

**CALIFORNIA STATE UNIVERSITY, EAST BAY**

Designation Code: 2008-09 **CAPR 07**

Date Submitted: November 6, 2008

TO: The Academic Senate  
FROM: Committee on Academic Planning & Review (CAPR)  
SUBJECT: BS in Construction Management  
PURPOSE: For Action by the Academic Senate  
ACTION  
REQUESTED: That the Academic Senate Approve the BS in Construction Management

At the CAPR meeting of November 6<sup>th</sup>, the committee members voted unanimously to approve the BS in Construction Management, for placement on the Academic Plan. The next program review will be in 2013-14 to coincide with the review of the Construction Mgmt MS program.

Program submission documents can be found on the CAPR Sharepoint site within the November 6th workspace at:

<https://sharepoint.csueastbay.edu/sites/AcademicSenate/capr/CAPR%20Meeting/default.aspx?In stanceID=20081106>

See also 08-09 CIC 8

Academic Program Planning  
401 Golden Shore, 6th Floor  
Long Beach, CA 90802-4210

562-951-4722  
Fax 562-951-4982  
E-mail [app@calstate.edu](mailto:app@calstate.edu)

**Proposing New CSU Degree Programs  
Bachelor of Science in Construction Management**

This document presents the format, criteria, and submission procedures for CSU bachelor's and master's degree program proposals. Please see the [Academic Program Planning](http://www.calstate.edu/APP/) Web site for doctoral degree proposal formats. (<http://www.calstate.edu/APP/> )

**Templates for Doctoral Proposals**

- [CSU Ed.D. Programs](#)
- [UC-CSU Joint Doctoral Programs](#)
- [Joint Doctorates with Independent Institutions](#)

**Criteria**

Proposals are subjected to system-level internal and external evaluation, through which reviewers seek evidence indicating that current campus budgetary support levels provide sufficient resources to establish and maintain the program. Review criteria include: curriculum, financial support, number and qualification of faculty, physical facilities, library holdings, responsiveness to societal need and regional and workforce needs, academic assessment plans, and compliance with all applicable CSU policies, state laws, and accreditation standards.

**Procedures**

Before a proposal is submitted to the Chancellor's Office, the campus proposes adding the projected degree program to the campus academic plan. Subsequent to the CSU Board of Trustees approval of the projection, a detailed, campus-approved program implementation proposal is submitted to Chancellor's Office for review and approval. Proposals are to be submitted in the academic year preceding projected implementation. Only programs whose implementation proposals have been approved by the CSU Chancellor may enroll students. [Campus Academic Plans](#) appear in the Educational Policy Committee Agenda Item of the annual March meeting of the Board of Trustees.

**Submission**

**CSU Campuses**  
Bakersfield  
Channel Islands  
Chico  
Dominguez Hills  
East Bay

Fresno  
Fullerton  
Humboldt  
Long Beach  
Los Angeles  
Maritime Academy

Monterey Bay  
Northridge  
Pomona  
Sacramento  
San Bernardino  
San Diego

San Francisco  
San José  
San Luis Obispo  
San Marcos  
Sonoma  
Stanislaus

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1. Please prepare the degree program proposal using the enclosed template.
2. Submit **four** complete hard copies of the campus-approved implementation proposal, including documentation of campus approval, to:

Academic Program Planning  
SU Office of the Chancellor  
401 Golden Shore  
Long Beach, California 90802-4210

3. Additionally, campuses are requested to send an electronic copy to [APP@calstate.edu](mailto:APP@calstate.edu).

**CSU Campuses**

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San Diego

San Francisco  
San José  
San Luis Obispo  
San Marcos  
Sonoma  
Stanislaus

## B.S. in Construction Management

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**1. Program Type (Please specify any from the list below that apply—delete the others)**

√ State-Support

√ [Fast Track](#)

√ New Program

**2. Program Identification**

a. Campus

CSU East Bay

b. Full and exact degree designation and title

Bachelor of Science in Construction Management

c. Date the Board of Trustees approved adding this program projection to the campus Academic Plan.

Approval will be requested ASAP at the Board of Trustee meeting. This is a fast track proposal.

d. Term and academic year of intended implementation.

Fall 2009

e. Name of the department(s), division, or other unit of the campus that would offer the proposed degree major program. Please identify the unit that will have primary responsibility.

Engineering Department

f. Name, title, and rank of the individual(s) primarily responsible for drafting the proposed degree major program.

Saeid Motavalli, Professor and Chair of Engineering

g. Statement from the appropriate campus administrative authority that the addition of this program supports the campus mission and will not impede the successful operation and growth of existing academic programs. (CPEC “Appropriateness to Institutional and Segmental Mission”)

The addition of the B.S. in Construction Management is in keeping with the university mandate to be “a university of choice through regional stewardship.” This mandate includes offering academic programs that meet the workforce needs of the region. The B.S. in Construction Management will not compete with our current academic programs since it is focused on a segment of the market that we do not currently serve. Thus, it will generate new FTE which will support the new degree program.

- h. Any other campus approval documents that may apply (e.g. curriculum committee approvals).

[we will need to add something later after we get the approvals]

- i. Please specify whether this proposed program is subject to WASC Substantive Change review.

We will start the program in a hybrid mode. The WASC approval will be sought as soon as we can offer more than 50% of the program on-line.

- j. Optional: Proposed Classification of Instructional Programs ([CIP Code](#)) and CSU Degree [Program Code](#)

CIP code 52.20

CSU Code 09254

Campuses are invited to suggest one CSU degree program code and one corresponding CIP code. If an appropriate CSU code does not appear on the system wide list at: [http://www.calstate.edu/app/documents/HEGIS-CIP2000\\_102406.xls](http://www.calstate.edu/app/documents/HEGIS-CIP2000_102406.xls), you can search CIP 2000 at <http://nces.ed.gov/pubs2002/cip2000/> to identify the code that best matches the proposed degree program. The Classification of Instructional Programs (CIP) is a National Center for Education Statistics (NCES) publication that provides a numerical classification and standard terminology for secondary and postsecondary instructional programs. The CSU degree program code (based on old HEGIS codes) and CIP code will be assigned when the program is approved by the Chancellor.

