TO: The Executive Committee
FROM: The Committee on Instruction and Curriculum (CIC)
SUBJECT: 17-18 CIC 68: Request for New Self-Support and State Support Civil Engineering BS program

ACTION REQUESTED: That the Executive Committee and Academic Senate approve the request for Civil Engineering’s new state support BS program; effective Fall 2019 upon approval of the President.

BACKGROUND INFORMATION:
On May 7, 2018, CIC reviewed Civil Engineering’s request for a new state support BS program.

As noted on p. 27 of the proposal, CIC was asked to allow a waiver of GE Area E and to double-count both Code classes as GE Area D courses. These were consistent with previous Engineering programs and were approved unanimously by the Committee in order to allow the program to remain under 120 units. The program, itself, was also approved unanimously by the Committee.

The summary is attached.

CAPR reviewed and approved the request on 5/3/18.
Proposing New CSU Degree Programs
Bachelor’s and Master’s Levels

Offered through Self-Support and State-Support Modes

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 website 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 qualifications 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 adds 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

1. The degree program proposal should follow the format and include information requested in this template. If the proposed program is subject to WASC Substantive Change, the Chancellor’s Office will accept the WASC Substantive Change Proposal format in place of the CSU format. If campuses choose to submit the WASC Substantive Change Proposal, they will also be required to submit a program assessment plan using the format found in the CSU program proposal template. For undergraduate degrees, the total number of units required for graduation must still be made explicit.
2. Submit ONE hard copy of the campus-approved degree implementation proposal, including documentation of campus approval, to:

   Academic Programs and Faculty Development  
   CSU Office of the Chancellor  
   401 Golden Shore  
   Long Beach, California 90802-4210

3. Submit ONE electronic copy to APP@calstate.edu. A Word version is preferred.

CSU DEGREE PROPOSAL  
Faculty Check List

Please confirm (√) that the following are included in the degree proposal:

___√___ Board of Trustees Academic Master Plan approval date.

_____ Copies of any contracts or agreements made between parties with an interest in operating the proposed program. Other entities may include academic departments, academic institutions, foundations, vendors or similar. Please include a copy of the agreement and an e-mail or other evidence that the campus attorney has approved the agreement.

___√___ The total number of units required for graduation is specified (not just the total for the major):

   _√_ a proposed bachelor’s program requires no fewer than 120 semester units

   ___ any proposed bachelor’s degree program with requirements exceeding 120 units must request an exception to the 120 semester unit limit policy

   _√_ all units required for degree completion must be included in the total units required for the degree. Any proficiencies required to graduate that are beyond what is included in university criteria admission criteria must be assigned unit values and included in the total unit count.

___N/A___ Please specify the total number of prerequisite units required for the major.  
Note: The prerequisites must be included in the total program unit count.

List all courses and unit counts that are prerequisite to the major:

_________________________________________________________________
_________________________________________________________________

___√___ Title 5 minimum requirements for bachelor’s degree have been met, including:
___√___ minimum number of units in major (BA 24 semester units), (BS 36 semester units)

___√___ minimum number of units in upper-division (BA 12 semester units), (BS 18 semester units)

___N/A___ Title 5 requirements for proposed master’s degree have been met, including:

___ minimum of 30 semester units of approved graduate work are required

___ no more than 50% of required units are organized primarily for undergraduate students

___ maximum of 6 semester units are allowed for thesis or project

___ Title 5 requirements for master’s degree culminating experience are clearly explained.

___ for graduate programs, at least five-full time faculty with terminal degrees in appropriate disciplines are on staff.

___N/A___ For self-support programs:
(in conformance with EO 1099 and EO 1102)

___ specification of how all required EO 1099 self-support criteria are met

___ the proposed program does not replace existing state-support courses or programs

___ academic standards associated with all aspects of such offerings are identical to those of comparable state-supported CSU instructional programs

___ explanation of why state funds are either inappropriate or unavailable

___ a cost-recovery program budget is included*

___ student per-unit cost is specified

___ total cost for students to complete the program is specified

* Basic Cost Recovery Budget Elements
   (Three to five year budget projection)

Student per-unit cost
Number of units producing revenue each academic year
Total cost a student will pay to complete the program
Revenue - (yearly projection over three years for a two-year program; five years for a four-year program)
  - Student fees
  - Include projected attrition numbers each year
  - Any additional revenue sources (e.g., grants)

Direct Expenses
  - Instructional costs – faculty salaries and benefits
  - Operational costs – (e.g., facility rental)
  - Extended Education costs – staff, recruitment, marketing, etc.
  - Technology development and ongoing support (online programs)

Indirect Expenses
  - Campus partners
  - Campus reimbursement general fund
  - Extended Education overhead
  - Chancellor’s Office overhead

*Additional line items maybe added based on program characteristics and needs.
Please Note:

- Campuses may mention proposed degree programs in recruitment material if it is specified that enrollment in the proposed program is contingent on final program authorization from the CSU Chancellor’s Office.

- Approved degree programs will be subject to campus program review within five years after implementation. Program review should follow system and Board of Trustee guidelines (including engaging outside evaluators) and should not rely solely on accreditation review.

- Please refer to the document “Tips for Completing a Successful Program Proposal” (which follows this document) before completing the Program Proposal Template.

1. Program Type (Please specify any from the list below that apply—delete the others)
   a. State-Support
   c. Delivery Type: Fully face to face
   g. New Program

2. Program Identification
   a. Campus:
      CSU East Bay
   b. Full and exact degree designation and title (e.g. Master of Science in Genetic Counseling, Bachelor of Arts with a Major in History):
      Bachelor’s of Science in Civil Engineering
   c. Date the Board of Trustees approved adding this program projection to the campus Academic Master Plan.
      March 2017
   d. Term and academic year of intended implementation (e.g., fall 2018):
      Fall 2019
e. Total number of units required for graduation. This will include all requirements (and campus-specific graduation requirements), not just major requirements:

120 units

f. 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:

School of Engineering

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

Saeid Motavalli, Professor and Chair of Engineering

h. 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:

The addition of the B.S. in Civil Engineering is in keeping with the university Shared Strategic Commitments to: (a) Demonstrate our continuing record of leadership and innovation in higher education, focused on 21st century skills, including science, technology, engineering, and mathematics (STEM), and (b) Contribute to a sustainable planet through our academic programs, university operations, and individual behavior.

The addition of the Civil Engineering program also supports CSUEB’s mission: “Cal State East Bay welcomes and supports a diverse student body with academically rich, culturally relevant learning experiences which prepare students to apply their education to meaningful lifework, and to be socially responsible contributors to society. Through its educational programs and activities the University strives to meet the educational needs and to contribute to the vitality of the East Bay, the state, the nation, and global communities.”

The B.S. in Civil Engineering will not compete with, but rather will complement our current academic programs. This new degree program builds on the strengths of our Construction Management Program in terms of faculty and laboratory requirements. In addition, it will feed the Construction Management Program at the Master’s level, with civil engineering students wanting to pursue a graduate degree. It will also provide additional engineering options for undecided engineering students and further increase enrollment in the Construction Management undergraduate and graduate programs, thus generating new FTES. These are the students who realize that
they might not have sufficient background for additional science and mathematics required.

