

## 2011-13 Cal Poly Catalog

### Construction Management Department

#### CM—CONSTRUCTION MANAGEMENT

##### CM 102 Introduction to Construction Management (2)

Introduction to the fundamental concepts and overview of the essential elements associated with the construction profession, to include: construction trends, ethics, safety and health issues, and professional practice methods. 2 lectures.

##### CM 115 Fundamentals of Construction Management (6)

Production of drawings and specifications for residential and light commercial construction. Integration of scheduling, estimating, codes, and contracts with a project based approach. Manual drawing techniques and computer aided drafting with building information modeling develop visualization skills for architectural systems. 6 laboratories. Prerequisite: ARCH 106, MATH 141, and PHYS 141.

##### CM 212 Fundamentals of Construction Management (3)

Introduction to the fundamental concepts of construction management. Primary areas of focus are quantity surveying and basic scheduling techniques. Additional topics of study to include work activity durations and sequencing, and computer applications in scheduling. Course does not satisfy approved technical elective requirement for CM majors. 3 laboratories. Prerequisite: Consent of instructor.

##### CM 213 Heavy Civil Construction Management (6)

Materials, methods, and techniques associated with civil engineering projects and heavy construction operations. Topics include tunnel, bridge, dam, and road construction; equipment selection; and temporary structures. Integration of scheduling, estimating, and construction contracts with a project based approach. 6 laboratories. Prerequisite: CM 102, CM 115 and CM 221. Prerequisite or concurrent: ARCE 211; BRAE 239; and BUS 207.

##### CM 221 Concrete and Formwork Technology (3)

Modern concepts of concrete and formwork construction. Significant developments in concrete chemistry and strength theory. Formwork systems, concrete mix design, admixtures, batching, finishing, curing and testing. Includes physically building basic forms, finishing and curing concrete, and testing of designed mixes. 2 lectures, 1 laboratory. Prerequisite: ARCH 106.

##### CM 270 Selected Topics (1–4)

Directed group study of selected topics. The Schedule of Classes will list topic selected. Total credit limited to 8 units. 1 to 4 lectures. Prerequisite: Open to undergraduate students and consent of instructor.

##### CM 311 Residential Construction Management (6)

Materials, methods, and techniques associated with residential and light commercial construction operations. Topics include shallow foundations, timber and masonry framing, roofing, and exterior and interior finishes. Integration of scheduling, estimating, and construction contracts with a project based approach. 6 laboratories. Prerequisite: CM 213; PHYS 132 or CHEM 124 or CHEM 127; and CM 332. *Change effective Winter 2013.*

##### CM 313 Commercial Construction Management (6)

Materials, methods, and techniques associated with large commercial and institutional construction operations. Topics include building systems analysis of foundations, waterproofing, structural framing, exterior cladding, and finishes. Integration of scheduling, estimating, and construction contracts with a project based approach. 6 laboratories. Prerequisite: CM 311.

##### CM 331 Construction Accounting (3)

Fundamentals of construction accounting principles to include income recognition, job cost control, cash flow analysis and associated cost reports. 3 lectures. Prerequisite: BUS 212 or BUS 214.

##### CM 332 Evaluation of Cost Alternatives (3)

Basic principles of economic evaluations using fundamental concepts of time value of money to compare cost alternatives related to construction, design, and real property development. 3 lectures. Prerequisite: Completion of GE Area D2 and MATH 142 or MATH 182.

##### CM 333 Construction Law (3)

The intersection of law and the construction industry. Topics of study include a survey of most major legal issues potentially encountered during construction activity. 3 lectures. Prerequisite: BUS 207 and CM 313, or consent of instructor.

##### CM 364 Construction Jobsite Management (3)

Procedures, methods and documentation associated with project level management of the construction process. Administrative roles and managerial

relationships among the various members of the project team, primarily constructors, designers and owners. 3 laboratories. Prerequisite: CM 212.

##### CM 400 Special Problems for Advanced Undergraduates (1–2)

Individual investigation, research, studies or surveys of selected problems. Total credit limited to 6 units, with a maximum of 4 units per quarter. Prerequisite: Consent of instructor.

