PROGRAM DESCRIPTION

The CSUS Construction Management degree prepares students for managerial positions with contractors and other organizations involved in the construction process. For a graduate, this preparation can combine with experience and lead to recognition as a construction professional, a Constructor. The construction professional is responsible for the execution of construction work, for the creation of completed projects from plans prepared by design professionals such as Architects and Engineers. What is to be built is defined by design professionals; how the work is to be accomplished is the concern of the Constructor. A Constructor is master of the construction process, the process that involves determining the methods to be used and directing the economical application of resources in the construction of timely and safe projects at satisfactory prices, and to the required standards of quality.

The immediate objective of the program is to provide university-level preparation for managerial positions in construction and a foundation for continued learning. The curriculum emphasizes subject areas that are significant to the Constructor: engineering fundamentals, construction management, business administration, humanities and social sciences, and the development of analytical and communication skills. Qualified students may pursue special academic plans in mechanical and electrical contracting, and environmental remediation.

FEATURES

To meet the objectives of this specialized professional program, the Construction Management curriculum consists of three distinct components.

The engineering component, based in sciences and mathematics, stresses engineering principles and their application to the construction process. This component provides sound engineering fundamentals.

The construction management component utilizes the functional approach as a framework for studying the management of the construction process. In the individual courses, construction activities are analyzed from a managerial viewpoint and the functions of management are stressed.

Courses in business administration, the supporting field, form the third component and reinforce the program’s management emphasis. A minor in Business Administration is obtained by combining the required lower and upper division business courses. Furthermore, completing the minor requirements can satisfy many of the core requirements of the graduate program in Business Administration at CSUS.

Overall, the curriculum provides the balanced content that is essential to construction professionals. This unique program is accredited by the American Council for Construction Education (ACCE).

CAREER POSSIBILITIES

Construction Manager • General Contractor • Sub-Contractor • Project Manager • Construction Estimator • Technical Salesperson • Construction Scheduler or Planner • Forensic Construction Specialist • Environmental Remediation Contractor

FACULTY

Keith Bisharat, Coordinator
Keith Bisharat, Donald Nostrant, Donald L. Steward
Kay Carling-Smith, Administrative Support Assistant
Department Office, Riverside Hall 4024, 278-6616
MAJOR REQUIREMENTS • BS

Total units required for BS: 139

Lower Division Pre-major 33 units
Business Minor 15 units
General Education Minor 19 units

Upper division Major 42 units
Business Minor 15 units
General Education 18 units

Courses in parentheses are prerequisites.

A. Required Lower Division Courses (Pre-major)

1. First Semester Freshman Year - Spring (16 units)
   - (3) ENGL 001A* Introduction to College Composition (ENGL 001)
   - (1) MIS 001 A Microcomputer Hardware and Software
   - (1) MIS 001B Spreadsheets
   - (1) MIS 001C Word Processing and Presentation Graphics
   - (3) MATH 026A Calculus I (MATH 011) OR MATH 030*
   - (4) PHYS 005A* General Physics: Mechanics, Heat, Sound (MATH 009)
   - (3) General Education Course

2. Second Semester Freshman Year - Fall (17 units)
   - (1) CM 010 The Construction Industry
   - (3) CM 020 Construction Materials and Processes
   - (3) MATH 026B Calculus II (MATH 026A) OR MATH 031*
   - (3) ENGL 020 Expository Writing (ENGL 001A) OR ENGR 150 Technical Communications
   - (3) OBE 018 Legal Environment of Business
   - (4) PHYS 005B* General Physics: Light, Electricity & Magnetism, Modern Physics (PHYS 005A)

3. First Semester Sophomore Year - Spring (16 units)
   - (3) ACCY 001 Accounting Fundamentals
   - (3) CE 009 Plane & Topographic Surveying (MATH 026A or MATH 030; may be taken concurrently)
   - (3) CM 021 Construction Graphics (CM 020, mechanical drawing ability)
   - (3) CM 040 Properties of Construction Materials (CM 020, PHYS 005A)
   - (4) BIO 005 General Biology