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

N/A

j. Please specify whether this proposed program is subject to WASC Substantive Change review. The campus may submit a copy of the WASC Sub-Change proposal in lieu of this CSU proposal format. If campuses choose to submit the WASC Substantive Change Proposal, they will also be required to submit a program assessment plan using the format found in the CSU program proposal template.

N/A

k. Optional: Proposed Classification of Instructional Programs and CSU Degree Program Code:

CSU Code 09081
CIP code 14.0801

3. Program Overview and Rationale

a. Provide a brief descriptive overview of the program citing its 1) purpose and strengths, 2) fit with the institutional mission or institutional learning outcomes, and 3) the compelling reasons for offering the program at this time:

According to the California Employment Development Department, “Civil Engineers plan, design, and supervise the construction and maintenance of infrastructure such as airports, bridges, buildings, dams, irrigation projects, power plants, roads, tunnels, and water supply and sewage systems. They must consider many factors during the design process, from the construction costs and expected lifetime of a project to governmental and environmental regulations and potential natural hazards, such as earthquakes and hurricanes. Engineers may also work with specialists on problems, such as soil, or ground water contamination, or energy development and conservation. Most Civil Engineers also focus on sustainable engineering practices to make sure the natural environment’s integrity is maintained while meeting the needs of the present generation without compromising the needs of future generations.”

The Bureau of Labor Statistics, US Department of Labor, has established that the Employment of Civil Engineers is expected to grow 19 percent from 2010
to 2020, which is about 8% faster than the growth of engineering fields in general and 5% faster than all other occupations combined (Figure 1).

Figure 1. Projected percent change in employment for Civil Engineering

As infrastructure continues to age, civil engineers will be needed to design projects, rebuild bridges, repair roads, and upgrade levees and dams. The American Society of Civil Engineering graded America’s infrastructure condition as D+ (see Figure 2).

Figure 2. Condition and investment needs for US Infrastructure. (source: American Society of Civil Engineers)
The San Francisco Bay Area is a prime location for offering such a degree. There is a large concentration of major civil engineering and construction firms in this part of the state. The San Francisco Bay area is located in District 4 of Caltrans, which is one of the largest districts by expenditures. With new spending by the state on transportation projects, it is expected that there will be significant new demand for professionals capable of designing and managing large construction projects.

This program targets both freshmen and transfer students from community colleges. The target population will also include individuals who are already working in the civil engineering and construction industry and trying to advance their career to design and manage large infrastructure projects in the public and private sectors.

The proposed Civil Engineering program is focused on design, maintenance, rehabilitation, and construction of large infrastructure projects. This program includes courses such as: Computer Applications in Infrastructure, Transportation Engineering, Highway and Pavement Design, Sustainability and Green Building, and technical electives in construction and infrastructure engineering.

The proposed program will be closely tied to the needs established by the State of California through its Board for Professional Engineers and the Civil Engineering and the Construction Industry. We will establish an industry advisory board that will help us in accomplishing this task. This combined effort will graduate students who will have relevant certifications, such as the Engineer in Training, OSHA, and Leadership in Energy and Environmental Design (LEED) Green Associate. The aforementioned certifications will help the students to become Licensed Professional Engineers (PE) by the State of California and certified as LEED Accredited Professional by the U.S. Green Building Council, once they gain sufficient professional experience. We will seek accreditation by the Accreditation Board for Engineering and Technology (ABET) as soon as we have enough graduates to qualify the program for accreditation.

b. Provide the proposed catalog description. The description should include:

1. a narrative description of the program
2. admission requirements
3. a list of all required courses for graduation including electives, specifying course catalog numbers, course titles, prerequisites or co-requisites (ensuring there are no “hidden prerequisites” that would drive the total units required to graduate beyond the total reported in 2e above), course
unit requirements, and any units associated with demonstration of proficiency beyond what is included in university admission criteria.

4. total units required to complete the degree, and if a master’s degree

5. catalog copy describing the culminating experience requirement(s)

**Bachelor’s of Science in Civil Engineering**

**Program Description**

The School of Engineering offers a Bachelor’s of Science degree in Civil Engineering with emphasis on design, maintenance, rehabilitation, and construction of infrastructure projects. This program is designed for individuals who are planning to advance their knowledge in Civil Engineering and follow career paths in industry, government, consulting, and academia. Special attention is given to working professionals with classes offered mainly at times convenient to students. Students will take required courses in Structural Analysis, Structural Design, Engineering Materials, Geotechnical Engineering, Computer Applications in Infrastructure, Transportation Engineering, Highway and Pavement Design, Sustainability and Green Building. Also, issues in engineering ethics, building design codes, and life cycle analysis are covered.

**Mission Statement**

The mission of the Bachelor’s of Science degree in Civil Engineering is to prepare effective professionals to design, build, and lead public and private infrastructure projects, prepare a technically capable engineering workforce required for the expected increase in the state’s infrastructure improvement projects, and train high school graduates, transfer students and working professionals to assume leadership roles in civil engineering, consulting, and the construction industry.

**Program Objectives**

The objectives of the Bachelor’s of Science degree in Civil Engineering are to prepare graduates who:

- Successfully apply Civil Engineering knowledge and skills throughout their professional pursuits.
- Have enthusiasm and aptitude for continuously pursuing learning and professional development.
- Have the ability to communicate and work well as individuals or on teams that include engineers and colleagues from other disciplines.
Career Opportunities

An increase in large construction projects is expected, in part stemming from public spending on California’s infrastructure improvement and the economic growth of the Bay Area. There is considerable demand for individuals who can technically and scientifically design, build and lead such infrastructure and commercial projects. The construction industry as a whole is one of the largest industries in the nation with a great need for skilled civil engineers. Sample jobs are licensed engineer (PE), project engineer, staff civil engineer, city engineer, research engineer, project manager, consulting engineer, etc...

Features

The B.S. in Civil Engineering is designed to accommodate full time students as well as working students by conducting class at times convenient to students. The existing faculty in construction management program will initially teach the civil engineering courses. In addition, the part-time instructors will be selected from industry leaders with significant design/management work experience. Students will have the opportunity to take elective courses in construction management, business, or science to broaden their skills.

Admission

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

Degree Requirements

The B.S. in Civil Engineering requires completion of 120 semester units distributed among university requirements (general education), required major courses and major electives.

