications and latest developments in bridge management systems. Prereq: Senior standing. {Also offered for undergraduate credit - see CM&E 465.}

CM&E 670. Information Technologies for Construction Managers. 3 Credits.

This course provides an introduction to the applications and techniques of information technologies used in construction. Topics to include: operational concepts and computer software packages for estimating, scheduling, data management, CAD and automation. {Also offered for undergraduate credit - see CM&E 470.}

CM&E 693. Individual Study. 1-5 Credits.**CM&E 696. Special Topics. 1-5 Credits.****CM&E 701. Construction Technology and Equipment. 3 Credits.**

This course provides an overview of advanced construction technology and equipment. It covers site improvement, industrial plants, pavements, tunnels, buildings, construction innovation, sustainability, equipment selection and optimization, replacement analysis, and mathematical modeling in construction.

CM&E 703. Advanced Project Planning and Control. 3 Credits.

This course provides a discussion on advanced and emerging theories, principles, tools and techniques of planning, monitoring, and control problems and uncertainties arising in construction projects. Prereq: CM&E 603 or equivalent.

CM&E 705. Building Construction. 3 Credits.

This course provides an advanced discussion of the fundamentals of building construction, including building materials and construction methods for both residential and commercial structures.

CM&E 710. Managing for Quality in Construction Organizations. 3 Credits.

This course provides an advanced study of total quality management and managing organizational dynamics for improvement, specifically related to construction companies.

CM&E 711. Construction Cost Estimating. 3 Credits.

This course provides an advanced discussion of quantity takeoffs; labor, materials, equipment, and overhead costs; profit; and bidding strategies for construction projects. F.

CM&E 712. Construction Management. 3 Credits.

This course provides advanced topics on responsibilities and issues that construction professionals typically encounter as they administer a construction project. F.

CM&E 715. Construction Specifications and Contracts. 3 Credits.

This course provides a discussion of the procedures used to prepare and administer construction specifications and contracts, including: Construction Specification Institute format, AIA Documents, General Conditions, and liabilities and incentives for various construction contracts.

CM&E 720. Geotechnical Construction. 3 Credits.

This course provides an advanced discussion of the construction and management practices associated with geotechnical construction, including a variety of field applications for various geotechnical construction methods; a discussion of foundation construction; and the management practices related to geotechnical construction.

CM&E 725. Decision Making and Risk Analysis. 3 Credits.

Decision-making and decision theory. Decision support systems, applied risk identification, and analysis in construction activities. Computer applications. Prereq: CM&E 403. 3 lectures. S.

CM&E 740. Financial and Economic Concepts for Construction Managers. 3 Credits.

This course provides an advanced discussion of financial management and the economic appraisal of construction projects, including: accounting systems, financial documents, managing costs and cash flow, setting profit margins for bidding, time value of money, and economic evaluation of projects.

CM&E 753. Concrete Design and Construction. 3 Credits.

This course provides a discussion of the fundamentals of concrete construction, including: the properties of Portland cement concrete; concrete quality control and application; concrete additives and curing; concrete placement; reinforcement; and current technologies of concrete construction.

CM&E 770. Construction Organization Processes. 3 Credits.

The course provides an overview of critical management skills and the analysis of organizational management systems. Theories of motivation, planning, leadership, organizational interactions, etc. as they relate to construction operations.

CM&E 775. Facilities Management. 3 Credits.

This course provides an advanced discussion of the principles and practices needed to successfully construct and manage commercial, industrial and institutional facilities, buildings, and physical plants, from the perspective of a construction manager.

CM&E 780. Construction Systems and Temporary Structures. 3 Credits.

This course provides an advanced discussion of the planning, selecting and designing a variety of construction systems and temporary support and access structures, such as: formwork, falsework, earth retaining structures, cofferdams, diaphragms, dewatering, shoring, bracing, rigging, erosion & sedimentation, and blasting.

CM&E 785. Advanced Project Engineering and Management. 3 Credits.

This course provides a discussion of advanced topics in construction project engineering and management. Topics include: Geographic Information Systems (GIS) applications in construction, front end planning, and forensic engineering.

CM&E 790. Graduate Seminar. 1-5 Credits.**CM&E 793. Individual Study/Tutorial. 1-5 Credits.****CM&E 795. Field Experience. 1-15 Credits.****CM&E 797. Master's Paper. 1-3 Credits.****CM&E 798. Master's Thesis. 1-10 Credits.**