### 3. Program Overview and Rationale

- a. Rationale, including a brief description of the program, its purpose and strengths, fit with institutional mission, and a justification for offering the program at this time. The rationale may explain the relationship among the program philosophy, design, target population, and any distinctive pedagogical methods. **(CPEC “Appropriateness to Institutional and Segmental Mission”)**

According to the National Center for Educational Statistics, Construction Management is a program that prepares individuals to manage, coordinate, and supervise the construction process from concept development through project completion on timely and economic bases. It includes instruction in commercial, residential, mechanical, highway/heavy civil, electrical, environmental, industrial, and specialty construction; facilities management; project planning; budgeting and cost control; logistics and materials management; personnel management and labor relations; site safety; construction contracting; construction processes and techniques; organization and scheduling; and applicable codes and regulations.”

The San Francisco Bay Area is a prime location for offering such a degree. There is a large concentration of major construction activities in this part of the state. Also, with the approval of state bond initiatives totaling around \$40 billion in new spending by the state on transportation projects, it is expected that there will be significant new demand for professionals capable of managing large construction projects. For this program we are targeting both freshmen and transfer students from community colleges. The target population will also include individuals who are already working in the construction industry and trying to advance their career to manage large construction projects in the public and private sectors. To accommodate working professionals, the program will use a hybrid mix of on-line and in-class formats of instruction. The extent of the on-line component of each course is

determined by the requirements for in-person interaction and laboratory activities. All the in-class activities will be scheduled at times convenient to students.

- b. Proposed catalog description, including program description, degree requirements, and admission requirements. For master's degrees, please also include catalog copy describing the culminating experience requirement(s).

Bachelor of Science in Construction Management

Program Description

The Department of Engineering offers a Bachelor of Science degree in Construction Management designed for individuals who are planning to advance their knowledge and careers for managing construction projects.

The goals of the B.S. in Construction Management are to prepare effective managers for public and private construction projects, to prepare the workforce required for the expected increase in the state's transportation infrastructure improvements, and to enable high school graduates, transfer students and working professionals to assume leadership roles in construction industry. This program is unique in that it will be offered as a hybrid program with classes being offered partially on-line with limited in-class activity. Special attention is given to working professionals with classes offered mainly at times convenient to students. Students will take required courses in computer aided construction design, construction material and methods, legal and environmental issues in construction, project planning and control, project management, soil mechanics and cost estimating. Issues in construction safety, building codes, electrical and mechanical systems and cost accounting are also covered. Students will also have a broad choice of electives from courses in construction management, engineering, or business to personalize their expertise.

Mission Statement

The mission of the Bachelor of Science degree in Construction Management is to prepare effective managers to lead public and private construction projects, prepare a technically capable management workforce required for the expected increase in the state's transportation infrastructure improvement projects, and enable high school graduates, transfer students and working professionals to assume leadership roles in construction industry.

Student Learning Outcomes

Students graduating with a B.S. in Construction Management from Cal State East Bay will

- 1) have knowledge in the core construction management areas (construction materials and methods, safety, codes, scheduling, commissioning, planning and control, project management, construction law, cost accounting, human resources management, environmental and safety issues in construction),

- 2) have knowledge in broad areas of construction management beyond the core areas,
- 3) have the ability to communicate effectively,
- 4) have the ability to function in teams,
- 5) have the knowledge of sustainable building and construction techniques and relevant state regulations,
- 6) have an awareness of the complex environment (involving professional and ethical responsibilities) in which they will practice their profession,
- 7) have the ability to educate themselves and be prepared for lifelong learning and professional development, and
- 8) have experience in solving real life problems.

#### Career Opportunities

With the expected increase in large construction work in part stemming from the increase in public spending on California's transportation infrastructure improvement, there is considerable demand for individuals who can technically and scientifically manage construction projects. The construction industry as a whole is one of the largest industries in the nation with a great need for skilled project managers. Sample jobs are construction manager, site manager and others.

#### Features

The B.S. in Construction Management is designed to accommodate full time students as well as working students with courses offered in a hybrid format requiring a reduced number of on-campus class meetings. The class meetings will be conducted at times convenient to students. The instructors will be selected from industry leaders with significant construction management work experience. Students will have the opportunity to take elective courses in engineering, business, or science to broaden their skills.

#### Admission

The B.S. in Construction Management is open to individuals planning a career or advancing their career in the construction industry and who meet general university requirements for freshmen or transfer students (refer to on-line catalog).

#### Degree Requirements

The B.S. in Construction Management requires the completion of 184 quarter units distributed among required courses and electives.

## **4. Curriculum**

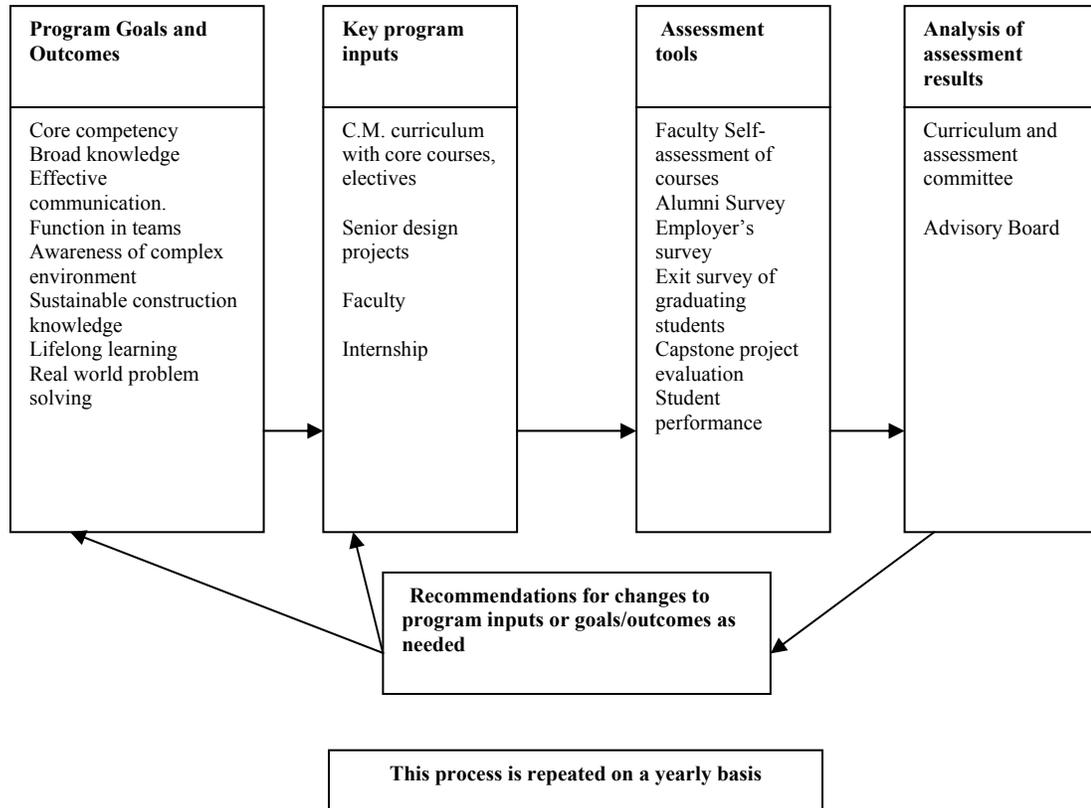
- a. Goals for the (1) program and (2) [student learning outcomes](#). Program goals are very broad statements about what the program is intended to achieve, including what kinds of graduates will be produced. Student learning outcomes are more specific statements that are related to the program goals but that more narrowly identify what students will know and be able to do upon successful completion of the program.