List of Major Required Courses

Lower division (38)

CHEM 110 - General Chemistry for Engineering (3)
MATH 130 - Calculus I (4)
MATH 131 - Calculus II (3)
MATH 230 - Calculus III (3)
MATH 210 - Linear Algebra with Differential Equations (3)
PHYS 135 - Physics for Scientists and Engineers I (4)
PHYS 136 - Physics for Scientists and Engineers II (4)
ENGR 200 - Introduction to Engineering and Design (3)
ENGR 215 – Computational Methods in Engineering (3)
CIVE 206 –Engineering Materials (3)
CMGT 201 - Surveying (2)
ENGR 220 - Statics (3)

Upper Division (44)

*CIVE 319 - Fluid Mechanics (3)
*CIVE 330 - Strength of Materials (3)
*CIVE 350 –Geotechnical Engineering (3)
*CIVE 361 - Transportation Engineering (3)
*CIVE 385 - Structural Analysis (3)
*CIVE 410 - Hydraulics and Water Resources (3)
*CIVE 421 - Structural Engineering Design (4)
*CIVE 435 - Highway and Pavement Design (3)
*CIVE 430 - Environmental Engineering and Sustainability (3)
*CIVE 440 - Construction Engineering (3)
*CIVE 492 - Senior Design Project (4)
ENGR 320 - Engineering Economics (3)
INDE 330 – Engineering Statistics and Probability (3)
PHYS 308 – Sustainable Energy Systems (3)

Major Elective (3): Elective must be 300 level or above with Department approval
- 3 credit hours from ENGR/CMGT/INDE/CMPE

Note: * indicates a new course.

Course Descriptions

CHEM 110 - Elementary principles of chemistry including experimentation, laboratory skills, and science practices. Focused on real-world applications, connections to engineering, and systems thinking, including: properties of matter, energy, phase changes, chemical reactions, atomic structure and theory, reaction rates, equilibria, and electrochemistry. Prerequisites: Satisfaction of the Entry Level Math (ELM) requirement.

MATH 130 - Calculus I (4). Introduction to limits and limit techniques; derivatives; related rates; optimization and applications; antiderivatives, introduction to integration and the fundamental theorem of calculus. Prerequisite: MATH 120 with a grade of C- or higher; or Math 125 with a grade of C- or higher; or satisfactory score on the Department of Mathematics Placement Exam.
MATH 131 - Calculus II (3). Integration techniques and applications; sequences and series; introduction to differential equations. Prerequisite: MATH 130 with a grade of C- or higher.

MATH 230 - Calculus III (3). Vectors, dot and cross products; equations of lines, planes and surfaces; partial derivatives, directional derivatives and gradient vector; optimization and Lagrange multipliers; multiple integrals; vector fields; Stoke’s theorems; applications. Prerequisites: MATH 131 with a grade of C- or higher.


PHYS 135 - Physics for Scientists and Engineers I (4). A calculus-based introduction to Newtonian mechanics that emphasizes both conceptual understanding and the ability to solve quantitative problems. Topics of study include kinematics, Newton’s laws, conservation of momentum and energy, rotational motion, gravitation, oscillations, and fluids. Prerequisite: MATH 130.

PHYS 136 - Physics for Scientists and Engineers II (4). A calculus-based introduction to electricity and magnetism that emphasizes both conceptual understanding and the ability to solve quantitative problems. Topics of study include the electric force, field, and potential, electric circuits, magnetic force, magnetic field, electromagnetic induction, Maxwell’s equations, and electromagnetic waves. Prerequisite: MATH 130 and PHYS 135

ENGR 200 - Introduction to Engineering and Design (3). Engineering history, disciplines and professions, current global issues in engineering. Engineering design process, visualization, and graphics. Introduction to CAD, and computer tools such as spreadsheet, mathematics software, and presentation software. Teamwork skills, technical communication, engineering ethics, and critical thinking. Prerequisite: None.

ENGR 215 – Computational Methods in Engineering (3). Computational algorithms used in solving engineering problems. Use of computer tools for solving a system of equations, matrix manipulations, numerical integration and differentiation, optimization, and simulation for engineering applications. Prerequisite: MATH 131

*CIVE 206 – Engineering Materials (3). Introduction to the composition, structure, properties, and behavior of civil engineering materials. Experimental
design, testing and analysis of construction materials. Prerequisite: CHEM 110 and PHYS 135.

CMGT 201 - Surveying (2). Construction surveying site layout techniques are studied. Benchmark, building lines, property lines, leveling and profiling are discussed in lecture with applied laboratory exercises. Broad-based background in interpreting plans. Typical plans for both residential and commercial buildings will be reviewed. Prerequisite: Math 130

ENGR 220 - Statics (3). An intermediate application of Newtonian mechanics to solve engineering problems. Fundamental concepts of mechanics, including resultants of force systems, free-body diagrams, equilibrium of rigid bodies, and analyses of structures. Prerequisite: PHYS 135

*CIVE 319 - Fluid Mechanics (3). Incompressible fluid mechanics with particular emphasis on topics in analysis and applications in civil engineering areas; principles of continuity, momentum and energy, kinematics of flow and stream functions, potential flow, laminar motion, turbulence, and boundary-layer theory. Prerequisite: ENGR 220.


*CIVE 350 - Geotechnical Engineering (3). Properties and behavior of earth materials to engineering design and construction problems; drainage, settlement, strength, bearing capacity, stability and lateral earth pressures. Subsurface stresses, settlement analysis, site investigation and field methods, foundations, slope stability, and retaining wall design. Prerequisite: ENGR 220.

*CIVE 361 - Transportation Engineering (3). Design, planning, management, and maintenance of transportation systems; integrated multi-modal transportation systems; layout of highways, airports, and railroads with traffic flow models, capacity analysis, and safety. Design of facilities and systems with life cycle costing procedures and criteria for optimization. Prerequisite: CIVE 206.

*CIVE 385 - Structural Analysis (3). Analysis of statically determinate and indeterminate beams, trusses, and rigid frames; deflections by virtual-work, moment-area; influence lines; force methods; structural design loads, introduction to structural design, approximate methods. Prerequisite: CIVE 330.

*CIVE 410 - Hydraulics and Water Resources (3). Nature of flow of a real fluid, open channel flow, flow in pipes, and fluid forces on objects. Introduction to reservoirs, dams, pipelines, channels, hydraulic machinery, ground water, water
rights, statistical analysis, engineering economy applications, and water resources planning. Prerequisite: CIVE 319.

*CIVE 421 - Structural Engineering Design (4). Theories and concepts of both concrete and steel design and analysis. Design experience and skills will be acquired through problem solving and a comprehensive design project. An understanding of real-world structural design will be developed. Prerequisite: CIVE 385.

*CIVE 430 - Environmental Engineering and Sustainability (3) Fundamental understanding of environmental issues and sustainability. Topics include land use, energy efficiency, water use, indoor environmental quality, life cycle analysis, and construction waste disposal. High performance construction and green building assessment systems. Prerequisite: CIVE 206.

*CIVE 435 - Highway and Pavement Design (3). Highway classification; analysis of factors in developing a transportation facility; highway geometric design and safety standards; analysis, behavior, performance, and structural design of highway flexible and rigid pavements; climate factors, drainage, traffic loading analysis, and life cycle cost analysis. Prerequisite: CIVE 330 and CIVE 361.

*CIVE 440 - Construction Engineering (3). An introduction to construction management concepts; topics such as roles and responsibilities, delivery methods, scheduling and estimating, administrative systems, project control, documentation, quality management, commissioning, and risk management. Prerequisite: CIVE 330.


