

# CONSTRUCTION ENGINEERING AND MANAGEMENT (CEMT)

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## CEMT 5231 - Construction Materials and Methods (3 Credits)

This course serves as an introduction to the primary materials and methods used to construct buildings and infrastructure across the United States, including concrete, wood and steel. Students explore processes related to specifying and installing materials, as well as analyze various material performance characteristics. Students are required to complete lectures, videos and class activities. Students also research and present information on a wide range of materials and construction processes. Prereq: CEMT 2100 and CEMT 3231 all with a C- or better or graduate standing. Cross-listed with CEMT 3231. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: CEMT 2100 and CEMT 3231 all with a C- or better or graduate standing.

## CEMT 5232 - Construction Planning and Control (3 Credits)

This course presents knowledge on planning and controlling of construction projects. Students will learn the basics of construction planning to develop work breakdown structure and activity list, estimate activity cost and duration, and identify job logic and precedence relationships. Several scheduling techniques will be presented in this class, including bar chart, network scheduling, uncertainty in scheduling (PERT), limited resources scheduling, resource leveling, line of balance, and time-cost tradeoff analysis. Furthermore, this class will provide knowledge on cash flow analysis and construction control techniques such as Earned Value method. Students will acquire skills on the use of currently available computer scheduling and planning software such as Primavera 6 and Navisworks Manage to create 5D models to visualize sequence of the construction activities. In addition, students will form teams and work on a project throughout the semester to apply the skills that they learn in class. Prereq: CEMT 2100, CEMT 2300, CEMT 3100, and CEMT 3231 all with a C- or better or graduate standing. Cross-listed with CVEN 4232. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: CEMT 2100, CEMT 2300, CEMT 3100, and CEMT 3231 all with a C- or better or graduate standing.

## CEMT 5233 - Construction Cost Estimating (3 Credits)

This course presents the application of scientific principles to rough and detailed cost estimating for construction. The course starts with an introduction to estimating and how it fits in bid/proposal process and construction management. Quantity take offs, putting costs to those quantities, overhead costs, cost markups and profits; and computerized estimating will be explored. The project includes quantity take and cost estimate for the concrete and metals portion of an actual project. Prereq: CEMT 2100, CEMT 2300, CEMT 3100, and CEMT 3231 all with a C- or better or graduate standing. Cross-listed with CEMT 4233. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: CEMT 2100, CEMT 2300, CEMT 3100, and CEMT 3231 all with a C- or better or graduate standing.

## CEMT 5234 - Sustainable Construction (3 Credits)

This course will serve as an introduction to major components and technologies used in sustainable design and construction to create healthy, environmentally-sensitive built environments. Content focuses on construction processes, renewable energy systems, healthy buildings, natural and cultural resources, and traditional as well as cutting-edge building techniques. Course participants will gain knowledge about effective sustainable practices through active learning by engaging in case studies, class presentations, and group activities. Numerous guest speakers will share first-hand experience regarding implementation and professional practice of sustainable principles in the real-world. Prereq: CEMT 2100, CEMT 2300, CEMT 3100, and CEMT 3231 all with a C- or better or graduate standing. Cross-listed with CEMT 4234. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: CEMT 2100, CEMT 2300, CEMT 3100, and CEMT 3231 all with a C- or better or graduate standing.

## CEMT 5235 - Advanced Construction Engineering (3 Credits)

This course starts with a high-level overview of Construction Engineering Management including organizations involved, current approaches and industry challenges. The course delves into contracts, estimating and managing earthwork, temporary construction, scheduling, quality and others. The course is delivered in an accelerated 8-week format. Prereq: CEMT 2100 or CVEN 4230 with a C- or better or graduate standing. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: CEMT 2100 or CVEN 4230 with a C- or better or graduate standing.