Program Goals

The Construction management program provides a quality education which produces graduates who have

- exhibited evidence of successfully applying their learned skills throughout their professional pursuits,
  - enthusiasm and aptitude to continuously pursue learning,
  - ability to communicate and work well on teams that may include colleagues from other disciplines,
  - gained recognition as qualified construction managers with high ethical standards.
  - knowledge in the core construction management areas (construction materials and methods, safety, codes, scheduling, commissioning, planning and control, project management, construction law, cost accounting, human resources management, environmental and safety issues in construction),
  - knowledge in broad areas of construction management beyond the core areas,
  - the ability to communicate effectively,
  - the ability to function in teams,
  - knowledge of sustainable building and construction techniques and relevant state regulations,
  - an awareness of the complex environment (involving professional and ethical responsibilities) in which they will practice their profession,
  - the ability to educate themselves and be prepared for lifelong learning and professional development, and
  - experience in solving real life problems.
- b. Plans for assessing program goals and student learning outcomes. Some planners find it helpful to develop matrices in which student learning outcomes and required courses are mapped, indicating where content related to the learning outcomes is introduced, reinforced, and practiced at an advanced level in required courses. (**CPEC “Maintenance and Improvement of Quality”**)

Assessment Process is depicted in the figure below:



Mapping of Program inputs to program outcomes is depicted in the figure below:

Program Inputs								
	1. Core Knowledge	2. Broad Knowledge	3. Effective Communication	4. Teaming	5. Awareness of Complex Env.	6. Sustainable construction knowledge	7. Ability to Self Educate	8. Real Life Prob. Solving Experience
Faculty	✓	✓	✓	✓	✓	✓	✓	✓
Senior design	✓	✓	✓	✓	✓	✓	✓	✓
Internship			✓	✓	✓		✓	✓
<b>Required Courses</b>								
Financial Reporting and Analysis I	✓							
Basic Chemistry for the Health Sciences	✓							
Introduction to Construction Management	✓	✓	✓	✓				
Construction Methods and Material I	✓					✓		✓
Construction Methods and Material II	✓				✓	✓		✓
Principles of Microeconomics		✓						
Engineering Graphics	✓							
College Algebra	✓							
Trigonometry and Analytic Geometry	✓							
Introductory Physics	✓							
General Psychology		✓						
Elements of Probability and Statistics	✓							
Construction Safety	✓				✓			✓
Construction Law	✓	✓	✓					
Construction Project Management and Commissioning	✓	✓	✓				✓	✓
Building Codes	✓							✓
Soil Mechanics and Building Foundations	✓				✓			
Engineering Graphics for Construction Management	✓		✓					
Construction Scheduling	✓				✓		✓	✓
Electrical and Mechanical Systems in Construction	✓							✓
Environmental Issues and Green Building	✓	✓			✓	✓	✓	✓
Construction Cost Estimation	✓	✓		✓	✓		✓	✓
Construction Project Planning and Control, Computer Tools	✓						✓	
Senior Project I			✓	✓	✓	✓	✓	✓
Senior Project II			✓	✓	✓	✓	✓	✓
Statics	✓							
Human Resources Management	✓	✓	✓	✓	✓			✓
<b>Elective courses</b>		✓						

c. Total number of units required for the major.

184 units

- d. Include a justification for any baccalaureate program that requires more than 120-semester units or 180-quarter units.

We are only 4 units above the minimum requirement for a B.S. degree. We are planning to request G.E. designation for one of the upper division required courses to reduce the credit requirement to 180. Also two courses in the elective course list, ENGR 3190, *B6* and ENGR 3140, *D4* are approved upper division G.E. course that students can take to reduce their degree requirements to 180.

- e. If any formal options, concentrations, or special emphases are planned under the proposed major, identify and explain fully. Optional: You may propose a CSU degree program code and CIP code for each concentration that you would like to report separately from the major program, if the option is approximately equivalent to a degree currently listed on the CSU application-booklet degree program table. If you do not find an appropriate CSU degree program code at: [http://www.calstate.edu/app/documents/HEGIS-CIP2000\\_102406.xls](http://www.calstate.edu/app/documents/HEGIS-CIP2000_102406.xls), you can search CIP 2000 at <http://nces.ed.gov/pubs2002/cip2000/> to help identify the code that best matches the proposed curriculum.

N/A

- f. A list of all courses *required* for the major, specifying catalog number, *title*, units of credit, and prerequisites or co-requisites (ensuring that there are no “hidden” prerequisites that would drive the total units required to graduate beyond the total reported in 4c above).

*Lower division (56)*

ACCT 2251	Financial Reporting and Analysis I (4)
CHEM 1601	Basic Chemistry for the Health Sciences (4) <b>B1</b>
*CMGT 1011	Introduction to Construction Management (4)
*CMGT 2060	Construction Methods and Material I (4)
*CMGT 2070	Construction Methods and Material II (4)
ECON 2301	Principles of Microeconomics (4) <b>D1</b>
ENGR 1420	Engineering Graphics (2)
MATH 1130	College Algebra (4) <b>B4</b>
MATH 1300	Trigonometry and Analytic Geometry (4)
PHYS 2701	Introductory Physics (4) <b>B5</b>
PHYS 2702	Introductory Physics (4)
PSYC 1000	General Psychology (5) <b>B2</b>
STAT 1000	Elements of Probability and Statistics (5)

*Upper Division (56)*

*CMGT 3101	Statics (4)
*CMGT 3190	Construction Safety (4)

*CMGT 3280	Construction Law (4)
*CMGT 3400	Construction Project Management and Commissioning (4)
*CMGT 3450	Building Codes (4)
*CMGT 3600	Soil Mechanics and Building Foundations (4)
#CMGT 4100	Engineering Graphics for Construction Management (4)
*CMGT4200	Construction Scheduling (4)
*CMGT 4250	Electrical and Mechanical Systems in Construction (4)
#CMGT 4300	Environmental Issues and Green Building (4)
#CMGT 4400	Construction Cost Estimation (4)
#CMGT 4500	Construction Project Planning and Control, Computer Tools (4)
*CMGT 4610	Senior Project I (4)
*CMGT 4620	Senior Project II (4)
MGMT 3610	Human Resources Management (4)

*Electives (8)*

8 credit hours from the following courses or other 3000 or 4000 level courses with department approval.