ENGR 320 - Engineering Economics (3). Cost estimations, time value of money, cash flow diagrams, compound interest, economic equivalence, pay back periods, net present values, net annual equivalence, rate of return, depreciations, income taxes, gain taxes, and inflation. Economic analysis and decision making on engineering alternatives. Prerequisite: MATH 130.

INDE 330 – Engineering Statistics and Probability (3). Analyzing data to solve non-deterministic engineering problems including specialized engineering software applications. Topics include analysis of service and production systems including error and variability analysis and optimal sampling schemes for decision-making in logistics and manufacturing. Prerequisites: MATH 130.
PHYS 308 – Sustainable Energy Systems (3). Project-based course; Science of climate change and its relation to energy systems; student projects have high impact on their campus carbon emissions. Readings, discussion, and research on contemporary and/or significant issues in physics relating to climate science and energy systems. Prerequisites: Completion of GE B4.

4. Curriculum – (These requirements conform to the revised 2013 WASC Handbook of Accreditation)

a. These program proposal elements are required:

- Institutional learning outcomes (ILOs)
- Program learning outcomes (PLOs)
- Student learning outcomes (SLOs)

Describe outcomes for the 1) institution, 2) program, and for 3) student learning. Institutional learning outcomes (ILOs) typically highlight the general knowledge, skills, and dispositions all students are expected to have upon graduating from an institution of higher learning. Program learning outcomes (PLOs) highlight the knowledge, skills, and dispositions students are expected to know as graduates from a specific program. PLOs are more narrowly focused than ILOs. Student learning outcomes (SLOs) clearly convey the specific and measurable knowledge, skills, and/or behaviors expected and guide the type of assessments to be used to determine if the desired level of learning has been achieved.

(WASC 2013 CFR: 1.1, 1.2, 2.3)

a. The following CSUEB-specific elements are required:

- Institutional learning outcomes (ILOs)
- Program student learning outcomes (SLOs)
- Program goals

List learning outcomes for 1) the institution, and 2) the program. Institutional learning outcomes (ILOs) typically highlight the knowledge, skills, and dispositions all students are expected to have upon graduating from an institution of higher learning. Program student learning outcomes (Program SLOs) highlight the knowledge, skills, and dispositions students are expected to attain as program graduates. Student learning outcomes clearly convey the specific and measurable knowledge, skills, and/or behaviors expected and guide the type of assessments to be used to determine if the desired level of learning has been achieved. Program goals are broad, general statements
about what the program intends to accomplish. They may include the characteristics of an ideal program graduate.

**Institutional Learning Outcomes**

Graduates of CSUEB will be able to:

a. think critically and creatively and apply analytical and quantitative reasoning to address complex challenges and everyday problems;

b. communicate ideas, perspectives, and values clearly and persuasively while listening openly to others;

c. apply knowledge of diversity and multicultural competencies to promote equity and social justice in our communities;

d. work collaboratively and respectfully as members and leaders of diverse teams and communities;

e. act responsibly and sustainably at local, national, and global levels;

f. demonstrate expertise and integration of ideas, methods, theory and practice in a specialized discipline of study

**Program Learning Outcomes**

The following (a-k) learning outcomes are required to be assessed for accreditation of all engineering programs by Accreditation Board of Engineering and Technology (ABET). However, we have condensed these to five outcomes as stated below for our internal assessment purposes.

**ABET required Learning Outcomes:**

Students graduating with a B.S. degree in Civil Engineering from Cal State East Bay will have the:

a. Ability to apply knowledge of mathematics, science, and engineering.

b. Ability to design and conduct experiments, as well as to analyze and interpret data.

c. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, constructability, and sustainability.

d. Ability to function on multidisciplinary teams.

e. Ability to identify, formulate and solve engineering problems.

f. Understanding of professional and ethical responsibility.

g. Ability to communicate effectively.
h. Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

i. Recognition of the need for, and an ability to engage in, life-long learning.

j. Knowledge of contemporary issues.

k. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

CSU East Bay, Civil Engineering outcomes:

Students graduating with a B.S. degree in Civil Engineering from Cal State East Bay will have the

1. Ability to apply their knowledge of math and basic sciences to design a system, a component or a process considering realistic constraints.

2. Ability to design solutions to real-world problems using modern engineering techniques, skills, and tools.

3. Ability to communicate effectively while working in multidisciplinary teams.

4. Ability to make professional, ethical, responsible, and sustainable decisions.

5. Ability to understand the impact of engineering solutions in a global, economic, environmental, and social context.

The following Table is the mapping of ABET outcomes to CSU East Bay Civil Engineering outcomes.

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<tr>
<th>CSU East Bay PLOs</th>
<th>ABET PLOs</th>
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b. These program proposal elements are required:

- Comprehensive assessment plan addressing all assessment elements
- Matrix showing where student learning outcomes are introduced (I), developed (D), and mastered (A)

Key to program planning is creating a comprehensive assessment plan addressing multiple elements, including a strategy and tool to assess each student learning outcome. SLOs operationalize the PLOs and serve as the basis for assessing student learning in the major. Constructing an assessment matrix, showing the relationship between all assessment elements, is an efficient and clear method of displaying all assessment plan components.

Creating a curriculum map matrix, identifying the student learning outcomes, the courses where they are found, and where content is “introduced,” “developed,” and “mastered” insures that all student learning outcomes are directly related to overall program goals and represented across the curriculum at the appropriate times. Assessment of outcomes is expected to be carried out systematically according to an established schedule, generally every five years.
Assessment Process is depicted in the figure below:

Program Goals and Outcomes:
- Core competency
- Broad knowledge
- Effective communication
- Function in teams
- Awareness of complex environment
- Sustainable construction knowledge
- Lifelong learning
- Real world problem solving

Key Program Inputs:
- GIVE curriculum with core courses, electives
- Senior design projects
- Faculty
- Internship

Assessment Tools:
- Faculty Self-assessment of courses
- Alumni Survey
- Employer’s survey
- Exit survey of graduating students
- Capstone project evaluation
- Student performance in courses: midterms, exams and final projects.