4. Second Semester Sophomore Year - Fall (18 units)
   - (3) ACCY 002 Managerial Accounting (ACCY 001)
   - (3) CM 022 Construction Documents (CM 010, CM 021, OBE 018)
   - (3) CM 030 Engineering Mechanics — Statics (MATH 026B, may be taken concurrently, PHYS 005A, CM 021)
   - (3) COMS 004* Introduction to Public Speaking OR COMS 005* The Communication Experience
   - (3) STAT 001* Introduction to Statistics
   - (3) ECON 001A Introduction to Macroeconomic Analysis OR ECON 001B Introduction to Microeconomic Analysis

*Indicates courses that can also be used to satisfy General Education requirements. For the degree, students must satisfy all the University’s General Education requirements for Construction Management. Students should contact the program office for a complete list of these requirements. A second year foreign language course (2A or equivalent) may also satisfy 3 units of GE when the course is being taken to comply with the CSUS foreign language requirement. Students should consult with an advisor for exact GE eligibility of these courses.

Notes:
- High school chemistry (one year), mechanical drawing (one year), and trigonometry (one-half year) also required. Students without this high school preparation must take the necessary courses in addition to those listed above.
- The recommended course sequence in lower division may change. Students should consult the Civil Engineering Department for current information.

B. Required Upper Division Courses (Major)

Upper division Construction Management courses are open only to students who have satisfactorily completed all required lower division preparation and have been admitted to the major. Lower division prerequisites are noted below only to show the relationship of the subjects.

1. First Semester Junior Year - Spring (18 units)
   - (3) CM 120 Construction Operations & Methods Analysis (CM 022)
   - (3) CM 121 Fundamentals of Construction Estimating (CM 022; CM 120 concurrently)
   - (3) CM 130 Structures I - Design Principles & Structural Steel Design (CM 030, CM 040)
   - (3) OBE 130 Business Communications
   - (3) General Education Course
   - (3) General Education Course

2. Second Semester Junior Year - Fall (18 units)
   - (3) CM 111 Construction Labor Relations
   - (3) CM 125 Advanced Estimating & Bidding (CM 121, CM 135)
   - (3) CM 127 Planning, Scheduling & Control (CM 121)
   - (3) CM 135 Soils & Foundations (CM 130)
   - (3) CM 140 Structures II - Timber & Formwork Design (CM 130)
   - (3) General Education Course

3. First Semester Senior Year - Spring (18 units)
   - (3) CM 110 Legal Aspects of Construction (OBE 018, CM 022)
   - (3) CM 124 Engineering Construction (CM 120, CM 135)
   - (3) CM 126 Construction Project Management (CM 125, CM 127)
   - (3) CM 150 Structures III - Concrete & Masonry (CM 140)
   - (3) OBE 150 The Management of Contemporary Organizations
   - Select one of the following: MGMT 120 Principles of Marketing
   - MGMT 133 Business Finance
   - MGMT 180 Operations Management

4. Second Semester Senior Year - Fall (18 units)
   - (3) CM 129* Construction Management (CM 110, CM 111, CM 124, CM 126, OBE 150)
   - (3) CM 136 Principles of Mechanical & Electrical Engineering (PHYS 005B, CM 030)
   - (3) BA Elective A 100-level Business Administration course
   - (3) General Education Course
   - (3) General Education Course
   - (3) General Education Course

* Indicates courses that also can be used to satisfy General
education requirements. For the degree, students must satisfy all
the University's General Education requirements for Construc-
tion Management. Students should contact the program office
for a complete list of these requirements.

Note: Business Administration lower and upper division courses
apply both to the major and to a Business Administration minor.
Students interested in pursuing a pre-MBA sequence should
contact the Degree Program Center in the College of Business
Administration.

Mechanical-Electrical-Environmental Elective Sequence
For a limited number of students who specifically plan
careers in mechanical or electrical contracting, or in
environmental remediation it may be possible to arrange a
different sequence of courses in the engineering funda-
mentals component. Subject to space being available in
the MET and CE courses, and subject to approval by the
departments involved, courses selected from the MET 110,
MET 140 and MET 150 series and certain CE courses can
be substituted for the five courses in the CM 130 series.

