

California 2025-2026 Undergraduate and Graduate Catalog State University, Long Beach

Courses

[Contract All Courses](#) |

Construction Engineering Management

CEM 121 - Construction Drawing I

(2 units)

An introduction to conventional and computer aided drafting techniques in the relation of drawings for construction. Interpretation of details in construction drawings/blueprints and reference materials. Laboratory: Drafting plans for a residential building using the techniques introduced in the course.

Letter grade only (A-F). (Laboratory 6 hours).

CEM 125 - Fundamentals of Construction

(3 units)

Survey of the professional activities and environments of Construction Education. Overview of residential, commercial, institutional, industrial, and heavy civil construction and associated codes, standards, and ethical boundaries. Areas of focus to include type of foundations, materials, contract documents, working drawings and vocabulary.

Letter grade only (A-F). (Lecture-Discussion 2 Hours, Activity 2 Hours)

CEM 200 - Concrete Construction

(1 unit)

Prerequisite: [CEM 125](#)

with a grade of "C" or better.

Corequisite: [CEM 200L](#)

Concrete composition, Concrete mix design technology, physical properties of concrete, use of admixtures, concrete batching, curing, testing. Includes physical testing of designed mixes. Modern concepts as fundamental solutions to concrete construction challenges. New developments in concrete chemistry and strength theory.

Letter grade only (A-F). (Lecture-Discussion 1 hour)

CEM 200L - Concrete Construction Laboratory

(1 unit)

Corequisite: [CEM 200](#)

Laboratory exercises in support of [CEM 200](#)

, Concrete Construction. Develop concrete mix designs and prepare concrete samples for testing, such as compressive strength, slump and air entrainment, and aggregate testing.

Letter grade only (A-F). (Laboratory 3 hours)

CEM 202 - Probability and Statistics for Construction Engineering Management

(2 units)

Prerequisite: High School Algebra.

Statistics and probability theories, sampling, correlation, regression applied to Construction Management. Projects on simulation using statistical packages

Letter grade only (A-F). (1 hour lecture, 2 hours activity.)

CEM 204 - Applied Mechanics_Statics

(3 units)

Prerequisites: [MATH 122](#)

and [PHYS 100A](#)

or [PHYS 151](#)

all with a grade of "C" or better.

Provides an overview of the principles of statics as it relates to building structures and machines.

Equilibrium of forces. Free body diagrams. Force components. Bending moments. U.S. and S.I. units of measurements.

Letter grade only (A-F). (Lecture 2 hours, Activity 2 hours)

CEM 206 - Trends in Construction Engineering Management

(2 units)

Prerequisites: [C E 101](#)

, [CEM 121](#)

and [CEM 125](#)

all with a grade of "C" or better.

Introduction to current trends including emerging technologies and practices in Construction Management (CEM). Applications of the emerging technologies and practices in CEM problem solving.

Letter grade only (A-F). (Lecture 1 hr., laboratory 3 hrs)

CEM 225 - Residential and Light Commercial Construction Practices and Estimating

(3 units)

Prerequisites: [CEM 121](#)

, [CEM 125](#)

with a grade of "C" or better.

Introductory course in planning, design, and construction of residential and light commercial buildings including materials, equipment, construction/assembly methods, quantity take-off, and building codes/standards. Field trips or visual presentation is required.

Letter grade only (A-F). (Seminar 2 hours and Activity 2 hours)

CEM 304 - Applied Mechanics Strength of Materials

(2 units)

Prerequisite: [CEM 204](#)

with a grade of "C" or better.

Strength of structural materials and applications in building structures and machines. Mechanical properties of materials, structural behaviors of load resisting components associated with construction processes.

Letter grade only (A-F). (Lecture-Discussion 1 hr., Activity 2 hrs)

CEM 315 - Construction Safety

(2 units)

Prerequisite: [CEM 225](#)

with a grade of "C" or better.

Terminology, safety functions, accident costs, workman's compensation, and liability laws, O.S.H.A., governmental and nongovernmental codes, regulations, and field safety methods pertinent to the construction industry.

Letter grade only (A-F). (Lecture 1 hour, Activity 2 hours)

CEM 324 - Commercial, Institutional and Industrial Construction Practices and Estimating

(3 units)

Prerequisite/Corequisite: [CEM 315](#)

Fundamental of commercial construction, including building layout, shallow and deep foundations, introduction to formwork systems, high strength, heavy and light weigh concrete, framing, flooring, and roofing systems, construction and expansion joints, masonry, and steel construction. Quantity takeoff.