Analysis of Assessment Results:
- Curriculum and assessment committee
- Advisory Board

Recommendations for changes to program inputs or goals/outcomes as needed

This process is repeated on a yearly basis

Mapping of Program inputs to program outcomes is depicted in the figure below:
<table>
<thead>
<tr>
<th>Course Title</th>
<th>PLO1</th>
<th>PLO2</th>
<th>PLO3</th>
<th>PLO4</th>
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<tr>
<td><strong>Civil Engineering Core</strong></td>
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<tr>
<td>CIVE 206 Engr. Materials</td>
<td>D</td>
<td>D</td>
<td>I</td>
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<tr>
<td>CIVE 319 Fluid Mechanics</td>
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<td>D</td>
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<tr>
<td>CIVE 330 Strength of Materials</td>
<td>I</td>
<td></td>
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<tr>
<td>CIVE 350 Geotechnical Engineering</td>
<td>D</td>
<td>D</td>
<td></td>
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<tr>
<td>CIVE 361 Transportation Engineering</td>
<td>D</td>
<td>D</td>
<td>I</td>
<td></td>
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<tr>
<td>CIVE 385 Structural Analysis</td>
<td>D</td>
<td>D</td>
<td>D</td>
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<tr>
<td>CIVE 410 Hydraulics and Water Resources</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>CIVE 421 Structural Engineering Design</td>
<td>D</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CIVE 430 Environmental Engineering and Sustainability</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>CIVE 435 - Highway and Pavement Design</td>
<td>D</td>
<td>I</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CIVE 440 Construction Engineering</td>
<td>D</td>
<td>D</td>
<td>A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CIVE 492 Senior Design Project</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>CMGT 201 Surveying</td>
<td>I</td>
<td>I</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGR 200 Intro to Engineering &amp; Design</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>ENGR 220 Statics</td>
<td>D</td>
<td>D</td>
<td></td>
<td></td>
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<tr>
<td>ENGR 215 Comp. in Engr.</td>
<td>I</td>
<td>I</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGR 320 Engineering Economics</td>
<td>A</td>
<td>A</td>
<td>D</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>INDE 330 Engineering Statistics and Probability</td>
<td>A</td>
<td>A</td>
<td></td>
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</tbody>
</table>
NOTE THAT ENGINEERING IS ACCREDITED ON A 6 YEAR CYCLE BY AN EXTERNAL ACCREDITATION BODY (ABET). However, the 5 outcomes identified for internal assessment have a 3 year cycle as below.

| Year 1: 2019-2020 | PLO 1 – *Ability to apply their knowledge of math and basic sciences to design a system, a component or a process considering realistic constraints.*
|                  | (assessed in ENGR 220 exams and homework) |
|                  | PLO 2 – *Ability to design solutions to real-world problems using modern engineering techniques, skills, and tools.*
|                  | (assessed in CIVE 361 and CIVE 492 class projects and exams) |

| Year 2: 2020-2021 | PLO 3 - *Ability to communicate effectively while working in multidisciplinary teams.*
|                   | (assessed in CIVE 492 capstone projects) |
|                   | PLO 4 - *Ability to make professional, ethical, responsible, and sustainable decisions.* (assessed in CIVE 430 and CIVE 492 exams and capstone project) |

| Year 3: 2021-2022 | PLO 5 - *Ability to understand the impact of engineering solutions in a global, economic, environmental, and social context.*
|                   | (assessed in ENGR 200 and CIVE 492 exams and capstone project) |

c. Indicate total number of units required for graduation.

120

d. Include a justification for any baccalaureate program that requires more than 120-semester units or 180-quarter units. Programs proposed at more than 120 semester units will have to provide either a Title 5 justification for the higher
units or a campus-approved request for an exception to the Title 5 unit limit for this kind of baccalaureate program.

N/A

e. If any formal options, concentrations, or special emphases are planned under the proposed major, identify and list the required courses. 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.

N/A

f. List any new courses that are: (1) needed to initiate the program or (2) needed during the first two years after implementation. Include proposed catalog descriptions for new courses. For graduate program proposals, identify whether each new course would be at the graduate- or undergraduate-level.

*CIVE 206 – Engineering Materials (3). Introduction to the composition, structure, properties, and behavior of civil engineering materials. Experimental design, testing and analysis of construction materials. Prerequisite: CHEM 110 and PHYS 135.

*CIVE 319 - Fluid Mechanics (3). Incompressible fluid mechanics with particular emphasis on topics in analysis and applications in civil engineering areas; principles of continuity, momentum and energy, kinematics of flow and stream functions, potential flow, laminar motion, turbulence, and boundary-layer theory. Prerequisite: ENGR 220.


*CIVE 350 - Geotechnical Engineering (3). Properties and behavior of earth materials to engineering design and construction problems; drainage, settlement, strength, bearing capacity, stability and lateral earth pressures. Subsurface stresses, settlement analysis, site investigation and field methods, foundations, slope stability, and retaining wall design. Prerequisite: ENGR 220.

g. Attach a proposed course-offering plan for the first three years of program implementation, indicating likely faculty teaching assignments.

In the first two years after the implementation, we need to offer 2 new courses per semester. We will need to offer 3 new courses on the fall semester of the
third year. Proposed course-offering plan for the first three years of program implementation is attached.

**Proposed New Course offering**

**Year 1**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 206</td>
<td>CIVE 330</td>
</tr>
<tr>
<td>CIVE 319</td>
<td></td>
</tr>
</tbody>
</table>

**Year 2**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>CIVE 350</td>
<td>CIVE 385</td>
</tr>
<tr>
<td>CIVE 361</td>
<td>CIVE 410</td>
</tr>
</tbody>
</table>

**Year 3**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>CIVE 435</td>
<td>CIVE 492</td>
</tr>
<tr>
<td>CIVE 430</td>
<td>CIVE 440</td>
</tr>
<tr>
<td>CIVE 421</td>
<td></td>
</tr>
</tbody>
</table>

h. For master’s 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.

N/A

i. For graduate degree proposals, cite the corresponding bachelor’s program and specify whether it is (a) subject to accreditation and (b) currently accredited.

(WASC 2013 CFR: 2.2b)

N/A

j. For graduate degree programs, specify admission criteria, including any prerequisite coursework.

(WASC 2013 CFR: 2.2b)

k. For graduate degree programs, specify criteria for student continuation in the program.

N/A

l. For undergraduate programs, specify planned provisions for articulation of the proposed major with community college programs.
Articulation agreements with community colleges will be developed and placed on ASSIST. Also, please refer to http://pathways-engineering.com/csueb-cv for transfer to Engineering guidelines.

m. Provide an advising “roadmap” developed for the major.

<table>
<thead>
<tr>
<th>Course</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>First Semester (suggested timeline for GE; adjust as needed for major)</strong></td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>COMM 100 Communication</td>
<td>3</td>
</tr>
<tr>
<td>A2</td>
<td>ENGL 102 Advanced College Writing</td>
<td>3</td>
</tr>
<tr>
<td>B1/B3</td>
<td>Physics 135 Phys. for Scientists and Engineers I</td>
<td>4</td>
</tr>
<tr>
<td>B4</td>
<td>MATH 130 Calculus I</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL:</strong></td>
<td><strong>14</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Second Semester (suggested timeline for GE; adjust as needed for major)</strong></td>
<td></td>
</tr>
<tr>
<td>WII</td>
<td>ENGR 200 Intro to Engineering And Design</td>
<td>3</td>
</tr>
<tr>
<td>C2</td>
<td>MATH 131 Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>B2</td>
<td>Physics 136 Phys. for Scientists and Engineers II</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL:</strong></td>
<td><strong>16</strong></td>
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<tr>
<td></td>
<td><strong>Third Semester (suggested timeline for GE; adjust as needed for major)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ENGR 220 Statics</td>
<td>3</td>
</tr>
<tr>
<td>A3</td>
<td>PHIL 100 Introduction to Philosophy</td>
<td>3</td>
</tr>
<tr>
<td>B1/B3</td>
<td>CHEM 110 General Chemistry for Engineering</td>
<td>3</td>
</tr>
<tr>
<td>D1</td>
<td>MATH 230 Calculus III</td>
<td>3</td>
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<tr>
<td></td>
<td><strong>TOTAL:</strong></td>
<td><strong>15</strong></td>
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</table>
### Fourth Semester (suggested timeline for GE; adjust as needed for major)