Cooperative Education
Students are encouraged to participate in the Cooperative
Education Program which provides alternate periods of
study at the University and practical work experience in
industry or government for pay. Most participants of the
Co-op plan will complete one six-month work period in
their junior year and the other in their senior year.
Academic credit is granted for successful completion of
the Co-op phase. Students interested in the Cooperative
Education Program should apply in the satellite office in
Riverside Hall 2004 or the main office in Lassen Hall
2008. For information call 278-7234.

LOWER DIVISION COURSES

CM 010. The Construction Industry. An introduction to the
many facets of the construction industry and to the various
career opportunities. The unique products of construction, the
organizations involved, and the people that make it happen.
Guest speakers. Lecture one hour. Fall only. 1 unit.

CM 020. Construction Materials and Processes. An introduc-
tion to construction materials; to their properties in-place in
completed projects, and to their characteristics that affect
construction processes. The organizations, methods, equipment
and safety considerations that are common to projects of all
types and to all segments of the industry. Field trips. Lecture two
hours; laboratory three hours. Fall only. 3 units.

CM 021. Construction Graphics. Instruction and exercises in
graphic techniques and procedures applicable to construction.
The preparation of conventional drawings in the civil, architec-
tural, structural, mechanical and electrical fields. Freehand
sketching, Isometric and oblique presentations. Quantity
surveysing. Laboratory nine hours. Prerequisite: CM 020,
competence in mechanical drawing. Spring only. 3 units.

CM 022. Construction Documents. Analysis of construction
drawings, specifications, bid and contract documents. Technical
and legal interpretations and implications to managers of the
construction process. Quantity surveysing. Lecture two hours;
laboratory three hours. Prerequisite: CM 010, CM 021, OBE
018. 3 units.

the solution of engineering design problems. Concepts of units,
vectors, equilibrium, forces, force systems, shear and moment
diagrams. Lecture three hours. Prerequisite: CM 021, MATH
026B, PHYS 005A; MATH 026B may be taken concurrently.
Fall only. 3 units.

CM 040. Properties of Construction Materials. A study of the
engineering performance characteristics of materials. Covers
testing concepts and procedures. Includes basic properties of
metals, aggregates, cements, concrete, timber, asphalt, masonry
and plastics with emphasis on construction applications.
Lecture two hours; laboratory three hours. Prerequisite: CM
020, PHYS 005A. Spring only. 3 units.

CM 110. Legal Aspects of Construction. The application of
basic legal concepts to the construction process. Analysis of
problems relating to contract formation, administration, and
interpretation. Includes bidding and contract enforcement;
litigation of disputes vs. arbitration; liability for negligence,
waiver, and strict liability; safety; license law requirements;
mechanics’ liens and stop notices; bond rights and obligations.
Lecture three hours. Prerequisite: OBE 018, CM 022. Spring
only. 3 units.

CM 111. Construction Labor Relations. A study of federal and
state labor law; labor unions, and their importance in the
construction industry; and an analysis of the growth of open-
shop construction. Employment law. Lecture three hours. Fall
only. 3 units.

CM 120. Construction Operations and Methods Analysis. An
introduction to the analysis and management of construction
projects in terms of the work that must be performed in the
construction process. Analysis of operations and methods using
concepts and techniques, including video, that are applicable to
all types of projects in all segments of the industry. Safety as an
integral part of project and operations management. Field trips.
Lecture two hours; laboratory three hours. Prerequisite: CM
022. Spring only. 3 units.

CM 121. Fundamentals of Construction Estimating. A study of
the basic approaches to estimating the cost of all types of
construction projects from a managerial viewpoint. Types of
estimates and methods; elements of cost, variables and costing
concepts; analysis procedures for detailed estimates. Lecture
two hours; laboratory three hours. Prerequisite: CM 022.
Corequisite: CM 120. Spring only. 3 units.

construction projects with emphasis on equipment-paced
operations including safety aspects. Engineering fundamentals
and other factors that affect equipment selection and produc-
tion. Amplification of recording and analysis techniques. Unit
price contracts. Field trips. Lecture two hours; laboratory three
hours. Prerequisite: CM 120, CM 135. Spring only. 3 units.