##### CM 411 Specialty Contracting Construction Management (6)

Materials, methods, and techniques associated with mechanical, electrical, and plumbing systems. Topics include heating, ventilating, air conditioning, power distribution, grounding, lighting, communication, fire detection/protection, and plumbing. Integration of scheduling, estimating, and construction subcontracts with a project based approach. 6 laboratories. Prerequisite: CM 115, CM 213, CM 311, CM 313, CM 331, CM 332, ARCE 212, and BUS 207.

##### CM 413 Jobsite Construction Management (6)

Management activities applicable to the construction process involving techniques, applications, and theory needed in a jobsite environment. Addresses the relationships, roles, and perspectives of all stakeholders. Integrated utilization of temporary structures associated with field construction. 6 laboratories. Prerequisite: CM 115, CM 213, CM 311, CM 313, CM 331, CM 332, ARCE 212, and BUS 207.

##### CM 415 Interdisciplinary Project Management (5)

Team based collaborative effort to analyze and evaluate the unique interdisciplinary challenges associated with coordinating and integrating the design and construction processes to deliver a project with respect to the design, budget, schedule, quality, and performance expectations of a client. 5 laboratories. Prerequisite: CM 411 and CM 433.

##### CM 420 Service / Experiential Learning (1-6)

Service and project-based learning and teaching techniques as applied to a variety of construction management concepts. Goals and objectives achieved through service-learning, project-based, and/or experiential pedagogical approaches. The Schedule of Classes will list topic selected. Total credit limited to 8 units. 1-6 activities. Prerequisite: Third-year standing, or consent of instructor.

##### CM 421 Emerging Trends (1-6)

Emerging trends related to construction management concepts and practices. Goals and objectives achieved through analysis, study, and research of a particular construction emerging trend. The Schedule of Classes will list topic selected. Total credit limited to 8 units. 1-6 activities. Prerequisite: Third-year standing, or consent of instructor.

##### CM 422 Professional Preparation (1-6)

Professional practice related to the construction management industry. Goals and objectives achieved through analysis, study, and preparation for a particular professional practice. The Schedule of Classes will list topic selected. Total credit limited to 8 units. 1-6 activities. Prerequisite: Third-year standing, or consent of instructor.

##### CM 423 Construction Materials / Assemblies (1-6)

Various materials and assemblies related to construction process. Goals and objectives achieved through analysis, study, and research of a particular construction material and/or assembly. The Schedule of Classes will list topic selected. Total credit limited to 8 units. 1-6 activities. Prerequisite: Third-year standing, or consent of instructor.

##### CM 424 Construction Technology (1-6)

Technology related to construction management education and the construction industry. Goals and objectives achieved through analysis, study, and research of a particular construction technology. The Schedule of Classes will list topic selected. Total credit limited to 8 units. 1-6 activities. Prerequisite: Third-year standing, or consent of instructor.

##### CM 425 Sustainability and Environment (1-6)

Sustainable and environmental issues related to the construction industry. Goals and objectives achieved through analysis of a particular construction related sustainable and/or environmental issue. The Schedule of Classes will list topic selected. Total credit limited to 8 units. 1-6 activities. Prerequisite: Third-year standing, or consent of instructor.

##### CM 426 International Construction Studies (1-6)

Exploration of international construction studies through several potential teaching techniques, including field trips to countries overseas, research and case studies of companies and projects, and management skills and leadership as they relate to international construction. The Schedule of Classes will list topic selected. Total credit limited to 8 units. 1-6 activities. Prerequisite: Third-year standing, or consent of instructor.

**CM 430 Collaborative Process (3)**

A comprehensive set of tools and practices that allow for high performance, interdisciplinary collaborative teams to focus on extraordinary outcomes at each step of project development, including planning, design, bidding, permitting, construction and management phases. 3 activities. Prerequisite: Minimum junior standing or consent of instructor. *Crosslisted as CM/EDES 430.*

**CM 432 Design-Build Project Management (3)**

Management issues applicable to the design and construction integration method of project delivery. Project sponsor/project advocate techniques, monitoring the evolving design, detecting and controlling change, early warning systems, cost trending, schedule impacts, cost impacts, systems integration, contract/scope modifications, procurement, contingencies, quality, and overall process control. 3 activities. Prerequisite: Minimum junior standing.

**CM 433 Integrated Project Delivery (2)**

Investigation and analysis of special advanced topics in Integrated Project Delivery including Design-Build, CM-at-Risk, Alliance Contracting and other alternative delivery models and application across a wide range of project types. Topics include source selection, acquisitions, contracting, performance criteria, design management, and others. 2 activities. Prerequisite: CM 311 or consent of instructor.