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>ENGR 215</td>
<td>Computational Methods in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>LD Major</td>
<td>CIVE 206</td>
<td>Engineering Materials and Laboratory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MATH 210</td>
<td>Linear Algebra w/Diff. eq.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL:</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

### Fifth Semester (suggested timeline for GE; adjust as needed for major)

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>B6</td>
<td>PHYS 308</td>
<td>Sustainable Energy Systems</td>
<td>3</td>
</tr>
<tr>
<td>LD Major</td>
<td>CIVE 319</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>CIVE 330</td>
<td>Strength of Materials</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL:</strong></td>
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</tbody>
</table>

### Sixth Semester (suggested timeline for GE; adjust as needed for major)

<table>
<thead>
<tr>
<th>Code</th>
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<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>UD Major</td>
<td>CMGT 201</td>
<td>Surveying</td>
<td>2</td>
</tr>
<tr>
<td>UD Major</td>
<td>ENGR 320</td>
<td>Engr Econ</td>
<td>3</td>
</tr>
<tr>
<td>UD Major</td>
<td>CIVE 361</td>
<td>Transportation Engineering</td>
<td>3</td>
</tr>
<tr>
<td>UD Major</td>
<td>CIVE 385</td>
<td>Structural Analysis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>INDE 330</td>
<td>Engineering Statistics and Probability</td>
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<tr>
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<td><strong>14</strong></td>
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### Seventh Semester (suggested timeline for GE; adjust as needed for major)

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</thead>
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<td>CIVE 410</td>
<td>Hydraulics and Water Resources</td>
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</tr>
<tr>
<td>UD Major</td>
<td>CIVE 421</td>
<td>Structural Engineering Design</td>
<td>4</td>
</tr>
<tr>
<td>UD Major</td>
<td>CIVE 435</td>
<td>Highway and Pavement Design</td>
<td>3</td>
</tr>
<tr>
<td>UD Major</td>
<td>CIVE 350</td>
<td>Geotechnical Engineering</td>
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<tr>
<td>D4</td>
<td></td>
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<td>3</td>
</tr>
<tr>
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<td><strong>TOTAL:</strong></td>
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### Eighth Semester

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<tr>
<th>Code</th>
<th>Course Code</th>
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<th>Units</th>
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<tbody>
<tr>
<td>C4</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>UD Major</td>
<td>CIVE 430</td>
<td>Environmental Engineering and Sustainability</td>
<td>3</td>
</tr>
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<td>-----------------------------------------------</td>
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</tr>
<tr>
<td>UD Major</td>
<td>CIVE 440</td>
<td>Construction Engineering</td>
<td>3</td>
</tr>
<tr>
<td>UD Major</td>
<td>CIVE 492</td>
<td>Senior Design Project</td>
<td>3</td>
</tr>
<tr>
<td>UD Major</td>
<td>Elective</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

TOTAL: 15

* ENGR 200 is being vetted for potentially filling the Writing II requirement.

** We are requesting to waive Area E, which was also granted to Industrial Engineering and Computer Engineering

*** We are requesting to double-count D2 as a Code 1 course. (Based on 14-15 CIC 18)

**** We are requesting to double-count D3 as a Code 2 course. (Based on 14-15 CIC 18)

n. Describe how accreditation requirements will be met, if applicable, and anticipated date of accreditation request (including the WASC Substantive Change process).

(WASC 2013 CFR: 1.8)

*The proposed program meets accreditation requirements by ABET.*

**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’s degree major program.

*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. **Societal and Public Need for the Proposed Degree Major Program**
a. List other California State University campuses currently offering or projecting the proposed degree major program; list neighboring institutions, public and private, currently offering the proposed degree major program.

Our preliminary study shows that most CSU campuses that have engineering departments also offer civil engineering as part of their curriculum. These include San Francisco State, San Jose State, Fresno State, Fullerton, Long Beach, Los Angeles, Northridge, Cal Poly Pomona, Sacramento, and Cal Poly SLO.

A common denominator for such existing programs is their emphasis on traditional fields within civil engineering such as structures, geotechnical or environmental engineering. There is no existing civil engineering program in the CSU system that focuses in depth on infrastructure, such as the one proposed in this document.

b. Describe differences between the proposed program and programs listed in Section 5a above.

The proposed curriculum has been designed to address the growing need for professionals with a strong background in civil infrastructure design and construction to deal with the growing needs for new infrastructure and maintenance in California. The curriculum has been vetted by civil engineering leaders in the private and public sector to cover the special knowledge areas such as highway and bridge design, environmental issues and green building, building information modeling, and construction management.

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

ENGR 200 Introduction to Engineering and Design  
ENGR 310 CAD/CAM Graphics  
ENGR 320 Engineering Economics  
INDE 330 Engineering Statistics and Probability  
CMGT 206 – Construction Materials  
CMGT 207 – Construction Methods  
CMGT 310 – Statics and Strength of Materials  
CMGT 345 – Building Codes and Commissioning  
CMGT 360 – Soil Mechanics and Building Foundation  
CMGT 410- Building Information Modeling  
CMGT 350 – Construction Project Planning, Scheduling and Control  
CMGT 325 – Electrical and Mechanical Systems in Construction
d. Describe community participation, if any, in the planning process. This may include prospective employers of graduates.

The preliminary discussion about the development of a civil engineering program at CSUEB started about five years ago. After a few meetings between the 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 and civil engineering 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 2012. The members consist of industry leaders from companies and agencies such as Caltrans, Bart, Webcor, Turner, Balfour and Beatty, Cambridge Construction Management, Swinerton Builders, and members from academia. Also the Dean of the College of Science and the Engineering Department faculty were included in the Advisory Board.

The following points summarize the discussions of these meetings.

- There is a great need for educated civil engineers.
- The demand for civil engineers has increased based on the expected private and state expenditures.
- Many civil engineers need to be trained to become effective leaders in the construction industry.
- The curriculum should be diverse covering various aspects of civil engineering, and design-construction integration (constructability).
- Knowledge of environmental regulations and green building issues is essential.
- Issues such as design, dispute resolution, state law, the latest software tools, and safety are essential.
- The program should be tailored towards working engineers and other working professionals.
- Instructors should have significant industry experience.

e. Provide applicable workforce demand projections and other relevant data.

Note: Data Sources for Demonstrating Evidence of Need

APP Resources Web [http://www.calstate.edu/app/resources.shtml](http://www.calstate.edu/app/resources.shtml)
US Department of Labor, Bureau of Labor Statistics
California Labor Market Information

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 civil engineering.
This program is designed to advance the knowledge of the professionals in charge of designing, improving and maintaining California’s infrastructure. These projects are typically very complex and require a broad array of engineering knowledge to be supervised effectively. We believe that the proposed program will enable civil engineers to more effectively and scientifically integrate and implement their design through the different stages of a large infrastructure project. 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 civil engineers**

![Graph showing percent change in employment for civil engineers as compared to all engineers and all occupations.]