ENGR 3190 (B6), ENGR 3140 (D4), MGMT 3600, ACCT 2253, ACCT 2701, ACCT 3210, ACCT 3230, MGMT 3100, FIN 3300, FIN 4410, FIN 4415, and MGMT 3645

Note: \* indicates a new course and,  
# indicates tiered courses with existing graduate courses

*Course Descriptions*

ACCT 2251 Financial Reporting and Analysis I (4)  
Interpretation and analysis of financial statements for decision-making. Introduction to identification, measurement, and reporting of financial events of business entities. Prerequisites: Satisfactory completion of Entry-level Mathematics (ELM) requirement, and either credit for intermediate algebra or a satisfactory score on the Mathematics Diagnostic Test (MDT). No credit given to those who have completed ACCT 2210.

CHEM 1601 Basic Chemistry for the Health Sciences (4)  
A chemical perspective for healthier living. Basic inorganic chemistry: an introduction to atomic and molecular structure. A-F grading only. Not open to students with credit for CHEM 1605. Prerequisite: high school algebra. Three hrs. lect., 3 hrs. lab.

CMGT 1011 Introduction to Construction Management (4)  
An introduction to construction methods, materials, practices, contacts, codes, laws and trends. Also a study of professional ethics, management techniques and interaction with professional organizations and associations related to construction.

CMGT 2060 Construction Methods and Material I (4)  
Introduction to basic construction material. Emphasis is on both light residential and heavy commercial construction. Included material such as steel, concrete, brick, and wood. Analysis of building methods for structural, non-structural, and design and use of temporary structures including method selection, sequencing, and coordination of specialty trades in commercial and industrial construction. Prerequisites: CHEM 1601, PHYS 2702, CMGT 1011

CMGT 2070 Construction Methods and Material II (4)  
Methods in construction of buildings and large structures; site, excavation, foundation, framework, timber, reinforced concrete, structural steel, masonry, excavation, paving, compacting, and others. Prerequisite: CMGT 2060

CMGT 3101 Statics

An intermediate introduction to Newtonian mechanics. Analysis of forces and moments on engineering structures in equilibrium. Moments of inertia and stress strain relationships. Prerequisite: PHYS 2702

CMGT 3190 Construction Safety (4)

Explanation of requirements of the Occupational Safety and Health Act and other related federal and state legislation as applied to the building construction industry. Standards for accident prevention, hazard identification, and responsibility for compliance emphasized.

CMGT 3280 Construction Law (4)

Introduction to rules and regulations governing construction industry, including contractors licensing law, state lien laws, health and safety regulations, personnel relations and supervision, worker compensation, employment insurance, taxes, and dispute resolution.

CMGT 3400 Construction Project Management and Commissioning (4)

Project Management concepts for construction; concepts such as CPM and PERT, roles and responsibilities, labor relations and supervision, administrative systems, computer tools for project management, documentation, quality management, and process improvement. Issues related to commissioning of construction projects.

Prerequisites: ACCT 2251, CMGT 2070

CMGT 3450 Building Codes (4)

Construction codes: structural, mechanical, electrical, and plumbing. Building safety and accessibility. Prerequisite: CMGT 2070.

CMGT 3600 Soil Mechanics and Building Foundations (4)

Engineering properties of soils and rocks such as permeability, compressibility and shear strength. Site evaluation for building foundations, dams, tunnels and highways. slope stability. Prerequisite: CMGT 3101

CMGT 4100/6100 Engineering Graphics for Construction Management (4)

Engineering graphics concepts such as drawing and reading construction plans, emphasis on the use of advanced Computer Aided Design (CAD) tools in construction. Computer Aided Design tools such as REVIT Architecture will be utilized to introduce the concept of Building Information Modeling (BIM). Trends in construction industry in the use of a unified CAD system to handle various aspects of construction projects will be covered. Concepts such as Parametric Design and its effect on the ease of design modifications will be discussed. Prerequisites: ENGR 1420, MATH 1300

CMGT 4200 Construction Scheduling (4)

Critical Path method, planning, scheduling, and control of construction project including sequencing, time, and control. Use of computer tools for project scheduling. Prerequisite: CMGT 2070

CMGT 4250 Electrical and Mechanical Systems in Construction (4)

An introduction to current principles and practices in the application of mechanical and electrical systems. Electrical power system, lighting, wiring, and power distribution. Mechanical systems such as Heating Ventilating (HV), Air Conditioning, water supply, drainage, and sewers. Prerequisite: PHYS 2702

CMGT 4300/6300 Environmental Issues and Green Building (4)

Review of environmental issues and initiatives relevant to the building, construction and related industries. Environmental laws and regulations pertaining to construction. Issues such as construction waste disposal and treatment, and green building concepts, LEED permits, scoring and submittal processes for projects, sustainable development and construction are covered. Prerequisite: CMGT 2070

CMGT 4400/6400 Construction Cost Estimation (4)  
Issues related to construction project cost from conceptual phase to full implementation. Approaches to cost estimation, type of construction cost estimates, effects of scale on construction cost, unit cost method of estimation, allocation of construction cost overtime, estimation of operating costs, costs associated with constructed facilities and the use of computer aided tools for construction cost estimating. Also methods such as life cycle costing in construction, approaches in designing for construction costs are explored. Prerequisites: ACCT 2251, ECON 2301

CMGT 4500/6500 Construction Project Planning and Control, Computer Tools (4)  
Application of project planning techniques such as CPM and PERT. Project scheduling, forecasting and communications required for project cost and scheduling control. Study of various tools and techniques used in construction management information systems. Familiarization with the latest software for construction project planning and control. Newest approaches to integration of various computer databases used in construction projects. Prerequisite: CMGT 2070

CMGT 4610 Senior Project I (4)  
Development of technical writing and presentation skills through class discussions, proposal writing and presentations. Development of team skills through identification and development of team project proposal and through team building exercises. Utilization of construction management and project management techniques in proposal development. Introduction of professional ethics through case studies. Prerequisites: Senior standing and departmental approval.