Letter grade only (A-F). (Lecture-Discussion 2 hours, Activity 2 hours).

CEM 335 - Soil Mechanics Technology

(2 units)

Prerequisites: CEM 200, CEM 200L, and [CEM 304](#)
all with a grade of "C" or better.

Corequisite: [CEM 335L](#)

Soil Composition, description, and classification; soil compaction; determination of physical properties of soils.

Letter grade only (A-F). (Lecture-Problems 2 hours)

CEM 335L - Soil Mechanics Technology Laboratory

(1 unit)

Prerequisites: CEM 200, CEM 200L, and [CEM 304](#)
all with a grade of "C" or better.

Corequisite: [CEM 335](#)

Laboratory investigations and experiments in the phenomena of soil mechanics.

Letter grade only (A-F). Field trips. (Laboratory 3 hours)

CEM 373 - Fundamentals of Alternative Project Delivery

(3 units)

Prerequisite: CEM 315

General overview of the attributes of all major project delivery systems, procurement methodologies and contracting approaches.

Letter grade only (A-F). (2 hrs lecture, 2 hrs activities)

CEM 385 - Mechanical, Electrical, Plumbing Equipment for Buildings

(3 units)

Prerequisites: PHYS 100B or PHYS 152 with a grade of "C" or better.

Prerequisite(s)/Corequisite(s): CEM 324.

Principles and current practices of mechanical, electrical, plumbing systems for buildings.

Letter grade only (A-F). (Lecture 2 hours, Activity 2 hours)

CEM 405 - Construction Management Problem Solving

(1 unit)

Prerequisite: Instructor consent.

Study the techniques of organizing and directing of the construction management laboratory.

Letter grade only (A-F) (Laboratory 3 hours).

CEM 409 - Directed Studies in Construction Engineering Management

(3 units)

Prerequisites: Senior standing in CEM or consent of instructor.

Advanced work of a technical nature within area of specialization on an experimental or research basis.

Letter grade only (A-F). Not open to students who have previously obtained 1-2 units of this course.

CEM 415 - Job Site Management Problem Solving

(1 unit)

Prerequisites: CEM 324 with a grade of "C" or better.

Study job site management techniques of organizing and directing construction projects.

Letter grade only (A-F). (Laboratory 3 hours) Not repeatable for credit.

CEM 421 - Construction Planning, Scheduling, and Control

(3 units)

Prerequisite: [CE 406](#)

, [CEM 324](#)

all with a grade of "C" or better.

Planning, scheduling, and controlling construction projects. Implementing processes and techniques that integrate both manual and computer-based methods to optimize efficiency and effectiveness.

Letter grade only (A-F). (Lecture-Discussion 2 hrs, Activities 2 hrs)

CEM 424 - Earthwork and Civil Works Construction Practices

(3 units)

Prerequisites: [CEM 324](#)

, [CE 406](#)

all with a grade of "C" or better.

Fundamentals of earthmoving operations, including volume calculation and mass diagrams, soil protection and dewatering systems, volume change characteristics and fundamentals of moving earth, equipment selection, management, and economics.

Letter grade only (A-F). (Seminar 2 hours, Activity 2 hours).

CEM 426 - Business and Construction Law

(3 units)

Prerequisites: [CEM 324](#)

; [BLAW 220 or BLAW 320](#)

all with a grade of "C" or better.

Contractors license, mechanics lien, subdivision laws; public works projects, bid and bid requirements. Litigation and legal trends in affirmative action, design professional's liability. Administrative procedures of contractors. Study documentation, claims, waivers, arbitration, bonding, insurance, and indemnification. Discuss ethical practices.

Letter grade only (A-F). (Lecture-Discussion 3 hrs.)

CEM 429 - Advanced Estimating and Bidding

(3 units)

Prerequisites: [CEM 206](#)

, [CEM 315](#)

, [CEM 324](#)

, and [CEM 385](#)

all with a grade of "C" or better.

Concept and practices involved in the total estimate bidding process in construction, from initial project selection for submission of final bids. A complete project estimate and bid is prepared by each study.

Letter grade only (A-F). (Lecture 2 hours, Activity 2 hours).