**Figure 1.** Percent change in employment for civil engineers as compared to all engineers and all occupations.

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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Civil Engineers</td>
<td>17-2051</td>
<td>262,800</td>
<td>313,900</td>
<td>19%</td>
</tr>
</tbody>
</table>

**Table 1. Employment projection data for civil engineers, 2010-2020.**

**Table 2. California Employment projection for civil engineers**
Source: California Labor Market Information

6. Student Demand

a. Provide compelling evidence of student interest in enrolling in the proposed program. Types of evidence vary and may include (for example), 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.

The Bureau of Labor Statistics and the California Labor Market Information both project employment gains for civil engineers. The California growth projection between the 2006-2016 periods is expected to be in high double digits, which outpaces the national growth. The unemployment level for civil engineers 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.

b. Identify how issues of diversity and access to the university were considered when planning this program. Describe what steps the program will take to insure ALL prospective candidates have equitable access to the program. This description may include recruitment strategies and any other techniques to insure a diverse and qualified candidate pool.

We intend to offer upper division courses in the afternoon/evening hours to maximize access for working students. We will reach out to underrepresented groups by promoting our program at community college and high schools. We will target students through our collaborations with MESA and Project Lead the Way to actively engage lower income and underrepresented students in our newly established BSCE. The department has already secured grants totaling $500k to promote Engineering to these disadvantaged groups.

c. For master’s degree proposals, cite the number of declared undergraduate majors and the degree production over the preceding three years for the corresponding baccalaureate program, if there is one.

N/A

d. Describe professional uses of the proposed degree program.

This program is designed for professionals interested in design, construction, and engineering processes of the built environment and the civil infrastructure.
e. Specify the expected number of majors in the initial year, and three years and five years thereafter. Specify the expected number of graduates in the initial year, 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 grows to 20 yearly thereafter.

7. Existing Support Resources for the Proposed Degree Major 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.

a. List 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. Note: For all proposed graduate degree programs, there must be a minimum of five full-time faculty members with the appropriate terminal degree. (Coded Memo EP&R 85-20)

Dr. Reza Akhavian is an Assistant Professor at the School of Engineering, California State University East Bay (CSUEB). He received his Ph.D. in Civil Engineering from the University of Central Florida (UCF). He also holds an M.S. (UCF, 2012) and a B.S. (University of Tehran, 2010) in Civil Engineering. He has more than 20 articles published in peer-reviewed journals and conference proceedings and serves as a member of the editorial board of the American Society of Civil Engineers (ASCE) Journal of Construction Engineering and Management (JCEM). He is also a member of two ASCE Technical Committees namely the Visualization, Information Modeling, and Simulation (VIMS) Committee and the Data Sensing and Analysis (DSA) Committee. Dr. Akhavian’s industry experience includes consulting for civil engineering firms including Bentley Systems and DPR Construction. Dr. Akhavian's research interests are in the areas of information technology, data analytics, machine learning, and automation and robotics for different Construction Engineering and Management applications. His work involves enhancing health, safety, and productivity of construction project operations and sustainability and resiliency of the built environment.

Dr. David M. Bowen is a Professor at California State University, East Bay, School of Engineering. His research and teaching interests include design and
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.

Dr. Fadi Castronovo is an Assistant Professor at California State University, East Bay, School of Engineering. He earned his Ph.D. in Architectural Engineering at the Pennsylvania State University, with a focus on construction and educational psychology. He has worked in several architecture studios in Rome and New York, as an architectural and BIM designer, implementing BIM technology and sustainable solutions. He has also worked at Walt Disney Imagineering on the development of learning and assessment material for the Lean health of high performing project teams. His research publications focus on the use of innovative technology, such as simulation games, virtual reality, and Building Information Modeling, for the enhancement of construction management and engineering education. He oversaw the development of the Virtual Construction Simulator 4, a simulation game that engages learners in solving complex construction management problems. He leveraged his minor in Educational Psychology by performing research on self-regulated learning of Lean design and construction practices to enhance the delivery of construction projects. His teaching interests lie in the use of Building Information Modeling, virtual reality, video game technology, and other innovative technology to enhance the construction process and education.

Cristian Gaedicke, Ph.D. is an Associate Professor at California State University, East Bay, School of Engineering. He earned a Ph.D. in Civil Engineering from University of Illinois at Urbana-Champaign in 2009 and is a Licensed Professional Engineer (Civil) in the State of Texas since 2011. His research interests are sustainable construction materials, infrastructure, construction engineering, and engineering education. Dr. Gaedicke has extensive background in sustainable construction materials, airfield pavements, computational mechanics, transportation engineering, and transportation infrastructure. He has worked on federally and state funded research by various agencies such as the Federal Aviation Administration (FAA), Chicago O’Hare Airport Modernization Plan, and Texas Department of
Transportation. Dr. Gaedicke is a member of the American Concrete Institute (ACI) and the Society of Hispanic Professional Engineers (SHPE).

**Farnaz Ganjeizadeh, Ph.D.** is a Professor at California State University, East Bay, School of Engineering. She completed her Ph.D. in Industrial and Systems Engineering from the University of Alabama in Huntsville in 1988. She earned her M.S. in Engineering Administration and B.S. in Industrial Engineering and Operations Research from Syracuse University. 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.

**Saeid Motavalli, Ph.D., P.E.** is Professor and Chair of the School of Engineering 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 Civil Engineering program.

**Farzad Shahbodaghlou, Ph.D.** is an Associate Professor and the founding director of the Construction Management Program at California State University East Bay. He has over 25 years of experience as an academician and practitioner in the construction industry. He holds Ph.D. and MSCE degrees in Construction Engineering and Management from Purdue University. His resume includes faculty positions at Bradley University, San Jose State University and California State University East Bay. He also has several years of industry experience at DPR Construction Inc. and as a consultant with several Bay Area construction companies. His areas of expertise include process improvement, construction management, safety and risk management.

**Helen Zong, Ph.D., P.E.** 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.,
b. Describe facilities that would be used in support of the proposed program.

*We have already developed a sustainable materials laboratory to take care of the concrete and geotechnical portions of civil engineering. Our existing laboratory in North Science 247 has the testing equipment needed for teaching fundamental engineering courses. Furthermore, we have recently established our Construction Engineering Advanced Technology (CEAT) Center which includes two lab spaces: the Automation and Visualization (AV) Lab and the Immersive and Interactive Lab both in the Valley Business and Technology (VBT) building.*

c. Provide evidence that the institution provides adequate access to both electronic and physical library and learning resources.

*Electronic databases are the majority of the resources needed for this program. Such databases are already available at the library. The letter of support from the library is attached.*

d. Describe available academic technology, equipment, and other specialized materials.