CMGT 4620 Senior Project II (4)  
Utilization of construction management skills and design concepts including development of alternative solutions and economic analysis of alternatives to complete a construction management project. Prerequisite: CMGT 4610.

CMGT 4900 Independent Study (1-4)  
Course is based on selected research topics agreed on between the student and the faculty supervising the course. Prerequisite: Completion of 32 credit hours of required courses.

CMGT 4990 Special Topics (1-4)  
Group study of a selected topic, the title to be specified in advance. May be repeated for credit for a maximum of 4 units per quarter and 8 units total. Prerequisites: At least junior standing and permission of instructor.

ECON 2301 Principles of Microeconomics (4)  
Basic micro-economic concepts; introductory analysis of the determination of prices and output in different market situations; public policy.

ENGR 1420 Engineering Graphics (2)  
Engineering drawing, computer-aided design, dimensioning, and tolerancing. Drawings of mechanical components. One hr. lect., 3 hrs. lab.

MATH 1130 College Algebra (4)  
Functions and graphs: polynomials, rational functions, exponential and logarithmic functions. Prerequisite: satisfactory completion of Entry-Level Mathematics requirement.

MATH 1300 Trigonometry and Analytic Geometry (4)  
Definitions, properties and graphs of the trigonometric functions. Applications. Analytic geometry of conic sections. A preparatory course for calculus. Prerequisite: MATH 1130 or departmental permission.

**MGMT 3610 Human Resources Management (4)**  
Fundamentals of strategic human resource management from the perspective of human resources professionals and general managers. Focus on how firms use human resource functions, such as recruitment and selection, training and development, performance management, compensation and benefits, to gain a competitive advantage.

**PHYS 2701 Introductory Physics (4)**  
A sequence in general physics, designed primarily for students taking the B.S. biological sciences (including pre-professional students), chemistry (B.A.), and geology or for non-science majors requiring a good foundation in physics. Knowledge of algebra and trigonometry required. For students who are not majoring in physics. Three hrs. lect., 3 hrs. lab each. (2701: F; 2702: W)

**PHYS 2702 Introductory Physics (4)**  
(See PHYS 2701)

**PSYC 1000 General Psychology (5)**  
An introduction to the scientific study of basic processes underlying human and animal behavior; sensation and perception, learning and thinking, motivation, and emotion. Not open to students with credit for PSYC 1001, 1005, 2004, or 2009. Four hrs. lect., 2 hrs. act. or 5 hrs lect. F, W, Sp)

**STAT 1000 Elements of Probability and Statistics (5)**  
Descriptive statistics (measures of central tendency, dispersion, correlation), elementary discrete probability distributions. Introduction to tests of statistical hypotheses. Prerequisite: completion of ELM requirement.

**Electives (8)**

8 units from the following courses or other 3000 or 4000 level courses with department approval.

ENGR 3190 (B6), ENGR 3140 (D4), MGMT 3600, ACCT 2251, ACCT 3210, ACCT 3230, MGMT 3100, FIN 3300, FIN 4410, FIN 4415, and MGMT 3645

Note: With regard to Sections 4f and 4g, a proposed program should take advantage of courses already offered in other departments when subject matter would have considerable overlapping content.

- g. List of any new courses that are: (1) needed to initiate the program and (2) needed during the first two years after implementation. Only include proposed catalog descriptions for new courses. For graduate program proposals, identify whether each course is a graduate-level or undergraduate-level offering.

To initiate the program we need to offer one new course from the required course list.

- h. In the first two years after the implementation we need to offer 2 new courses per quarter of the required courses. Attach a proposed course-offering plan for the first three years of program implementation, indicating, where possible, likely faculty teaching assignments.

Proposed New Course offering

Year I		
Fall	Winter	Spring
	CMGT 1011	

**Year II**

	CMGT 1011	CMGT 2060
		CMGT 3101
		CMGT 3280

**Year III**

CMGT 2070	CMGT 1011	CMGT 2060
CMGT 3600	CMGT 3400	CMGT 3101
CMGT 4100	CMGT 3450	CMGT 3280
	CMGT 3190	CMGT 4200/6200
		CMGT 4250

**Year 4 and beyond**

CMGT 2070	CMGT1011	CMGT 2060
CMGT 3600	CMGT 3190	CMGT 3101
CMGT 4100	CMGT 3400	CMGT 3280
CMGT 4400/6400	CMGT 3450	CMGT 4200/6200
	CMGT 4500/6500	CMGT 4250
	CMGT 4610	CMGT 4300/6300
		CMGT 4620

- j. For Bachelor degree proposals, include evidence that program requirements conform to the minimum requirements for the culminating experience, as specified in [Section 40510](#) of [Title 5 of the California Code of Regulations](#).

The degree program requires the completion of a sequence of capstone design courses CMGT 4610 and CMGT 4620. This sequence requires working on real life construction management utilizing the knowledge gained in the program.

- k. Admission criteria, including prerequisite coursework.

Same as the general University requirements (Please refer to university catalog).

- l. Criteria for student continuation in the program.

Same as the general University requirements

- m. For undergraduate programs, planned provisions for articulation of the proposed major with community college programs.

Articulation agreements with community colleges will be developed and placed on ASSIST.

- n. If there is a [Lower-Division Transfer Pattern](#) (LDTP) for this major, indicate the relationship between the LDTP and the requirements presented in this proposal. Information on LDTP is available at: <http://www.calstate.edu/AcadAff/ldtp.shtml>

N/A

- o. Advising “roadmaps” that have been developed for the major.

Proposed Road Map, B.S. in Construction Management

Freshmen Year		
Fall	Winter	Spring
GE B1/3 CHEM 1601	ENGR 1420	STAT 1000
GE B4 MATH 1130	MATH 1300	GE B2 PSYC 1000-1005
	CMGT 1011	
<i>Additional G.E. Areas</i>	<i>Additional G.E. Areas</i>	<i>Additional G.E. Areas</i>
A1	A2	A3
G1	F1	G3
	G2	G4
		F2

Sophomore Year		
ACCT 2251	GE D1 ECON 2301	CMGT 2060
GE B5 PHYS 2701	PHYS 2702	CMGT 3280
<i>Additional G.E. Areas</i>	<i>G.E.</i>	CMGT 3101
C1	D2	<i>G.E.</i>
C2	ENGL 1002	C3
F3	F4	D3

Junior Year		
CMGT 2070	CMGT 3400	CMGT 4200
CMGT 3600	CMGT 3450	CMGT 4250
CMGT 4100	CMGT 3190	MGMT 3610
<i>G.E.</i>	<i>G.E.</i>	<i>G.E.</i>
D4	C4	B6

Senior Year		
CMGT 4400	CMGT 4500	CMGT 4300
Elective	CMGT 4610	CMGT 4620
		Elective
<i>G.E.</i>	<i>G.E.</i>	<i>G.E.</i>
Code U.S. History	Code U.S. History	

Needs to meet Cultural Groups and Women  
Needs to take WST in Junior Year

- p. Provision for meeting accreditation requirements, if applicable, and anticipated date of accreditation request (including the WASC Substantive Change process).