CEM 432 - Facility Administration

(3 units)

Prerequisite: [CEM 421](#)

with a grade of "C" or better.

Management skills for facility management. Emphasis is placed on the management functions of planning, organizing, directing, and controlling. Topics include negotiation; communication; performance measurement; job enrichment; motivation; contracting services and interpersonal relationships.

Letter grade only (A-F). (Lecture-Discussion 3 hours)

CEM 437 - Structural Building Systems

(3 units)

Prerequisite: [CEM 304](#)

with a grade of "C" or better.

Introduction to various structural building systems (e.g., timber, concrete, masonry, and steel structural systems) in the construction industry.

Letter grade only (A-F). (Lecture 2 hours, Activity 2 hours).

CEM 473 - Principles of Design-Build

(3 units)

Prerequisite: [CEM 373](#)

Concepts and practices involved in managing the Design-Build (DB) process and integrated team. Topics include making the mental shift to DB best practices, buying and marketing DB services, DB solicitation, managing DB integrated process and emerging practices & considerations.

Letter grade only (A-F). (Lecture-Discussion 2 hrs, Activities 2 hrs) Not repeatable for credit.

CEM 476 - Heavy Civil Construction Principles and Practices

(3 units)

Prerequisite/Corequisite: CEM 424

Comprehensive coverage of the construction principles and practices utilized in current heavy civil industry. The construction methods and practices of heavy civil projects, with emphasis on blueprint reading, quantity takeoff, cost estimating, and scheduling.

Letter grade only (A-F). (Lecture 2 hours - Activity 2 hours).

CEM 481 - Sustainability in the Built Environment

(3 units)

Prerequisite: [CEM 324](#)

with a grade of "C" or better.

Prerequisite/Corequisite: [CEM 429](#)

Integrative learning capstone design course. A supervised design team project, incorporating all aspects of sustainable design and construction for buildings. Technical aspects, social, environmental, economic issues, and ethical concepts. Oral presentations and written reports are required.

Letter grade only (A-F). (Lecture- Discussion 3 Hours).

CEM 482 - Sustainability in Infrastructure Systems

(3 units)

Prerequisite/Corequisite: CEM 429.

Comprehensive coverage of sustainable development for infrastructure projects. System planning, project planning, design, and construction, and continuing through operations and maintenance.

Emphasis on sustainability rating tools for infrastructure projects. Technical aspects, social, environmental, economic, and ethical issues considered.

Letter grade only (A-F). Not repeatable for credit.

CEM 483 - Virtual Design and Construction

(3 units)

Prerequisites: [CEM 206](#)

with a grade of "C" or better.

Prerequisites/Corequisites: [CEM 421](#)

or [CEM 429](#)

Virtual design and construction on the development, use and transfer of a centralized data-rich virtual project model that facilitates documentation, design exploration, model-based quantity take-off and estimating, interference checking, construction coordination and sequencing, digital fabrication and building information visualization.

Letter grade only (A-F). Not repeatable for credit.

CEM 485 - CEM Senior Seminar

(3 units)

Prerequisites: [CEM 429](#)

with a grade of "C" or better or consent of instructor.

Advanced work of a technical nature within the construction industry.

Letter grade only (A-F). (Lecture 2 hours, Activity 2 hours).

CEM 486 - Infrastructure Management

(3 units)

Prerequisites/Corequisites: CEM 424.

Integrated approach to infrastructure management theories and practices including tools, models, and applied systems. The course presents the principles required to manage, preserve, and improve the performance of infrastructure systems, with emphasis on utility pipes, bridges, and roads.

Letter grade only (A-F). (Lecture 2 hours - Activity 2 hours)

CEM 490 - Construction Project Management

(3 units)

Prerequisites: [CEM 335](#)

, [CEM 335L](#)

, [CEM 373](#)

, [CEM 421, CEM 424](#)

and [CEM 429](#)

with a grade of "C" or better. Completion of at least 60 units, completion of the entire Foundation, and completion of at least one GE Course from the Explorations stage.

Integrative learning capstone design course. A supervised design team project, incorporating all aspects of project management of design-build projects. Technical aspects, social, environmental, and economic issues considered. Ethical concepts discussed. Oral presentations and written reports are required

Letter grade only (A-F). (2 hrs lecture, 2 hrs activities)