## CEMT 5236 - Project Management Systems (3 Credits)

Address the basic nature of managing projects and the advantages and disadvantages to this approach. Introduce the characteristics, techniques, and problems associated with initiating, planning, executing, controlling, and closeout of projects. Learn about the International Standards of PM and how to use them. Develop a management perspective about projects to help develop future project managers. Restriction: Graduate standing. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: Graduate standing (Grad or Non-Degree Grad)

## CEMT 5237 - Advanced Project Management (3 Credits)

A survey of advanced topics in project management building on the Project Management Systems course and utilizing the Project Management of Knowledge. Case studies, complex problems, and a class project will be utilized in the course to bring a practical perspective to the conceptual lessons. Restriction: Graduate standing. Cross-listed with CVEN 6237. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: Graduate standing (Grad or Non-Degree Grad)

## CEMT 5238 - Integrated Construction Leadership (3 Credits)

This interdisciplinary course focuses on leadership. It is structured to feature top level executives in architecture, engineering and construction (AEC) industries to discuss current industry practice. It provides students opportunities to apply management and leadership principles in construction related projects and activities. The course is delivered in an accelerated 8-week format. Prereq: CEMT 2100 or CVEN 4230 with a C- or better or graduate standing. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: CEMT 2100 or CVEN 4230 with a C- or better or graduate standing.

**CEMT 5239 - Introduction to Temporary Structures and Construction Engineering (3 Credits)**

This course will introduce the many types of temporary structures that are integral in the completion of construction projects. The temporary structures to be discussed include but are not limited to formwork, falsework, scaffolding, Support of Excavation (SOE), and equipment bridges. Construction Engineering will also be introduced including the application of structural engineering to crane picks and demolitions. The course includes planning, management and design aspects. The project includes the delivery of a formwork design that stresses the importance of constructability, cost, while providing updates throughout the project to the instructor. Cross-listed with CEMT 4239. Prereq: CEMT 2100 with a C- or better and junior or graduate standing. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: CEMT 2100 with a C- or better and junior or graduate standing.

**CEMT 5240 - Building Information Modeling (BIM) (3 Credits)**

Building Information Modeling is an advanced approach to facility design and construction using object-oriented 3-D models. It can be integrated in the design and construction for analytical purposes, including design, visualization, quantity takeoff, cost estimating, planning, and facility management. Prereq: CEMT 2100, CEMT 2300, CEMT 3100, and CEMT 3231 all with a C- or better or graduate standing. Cross-listed with CEMT 4240. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: CEMT 2100, CEMT 2300, CEMT 3100, and CEMT 3231 all with a C- or better or graduate standing.

**CEMT 5242 - Construction Safety (3 Credits)**

This course is a study of safety practices in the construction industry and the specific safety procedures used in safety management of a construction project. Topics include safety risks inherent in construction projects, the roles of government, the judicial system, the insurance industry, designers and project owners in safety management and the economic impact of injuries. Advanced topics include safety risk quantification and analysis, design for safety and emerging technologies. Prereq: CEMT 2100, CEMT 2300, CEMT 3100, and CEMT 3231 all with a C- or better or graduate standing. Cross-listed with CEMT 4242. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: CEMT 2100, CEMT 2300, CEMT 3100, and CEMT 3231 all with a C- or better or graduate standing.

**CEMT 5245 - Construction Dispute Resolution (3 Credits)**

Construction disputes are an inevitable component of construction projects, and the navigation and analysis of the disputes is an important consideration for project stakeholders in successfully completing construction projects. This class introduces the basic concepts of dispute-resolution techniques in the construction industry. It discusses the selection and navigation of different techniques in the dispute resolution process, from prevention through negotiation, non-binding, binding, and litigation. It explores how to perform a forensic analysis of construction disputes, discussing entitlement, causation, and quantification of delay and cost disputes. Restriction: Restricted to students with senior standing or graduate standing. Prereq: CEMT 4232 or CEMT 5232 with a B- or better. Max hours: 3 Credits.

Grading Basis: Letter Grade

Restriction: Restricted to students with senior standing or graduate standing. Prereq: CEMT 4232 or CEMT 5232 with a B- or better.

**CEMT 5246 - Construction, Business and Innovation (3 Credits)**

AEC professionals rely on technical and soft (social) skills to solve complex challenges. The interdisciplinary nature of project delivery, to an increasing extent, requires professionals to collaborate across disciplines. This course explores innovation and collaboration at the interface of construction and business. Restriction: Graduate standing. Max hours: 3 Credits.

Grading Basis: Letter Grade

Prereq: Graduate standing (Grad or Non-Degree Grad)

**CEMT 5800 - Special Topics in Construction (3 Credits)**

These special topics courses cover a variety of topics in construction engineering and management. Restriction: Restricted to students with graduate standing. Repeatable. Max hours: 9 Credits.

Grading Basis: Letter Grade

Repeatable. Max Credits: 9.

Prereq: Graduate standing (Grad or Non-Degree Grad)