N/A

**Accreditation Note:**

*Master's degree program proposals*

If subject to accreditation, establishment of a master's degree program should be preceded by national professional accreditation of the corresponding Bachelor degree major program.

N/A

(Accreditation note finished on next page.)

*Fast-track proposals*

Fast-track proposals cannot be subject to specialized accreditation by an agency that is a member of the Association of Specialized and Professional Accreditors unless the proposed program is already offered as an authorized option or concentration that is accredited by an appropriate specialized accrediting agency.

**5. Need for the Proposed Degree Major Program  
(CPEC "Societal Need," "Number of Existing Programs in the Field," and "Advancement of the Field")**

- a. List of other California State University campuses currently offering or projecting the proposed degree major program; list of neighboring institutions, public and private, currently offering the proposed degree major program.

**CSU Facts:** Our preliminary study shows that currently five CSU campuses offer programs related to an undergraduate degree in Construction Management.

1. Chico State: This is a traditional program in the Department of Construction Management, which is the largest department in the College of Engineering.
  2. Fresno State: This program is only a minor in construction management. They are evaluating the establishment of a graduate program in construction management.
  3. CSU Northridge: Construction Management Technology. This program is designed as an on-site cohort based program.
  4. San Diego State: Construction Engineering Management is part of the Civil Engineering Department at San Diego State. The program emphasis is on the technical engineering courses.
  5. Cal Poly SLO: The Department of Construction Management is part of the College of Architecture and Environmental Design.
- b. Differences between the proposed program and programs listed in Section 5a above.

This program is designed with the direct input from industry. It reflects the need of the construction industry in the Bay Area. The curriculum is designed such that it trains construction managers who are ready for employment. The curriculum includes special topics such as conflict resolution, commissioning, green building technology and other practical skills required for construction managers. We also require a sequence of capstone design courses that entail completing real world construction management projects.

- c. List of other curricula currently offered by the campus that are closely related to the proposed program.

Master of Science in Construction Management

- CMGT 6100 Engineering Graphics for Construction Management (4)
- CMGT 6200 Legal Issues in Construction Management (4)
- CMGT 6300 Environmental Issues and Green Building (4)
- CMGT 6400 Construction Cost Estimating (4)
- CMGT 6500 Construction Project Planning and Control, Computer Tools (4)
- CMGT 6600 Financial Decision Making and Reporting in Construction (4)
- CMGT 6700 Construction Risk Management and Commissioning (4)
- CMGT 6800 Construction Safety (4)
- CMGT 6850 Current Issues in Construction Management (4)

- d. Community participation, if any, in the planning process. This may include prospective employers of graduates.

The preliminary discussion about the development of a construction management program at CSUEB started about a year ago. After a few meetings between the President, Dean of the College of Science and the Chair of the Engineering Department, it was decided that an advisory board consisting of the leaders in the construction industry in the Bay Area should be formed to evaluate the need and the curriculum for the degree program. We assembled an advisory board by March of 2007. The members consist of industry leaders from companies and agencies such as Bechtel, Cal Trans, Harris & Associates, Associated General Contractors, and members from academia. Also the President, Dean of the College of Science and the Engineering Department faculty were included in the Advisory Board.

The first meeting of the Advisory Board was held on April 17, 2007. Long range issues such as the need for the program, the type of program, the instructional mode, and the curriculum were discussed at the meeting. A second meeting of the Advisory Board was held on June 14, 2007. This meeting concentrated on specifying the curriculum, the mode of instruction and identifying possible sources for qualified instructors for the program. The following points summarize the discussions of these meetings.

- There is a great need for educated construction managers.
- The demand is expected to increase based on the expected increase in the level of state and government expenditures.
- Graduates of construction management programs have several job offers.
- There are people with unrelated degrees managing construction projects.
- Many civil engineers need to be trained to become effective construction managers.
- The curriculum should be diverse covering various aspects of construction management.
- Knowledge of environmental regulations and green building issues is essential.

- Issues such as claims, dispute resolution, liability, state law, the latest software tools, and safety are essential.
  - The program should be tailored towards working engineers and other working professionals.
  - Hybrid mode of instruction increases the attractiveness of the program.
  - Instructors should have significant industry experience.
  - There should be available instructors in the Bay Area.
- e. Applicable workforce demand projections and other relevant data.

Besides encouraging comments from our Advisory Board members regarding the demand for the degree program, we reviewed statistics from the US Bureau of Labor Statistics and California Labor Market Information. Both sources indicate strong demand for construction managers.

- f. If the program was proposed to meet society's need for the advancement of knowledge, please specify the need and explain how the program meets that need.

This program is designed to advance the knowledge of the professionals in charge of managing large construction projects. These projects are typically very complex and require a broad array of managerial knowledge to be supervised effectively. We believe that the proposed program will enable construction managers to more effectively and scientifically manage these projects. To support our claim, we have included the following data tables summarizing employment statistics for construction managers, from the U.S. Bureau of Labor Statistics and the California Labor Market Information.

National projection for labor market for construction managers

Occupation	Total employment (000's)		2004-2014 change in total employment		2004 self-employed Percent	2004-2014 average annual job openings (000's)		Percent		2004 Median annual earnings (Dollars)	Median annual earnings quartile *	Postsecondary-education or training category	Educational attainment cluster	Percent of workers aged 25 to 44, by educational attainment		
	2004	2014	Number (000's)	Percent		Due to growth and total replacement needs	Due to growth and net replacement needs	Part-time workers quartile *	Unemployed workers quartile*					High School Or less	Some College	Bachelor's degree or higher
Construction managers	431	475	45	10.4	54.0	28	12	VL	VL	69,870	VH	Bachelor's degree	HS/SC/C	40.9	29.5	29.6

\* VH = Very High; H = High; L = Low; VL = Very Low; n.a. = not available

Source: [US Department of Labor, Bureau of Labor Statistics](#)

California Employment projection for construction managers

Area	Code	Occupation	Est Yr-Proj Yr	Estimated Employment	Projected Employment	Numeric Change	Percent Change	Annual Openings Due to Growth	Annual Openings Due to Separations	Total Annual Openings
California	119021	Construction Managers	2004 - 2014	35,400	41,100	5,700	16.1	570	640	1,210

Source: [California Labor Market Information](#)

## 6. Student Demand (CPEC “Student Demand”)

- a. Compelling evidence of student interest in enrolling in the proposed program. Types of evidence vary and may include national, statewide, and professional employment forecasts and surveys; petitions; lists of related associate degree programs at feeder community colleges; reports from community college transfer centers; and enrollments from feeder baccalaureate programs, for example.