**CM 443 Management of the Construction Firm (4)**

Applications of strategic management techniques and business strategy for managing and long-range planning of the construction firm, including accounting practices. 4 activities. Prerequisite: CM 413.

**CM 452 Project Controls (3)**

Planning, organization, scheduling, and control of construction projects including cost control and resource control. Use of Critical Path Method (CPM) in planning and scheduling computer applications for CPM. 3 laboratories. Prerequisite: CM 364.

**CM 454 Construction Estimating (3)**

Methods, procedures and computer applications associated with estimating the costs of construction projects. Additional topics of study to include analysis of the bidding process and conceptual estimating. 3 laboratories. Prerequisite: CM 364.

**CM 461, 462 Senior Project I, II (2) (1-2)**

Selection and completion of a comprehensive project under faculty supervision. Problems to involve the student's technical and creative skills. Student proposal must be submitted and approved by project advisor and department head prior to registration for course. Construction and team projects encouraged. Prerequisite: Consent of project advisor and department head. See department for additional guidelines and requirements.

**CM 463 Senior Project: Professional Practice for Constructors (3)** Practical application of construction management theory and practice solving problems related to the built environment. 3 laboratories. Prerequisite: CM 413; corequisite: CM 443.

**CM 470 Selected Advanced Topics (1-4)**

Directed group study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1 to 4 lectures. Prerequisite: Consent of instructor.

**CM 471 Selected Advanced Laboratory (1-4)**

Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1-4 laboratories. Prerequisite: Consent of instructor.

**CM 475 Real Property Development Principles (4)**

Development process and its major actors: investors, developers, government agencies, environmental and local stakeholders; their development roles, objectives, approaches. Basics of urban markets and economics, financing, regulation, public planning; value added, contractual, environmental and community context factors. 4 lectures. Prerequisite: Minimum junior standing.

**CM 485 Cooperative Education Experience (3-6) (CR/NC)**

Full-time work experience in an area directly related to the construction industry for 3 months. Positions are paid and usually require relocation and registration in course for one quarter. Registration in course is required at start of work experience. Formal report and evaluation by work supervisor required. Credit/No Credit grading only. May be repeated for credit. Major credit limited to 6 units;

total credit limited to 12 units. See department for additional requirements. Prerequisite: Consent of instructor.

**CM 495 Cooperative Education Experience (12) (CR/NC)**

Full-time work experience in an area directly related to the construction industry for 6 months. Positions are paid and usually require relocation for two consecutive quarters. Registration in course is required at start of work experience. Formal report and evaluation by work supervisor required. Credit/No Credit grading only. May be repeated for credit. Major credit limited to 6 units; total credit limited to 24 units. See department for additional requirements. Prerequisite: Consent of instructor.

**CM 531 Construction Cost and Material Control (3)**

Advanced theory and practice of cost and material control for construction projects. Emphasis on computer applications. 2 lectures, 1 activity. Prerequisite: Graduate standing or consent of instructor.

**CM 533 Case Histories in Contract Administration (3)**

Common points of disputes between design professional, owner, and contractor. Methods of avoidance and dispute resolution. 3 activities. Prerequisite: Graduate standing or consent of instructor.

**CM 542 Advanced Construction Estimating (3)**

Advanced theory and practice of cost estimating techniques. Includes standard, conceptual and parameter estimating; bidding strategies, value engineering concepts, and risk analysis. Emphasis on computer applications. 2 lectures, 1 activity. Prerequisite: Graduate standing or consent of instructor.

**CM 552 Construction Project Scheduling (3)**

Basic and advanced network scheduling techniques as applied to architectural building projects. Emphasis on computer applications. 2 lectures, 1 activity. Prerequisite: Graduate standing or consent of instructor.

**CM 570 Selected Advanced Topics in Construction Management (4)**

Directed study of selected topics in Construction Management. The Schedule of Classes will list title selected. Total credit limited to 12 units. 4 seminars. Prerequisite: Graduate standing or consent of instructor.

**CM 571 Selected Advanced Laboratory (1-4)**

Directed group laboratory study of selected topics for advanced students. Open to undergraduate and graduate students. The Schedule of Classes will list title selected. Total credit limited to 8 units. 1-4 laboratories. Prerequisite: Graduate standing or consent of instructor.