

2009-11 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: ~~CM 102~~; ARCH 106, MATH 141, and PHYS 141, ~~and consent of department head~~. *Change effective Winter 2010.*

CM 211 Construction Drawings and Specifications (4)

Basic skills and techniques required to produce construction drawings and specifications conforming to current building codes and standards, including using manual drawing techniques and Computer Aided Drafting. Laboratory assignments develop visualization skills in order to examine the integration of construction systems, architectural conventions, organization of working drawings and specifications. 4 laboratories. Prerequisite: Consent of department head and ARCH 105 and ARCH 106.

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: ~~CM 211~~. *Change effective Winter 2011.*

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. *Change effective Winter 2010.*

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: CM 102 and ARCH 106.

CM 270 Selected Topics (1–4)

Directed group study of selected topics. The Schedule of Classes will list title 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, and CM 332.

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 315 Fiscal and Project Feasibility (4)

Analysis of the revenue streams and costs involved in project development. Impact analysis of costs and revenues on private and public sectors included. Construction of pro-formas for various project types. 3 lectures, 1 laboratory. Prerequisite: Completion of GE Area D2. *Crosslisted as CM/CRP 315.*

CM 325 Construction Management Practices (3)

Overview of construction methods, building systems, construction and contract documents, cost estimating and scheduling and other practices used in the contracting process. For non-majors. 2 lectures, 1 activity. Prerequisite: Minimum junior standing or consent of instructor.

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 215~~, and either BUS 212 or BUS 214. *Change effective Winter 2010.*

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 Contracts and Law (3)

~~Legal and contractual aspects of the construction industry. Topics of study to include the different types of contracts and clauses associated with the various project delivery systems. 3 lectures. Prerequisite: BUS 207.~~

CM 333 Construction Law (3)

Change effective Winter 2010

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 341 Residential Construction Practices (3)

Materials, methods, and techniques associated with residential and light commercial construction operations. Topics of study to include shallow foundation systems, structural framing systems (timber and masonry), roofing systems, and exterior and interior finish systems. 3 laboratories. Prerequisite: CM 212.

CM 342 Commercial Construction Practices (3)

Materials, methods, and techniques associated with large commercial construction operations. Topics of study to include earth retainage and foundation systems, structural framing systems (steel and concrete), roofing and exterior cladding systems, conveyance systems, and interior finish systems. 3 laboratories. Prerequisite: CM 212 and ARCE 211.

CM 343 Heavy Civil Construction Practices (3)

Materials, methods and techniques associated with heavy civil construction operations. Topics of study to include earthwork and associated heavy equipment, roadway work, bridge work, and various other types of heavy civil construction operations. 3 laboratories. Prerequisite: CM 212 and CM 221.

CM 350 Computer Applications in Construction Management (2)

Application of computer systems to control construction operations in the building industry. Development of construction management games. 2 lectures. Prerequisite: CSC 110 or ARCH 250.

CM 352 Electrical Systems for Buildings (3)

Materials, methods and techniques associated with the construction and installation of electrical power systems, lighting systems, and other wiring systems within the building. Additional topics of study to include electrical power generation and distribution to the building. 3 laboratories. Prerequisite: CM 212.

CM 353 Mechanical Systems for Buildings (3)

Materials, methods and techniques associated with the construction and installation of HVAC (Heating, Ventilating, and Air Conditioning) systems, plumbing systems and fire suppression systems within the building. Additional topics of study to include domestic water supply to the building and drainage systems (storm drains and sewers) from the building. 3 laboratories. Prerequisite: CM 212.

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** ~~with a maximum of 2 units per quarter~~. Prerequisite: Consent of instructor. *Change effective Spring 2009. Change effective Spring 2010.*

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 313.

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 313 and CM 331.

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 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 431 Integrated Project Services (3)

Overview of project delivery methods with an emphasis on trends in integrated services project delivery. Integrated services entity organization structures, process variations, procurement and selection methodologies. Integration of planning, design and construction efforts to achieve maximum project quality and value. 3 laboratories. Prerequisite: Minimum senior standing. *Crosslisted as CM/EDES 431.*

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 Design-Build Seminar (2)

Investigation and analysis of special advanced topics in design-build project delivery and project management, and application to design-build project case studies across a wide range of project types. Topics include source selection, acquisitions, contracting, performance criteria, design management, and others. 2 lectures. Prerequisite: CM 431 or consent of instructor.

CM 433 Integrated Project Delivery (2)

Change effective Fall 2009

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 431~~ **CM 311** (*Prerequisite change effective Winter 2010*) or consent of instructor.

CM 435 Capital Projects Planning (4)

Planning, programming, and management requirements of owner and end users in relationship to the design and construction of capital projects, improvements, and facilities. Identification of facility requirements, and coordination of the physical workplace, its people, and the work of the organization with the design and construction process. 4 activities. Prerequisite: **CM 313** and **CM 332**, ~~CM 434~~. *Change effective Winter 2011.*

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 444 Concrete Formwork and Other Temporary Structures (3)

Materials, methods and techniques associated with concrete formwork construction. Design and analysis of vertical and horizontal formwork systems. Additional topics of study to include temporary earth retainage systems (large excavations and trenches), dewatering systems, access scaffolding, and various

other temporary structures utilized in building construction. 3 activities.

Prerequisite: CM 341, CM 342, CM 343, CM 352, CM 353 and CM 364, and ARCE 226.

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 341, CM 342, CM 343, CM 352, CM 353 and 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 341, CM 342, CM 343, CM 352, CM 353 and 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**; ~~prerequisite or concurrent: CM 443, CM 452 and CM 454 or consent of department head.~~ *Change effective Winter 2011.*

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 and CM 333** or consent of instructor. *Change effective Winter 2011.*

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 and CM 333, 4th year architectural practice** or consent of instructor. *Change effective Winter 2011.*

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 and ~~CM-454~~ consent of instructor. *Change effective Winter 2011.*

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 and ~~CM-542~~ consent of instructor. *Change effective Winter 2011.*

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.