I have had discussions with Laney Community College in Oakland that is offering a successful associate degree program in construction management to create a seamless transfer agreement for their students into this program. Also Diablo Valley Community College offers a certificate in construction management. We will explore the transfer of their students to our program.

The Bureau of Labor Statistics and the California Labor Market Information both project employment gains for construction managers. The California growth projection between the 2004-2014 periods is expected to be at 16% which outpaces the national growth. As the tables show, the unemployment level for construction managers is expected to be very low and the median income is expected to be in the very high range as compared to all other occupations.

The proposed program is designed to train project managers that are needed to supervise medium/large construction projects. Prospective students consist of first time freshman, transfer students and professionals working in the construction industry looking for career advancement.

- b. Issues of access considered when planning this program.

The goal is to offer the program in hybrid format requiring few in-class meetings. We will try to offer upper division courses in the afternoon/evening hours to maximize access for working students.

- c. Professional uses of the proposed degree program.

This program is designed for professionals interested in managing construction projects.

- d. The expected number of majors in the year of initiation and three years and five years thereafter. The expected number of graduates in the year of initiation, and three years and five years thereafter.

First year, 20, and we expect the enrollment to increase to 60 in three years and 80 in five. The number of graduates is expected to be 10 in year three and grow to 20 yearly thereafter.

## 7. Existing Support Resources for the Proposed Degree Major Program (CPEC “Total Costs of the Program”)

**Note:** Sections 7 and 8 should be prepared in consultation with the campus administrators responsible for faculty staffing and instructional facilities allocation and planning. A statement from the responsible administrator(s) should be attached to the proposal assuring that such consultation has taken place.

The Provost has approved hiring of an additional faculty person to support this program (see attached memo and e-mail).

- a. Faculty who would teach in the program, indicating rank, appointment status, highest degree earned, date and field of highest degree, professional experience, and affiliations with other campus programs. For master’s degrees, include faculty publications or curriculum vitae.

In addition to the hiring of a new tenure track faculty, the following faculty from the Departments of Engineering, Earth and Environmental Studies, and Accounting and Finance also will contribute to this program.

### **David M. Bowen, Ph.D., Associate Professor**

Dr. David M. Bowen is an Associate Professor at California State University, East Bay, Department of Engineering. His research and teaching interests include design and management of human work systems, work group performance, engineering education and cognitive ergonomics. Dr. Bowen was a consultant and corporate-wide Education and Training Manager for TEFEN Ltd., a worldwide Industrial Engineering consulting firm, and later founded and was Managing Partner of BOPTIMAL Enterprises, a California consulting company. Consulting clients have included State and Federal government agencies, and private industry. Dr. Bowen has served on the faculties of the Graduate Business Program at St. Mary’s College, and in the College of Engineering, UC Berkeley. As a member of UC Berkeley’s Competitive Semiconductor Manufacturing Program, he conducted research in Europe, Asia and North America focusing on work group performance and manufacturing best-practices. As a Peace Corps volunteer he taught Mathematics in Africa. He earned his B.S., M.S., and Ph.D. degrees in Industrial Engineering and Operations Research from UC Berkeley.

### **Farnaz Ganjeizadeh, Ph.D., Assistant Professor**

Dr. Farnaz Ganjeizadeh completed her Ph.D. in Industrial and Systems Engineering from the University of Alabama in Huntsville since 1988. She earned her M.S. in Engineering Administration and B.S. in Industrial Engineering and Operations Research from Syracuse University. She is currently an assistant professor at California State University, East Bay. Her research interests are in the areas of Simulation Output Analysis and Intelligent Tutoring Systems. Dr. Ganjeizadeh has an extensive background in the Semiconductor Manufacturing Equipment Industry in the technical and management areas and served as a member of the technical staff and was the manufacturing engineering manager at Applied Materials. Her experience

includes designing an inductive model deployed for conducting multi-criteria decision-making and cost analysis at the system level. Additionally, Dr. Ganjeizadeh’s specialties are in the areas of strategic planning, new product introduction, simulation output analysis, applied operations research, quality assurance, product cost management and engineering management.

### **Christopher W.K. Lubwama, Professor**

Dr. Christopher W.K. Lubwama is a Professor of Accounting and currently the Chair of the Department of Accounting and Finance in the College of Business and Economics at California State

University, East Bay. Professor Lubwama is a graduate of Makerere University where he received a B.A in Accounting (Honors) in 1971. He then received an MBA in Accounting from the University of Alberta, Canada in 1972, and a Ph.D. in Accounting from Simon Frasier University, Canada in 1989. He

has been teaching at California State University since 1987. His teaching and research areas include auditing, cost and managerial accounting, financial accounting and international accounting.

**Saeid Motavalli, Ph.D., P.E., Professor**

Dr. Saeid Motavalli is currently Professor and Chair of the Engineering Department at CSUEB. Since joining CSUEB in 2001 he has been involved in curriculum development for the Industrial and Computer Engineering programs. His area of research is Manufacturing Systems. He has taught courses in facilities planning, quantitative methods in management, quality, production planning and control, and basic engineering. He will be responsible for the initial development and implementation of the Construction Management program.

**Sue Opp, Ph.D., Professor**

Dr. Sue Opp is a Professor of Biological Sciences and the Coordinator and founder of the Environmental Science B.S. program at CSUEB. She teaches numerous courses, from lower-division through graduate, concerning environmental science, ecology, zoology and entomology, and is involved with the development of other new environmental initiatives on campus, including potential programs and/or courses in green technology, environmental health and safety, and sustainable practices. Her professional research involves ecological investigations of insects, particularly agricultural pests, with the goal of developing economically and environmentally sound pest management methods. Dr. Opp is also a participant and advisor in the East Bay Science Project, a federally and state funded project which teaches science content to K-12 teachers.