CM 125. Advanced Estimating and Bidding. A study of the
concepts and practices involved in the total estimating and
bidding process in construction, from initial project selection to
submission of final bids. Covers considerations in project
selection, variables affecting labor productivity, sub-bid
analysis, contingency and risk analysis, pricing concepts,
bidding models, and an introduction to computer applications.
A complete project estimate and bid is prepared by each
student. Lecture two hours; laboratory three hours. Prerequisite:
CM 121, CM 135. Fall only. 3 units.
CM 126. Construction Project Management. An introductory class in the study of Project Management as it is used on the larger construction project. Students study how construction general contractors manage cost, time, scope, and quality. The theory of Project Management is developed and compared to management of the on-going business enterprise. Matrix and functional organizations are examined within the context of the industrial, commercial and heavy contract construction industries using the principles of the management process. Lecture three hours. Prerequisite: CM 125, CM 127. Spring only. 3 units.

CM 127. Planning, Scheduling and Control. A study of the concepts used in planning and controlling construction projects. Arrow, PERT, precedence, and linear scheduling methods; resource leveling; time-cost analysis; bar charts; and time-scaled diagrams. Manual procedures followed by computer applications. Lecture three hours. Prerequisite: CM 121. Fall only. 3 units.

CM 129. Construction Management. Consideration of technical, legal, business and human factors (including safety) in applying the functional approach to the management of construction organizations, projects, and operations. The individual construction professional in a competitive industry: personal and professional development, ethics, stress, physical and mental health. The industry and the construction professional in relation to the social and physical environments. Lecture three hours. Prerequisite: CM 110, CM 111, CM 126, OBE 150. Fall only. 3 units.

CM 130. Structures I — Design Principles and Structural Steel Design. Introduction to structural design. Consideration of load conditions, stresses, strain, beam deflection and column action. Basic design of structural steel members with emphasis on systems used in practical situations. Beams, trusses, and columns are designed using the Uniform Building Code as a reference and the results are shown on detailed drawings and sketches. Lecture three hours. Prerequisite: CM 030, CM 040. Spring only. 3 units.

CM 135. Soils and Foundations. A study of the properties and behaviors of soils used as materials in construction. Index and physical properties of soils including compaction; permeability, compressibility, and shear strength. Methods of laboratory and field tests. Principles of design of foundations, pavements, embankments and temporary soil support systems for trenches and cuts. Lecture two hours; laboratory three hours. Prerequisite: CM 130. Fall only. 3 units.

CM 136. Principles of Mechanical and Electrical Engineering. Basic principles of thermodynamics with application to heating, ventilating and air conditioning systems. Introduction to electrical circuits and circuit analysis with construction applications. Lecture three hours. Prerequisite: PHYS 005B, CM 030. Fall only. 3 units.

CM 140. Structures II — Timber and Formwork Design. Basic design of structural timber members with emphasis on systems used in practical situations. Beams, trusses, and columns are designed using the Uniform Building Code as a reference and the results are shown on detailed drawings and sketches. Application of engineering principles to satisfy construction requirements that are not designed or shown in typical construction documents. Includes analysis and design of concrete form systems, shoring, and falsework, and construction dewatering. Lecture three hours. Prerequisite: CM 130. Fall only. 3 units.

CM 150. Structures III — Concrete and Masonry. Basic design concepts of reinforced concrete and reinforced masonry design. Topics and examples include design of beams, slabs, columns and walls. Students are required to demonstrate drafting ability. Assignments include design and drawings of various structural systems. Lecture three hours. Prerequisite: CM 140. Spring only. 3 units.

CM 199. Special Problems. Individual Projects or Directed Reading. Note: Open only to students competent to carry on individual work. Admission to this course requires approval of an instructor and the student’s advisor. 1-3 units.