**Tammie X. Simmons-Mosley, Ph.D., Assistant Professor**

Dr. Tammie X. Simmons-Mosley joined the faculty of the College of Business and Economics at California State University, East Bay in 2003. Prior to this position, she was on the faculty at Lehigh University in Bethlehem, PA. Her research and teaching areas are in Finance and Real Estate. She prepared herself for this field of study by earning a bachelor's degree in Real Estate and Urban Planning from California State University, Northridge, a Master's degree in Real Estate Appraisal and Investment Analysis, and a Ph.D. degree in Business with a major in Real Estate and Urban Land Economics. She completed her doctoral degree in 2000. During her doctoral studies at the University of Wisconsin-Madison, Professor Simmons-Mosley began to focus on applying financial and economic models to housing research topics which led to publications in widely respected Real Estate and Finance journals such as the Journal of Real Estate Research, the Journal of Housing Economics, and the Journal of Portfolio Management. Additional topics included in her publications are the behavior of (1) retail property owners and (2) institutional real estate investors. Professor Simmons-Mosley continues to share her research at national and international academic conferences, as well as in the classroom with her students.

**Helen Zong, Ph.D., P.E., Professor**

Dr. Helen Zong is Professor of Engineering at California State University, East Bay. Before joining CSUEB in 2000, she was an associate professor at St. Cloud State University, MN for seven years. She has led and participated in many quality assurance and facility design projects with companies in California and Minnesota. These companies include Intel Inc., Applied Materials Inc., Lockheed Martin Space Company, UPS, FedEx, Frigidaire Inc., Fingerhut, KOMO Machines, and others.

**Dr. Karina Garbesi, Ph.D., Associate Professor**

Dr. Karina Garbesi, Associate Professor of Geography and Environmental Studies, has an AB in Physics with High Honors (1986) from the University of California at Berkeley, and Master's (1988) and PhD (1993) in Energy and Resources, from the same institution. She has twenty years of scientific and interdisciplinary experience in the fields of environmental assessment and energy resource management and assessment, having authored numerous papers and reports on these subjects and mentored many dozens of graduate and undergraduate students. Her awards include a Switzer Environmental Leadership Grant, Distinguished Faculty Mentor, a Department of Energy Fellowship for Achievements in Science, and an Alexander Hollaender Distinguished Postdoctoral Fellowship.

She is currently the Environmental Studies Program Coordinator at Cal State East Bay; she chairs the Committee on Budget and Resource Allocation, and is a member of the CSU Sustainability Advisory Committee Education and Research Subcommittee.

- b. Space and facilities that would be used in support of the proposed program.

Existing laboratory and class room resources are adequate to support this program

- c. A report provided by the campus Library, detailing resources available to support the program (discussion of subject areas, volume counts, periodical holdings, etc. are appropriate).

**Library Statement:**

“While library online and print resources may adequately support the *business* aspect of the Engineering Management and proposed Construction Management degree programs, we do not have access to nor own seminal indexing and abstracting resources for the engineering or construction portions. We will need start-up costs to purchase these plus additional industrial standards and specifications resources. Ongoing costs should be considered to update the standard resources as well as the annual subscription fees for the indexing and abstracting resources. Ongoing costs should be added to the library's base budget. Additionally, the library will continue to provide interlibrary loan services needed for this program.”

- d. Existing academic technology, equipment, and other specialized materials currently available.

The Engineering Department is housed in the new VBT building with a state of the art laboratory facility. There is adequate classroom space to accommodate the new program.

**8. Additional Support Resources Required  
(CPEC “Total Costs of the Program”)**

Note: If additional support resources will be needed to implement and maintain the program, a statement by the responsible administrator(s) should be attached to the proposal assuring that such resources will be provided.

- a. Any special characteristics of the additional faculty or staff support positions needed to implement the proposed program.

The University has committed an additional tenure track faculty position for the construction management program in the Engineering Department. (See the attached memo from the Provost).

Starting in Fall quarter of 2010, lecturer coverage will also be needed for two courses per quarter.

- b. The amount of additional lecture and/or laboratory space required to initiate and to sustain the program over the next five years. Indicate any additional special facilities that will be required. If the space is under construction, what is the projected occupancy date? If the space is planned, indicate campus-wide priority of the facility, capital outlay program priority, and projected date of occupancy.

No additional space is anticipated in the next five years. The existing space will support the program.

- c. A report written in consultation with the campus librarian, indicating any additional library resources needed. Indicate the commitment of the campus either to purchase or borrow through interlibrary loan these additional resources.

Refer to section 7-c (library Statement)

- d. Additional academic technology, equipment, or specialized materials that will be (1) needed to implement the program and (2) needed during the first two years after initiation. Indicate the source of funds and priority to secure these resource needs.

No additional special material or technology equipment is needed.

### **Submit completed proposal packages to:**

[APP@calstate.edu](mailto:APP@calstate.edu) and

Academic Program Planning  
CSU Office of the Chancellor  
401 Golden Shore  
Long Beach, CA 90802-4210

### **Contact Academic Program Planning**

Dr. Christine Hanson  
Interim Dean  
Academic Program Planning

Phone (562) 951-4672

Fax (562) 951-4982

[chanson@calstate.edu](mailto:chanson@calstate.edu)

Ms. Norma Warren  
Academic Programs

Phone (562) 951-4722

Fax (562) 951-4982

[nwarren@calstate.edu](mailto:nwarren@calstate.edu)

Academic Program Planning is on the Web <http://www.calstate.edu/APP/>

**Contact Extended Education**

Dr. Edward McAleer  
State University Dean, Extended Education

Phone (562) 951-4795

Fax (562) 951-4982

[emcaleer@calstate.edu](mailto:emcaleer@calstate.edu)

**CALIFORNIA STATE UNIVERSITY, EAST BAY  
OFFICE OF ACADEMIC PROGRAMS**

**MEMORANDUM**

Date: October 18, 2007

To: Michael Leung, Dean, College of Science

From: Michael Mahoney, Provost and Vice President, Academic Affairs

Subject: Support for B.S. in Construction Management

Academic Affairs has been consulted regarding the existing and additional support resources required for the proposed B.S. in Construction Management and approves a search for a tenure track position in this area.

**CERTIFICATION OF DEPARTMENT APPROVAL** by the chair and faculty.

Chair: Original signed by Saeid Motavalli

Date: 5/15/08

**CERTIFICATION OF SCHOOL APPROVAL** by the dean and faculty review body, and of **REVIEW BY THE ASSOCIATE VICE PRESIDENTS**, Academic Programs/Graduate Studies and Academic Resources/Administration

Faculty Review Body: Original signed by John Lovell Date: 5/15/08

Dean/Associate Dean: Original signed by Alan Monat Date: 5/15/08