*The School of Engineering is housed in the new SF building as well as the VBT building with a state of the art laboratory facility. There is adequate classroom space to accommodate the new program. The School of Engineering computer laboratories and existing software in VBT 217, VBT 223, and South Science 247 are adequate to support the proposed program.*

8. **Additional Support Resources Required**

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. Describe additional faculty or staff support positions needed to implement the proposed program.

*Lower division engineering courses are common with the existing engineering programs, which are taught by other engineering faculty. We have a total of 4 faculty with civil engineering degrees who can support this programs for the first 3 years in addition to 2 lecturers. Starting at year 4, we anticipate*
requesting an additional full-time tenure-track faculty position dedicated to the Civil Engineering program.

b. Describe 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. Major capital outlay construction projects are those projects whose total cost is $610,000 or more (as adjusted pursuant to Cal. Pub. Cont. Code §§ 10705(a); 10105 and 10108).

We are not requesting additional space to offer this new program. The plan is to move the surveying equipment from Science South 247 to the VBT 363 lab and place the requested equipment in that place and South Science 118 (Concrete Lab). The list of equipment is attached in Appendix E; the cost is $110,544.

c. Include a report written in consultation with the campus librarian which indicates any necessary library resources not available through the CSU library system. Indicate the commitment of the campus to purchase these additional resources.

Report attached

d. Indicate 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.

The list of equipment needed to support the program is attached as Appendix E.

9. Self-Support Programs

a. Confirm that the proposed program will not be offered at places or times likely to supplant or limit existing state-support programs.

b. Explain how state-support funding is either unavailable or inappropriate.

c. Explain how at least one of the following additional criteria shall be met:
   i. The courses or program are primarily designed for career enrichment or retraining;
   ii. The location of the courses or program is significantly removed from permanent, state-supported campus facilities;
iii. The course or program is offered through a distinct technology, such as online delivery;
iv. For new programs, the client group for the course or program receives educational or other services at a cost beyond what could be reasonably provided within CSU Operating Funds;
v. For existing programs, there has been a cessation of non-state funding that previously provided for educational or other services costing beyond what could be reasonably provided within CSU Operating Funds.

d. For self-support programs, please provide information on the per-unit cost to students and the total cost to complete the program (in addition to the required cost recovery budget elements listed in the CSU degree proposal faculty check list found earlier in this document and listed below):

* Basic Cost Recovery Budget Elements
(Three to five year budget projection)

Student per-unit cost
Number of units producing revenue each academic year
Total cost a student will pay to complete the program

Revenue - (yearly projection over three years for a two-year program; five years for a four-year program)
  Student fees
  Include projected attrition numbers each year
  Any additional revenue sources (e.g., grants)

Direct Expenses
  Instructional costs – faculty salaries and benefits
  Operational costs – (e.g., facility rental)
  Extended Education costs – staff, recruitment, marketing, etc.
  Technology development and ongoing support (online programs)

Indirect Expenses
  Campus partners
  Campus reimbursement general fund
  Extended Education overhead
  Chancellor’s Office overhead

*Additional line items may be added based on program characteristics and needs.

Submit completed proposal packages to:
APP@calstate.edu

Academic Programs and Faculty Development
CSU Office of the Chancellor
401 Golden Shore
Long Beach, CA 90802-4210

Contact Us
Dr. Christine Mallon
Assistant Vice Chancellor
Academic Programs and Faculty Development
Phone (562) 951-4672
cmallon@calstate.edu

Academic Programs and Faculty Development is on the Web
http://www.calstate.edu/APP/

Contact Extended Education
Dr. Sheila Thomas, Assistant Vice Chancellor and Dean, Extended Education
Phone (562) 951-4795
sthomas@calstate.edu
These “Tips” are designed to assist campuses as they prepare proposals for both internal campus and Chancellor’s Office review and approval. They are meant to clarify areas from the CSU Degree Program Proposal Template that may need additional explanation. Following these guidelines will increase the likelihood of receiving a positive outcome is greatly enhanced.

The “Tips” below address items 2 through 9 in the Proposal Template, as these areas generally require more detailed and/or more complex responses. All “Tips” are italicized and directly relate to the prompt indicated. Please note that some prompts in the template do not have “Tips” because the prompt itself is self-explanatory. However, if additional clarification is needed to complete any of the sections, please do not hesitate to contact the office of Academic Programs and Faculty Development at the Chancellor’s Office for assistance.

2. Program Identification

k. Optional: Proposed Classification of Instructional Programs and CSU Degree Program Code

When developing the curriculum for a new program, curricular content guidance is provided from the Classification of Instructional Programs (CIP) code. CIP codes are part of the Integrated Postsecondary Education Data System (IPEDS), run by the National Center for Education Statistics. Because CSU campus programs report to the CSU Chancellor’s Office and nationally to IPEDS, accurate reporting of degree program data relies on consistent use of codes that reflect the curricula defined by IPEDS. It is important to insure that program curriculum reflects the basic programmatic content as described in the CIP code definition.

3. Program Overview and Rationale

a. Provide a brief descriptive overview of the program citing its purpose and strengths, fit with the institutional mission or institutional learning outcomes, and the compelling reasons for offering the program at this time.

The first sentence should describe the program’s purpose clearly and succinctly. For example, starting out saying “This program is designed to . . .” or “The purpose of the program is to . . .” will help to define and describe the program’s content knowledge. What compelling or unique features does this program have that will draw candidates to apply and ultimately enroll?
Overall, what knowledge, skills, and dispositions will graduates possess when they graduate from the program?

The overview also requires a statement of how the program fits with the institutional mission or institutional learning outcomes. Simply stating “This program fits with the institutional mission” is not sufficient. Instead, state the actual mission statement or expected outcomes of the institution and describe in several sentences how the program fits, complements, augments, or extends the mission. Then, provide a justification for offering the program. The justification is critical as it forms the basis of the argument for requesting approval to offer the proposed program.

b. Provide the proposed catalog description. The description should include:

1. a narrative description of the program
2. admission requirements
3. a list of all required courses for graduation including electives, specifying course catalog numbers, course titles, prerequisites or co-requisites (ensuring there are no “hidden prerequisites” that would drive the total units required to graduate beyond the total reported in 2e above), course unit requirements, and if applicable, any allowable units associated with demonstration of proficiency.
4. total units required to complete the degree, and if a master’s degree,
5. catalog copy describing the culminating experience requirement(s)

In separate sections provide the proposed catalog description (the copy prospective candidates will view). The catalog copy should include 1) a description of the program, 2) admission requirements – avoiding vague language and requirements with multiple interpretations, and 3) a list of all required courses indicating which courses are electives and or prerequisites. In the course list, include the catalog number, course title, and number of units required for the course, 4) the total number of units to complete the degree keeping in mind the 120 maximum policy for most bachelor’s degrees and the minimum of 30 units for master’s degrees. For master’s degrees, describe the type of culminating experience required. Title 5 allows three choices – thesis, project, or comprehensive examination.

A note about admission requirements: Criteria must be clear, succinct, and stated using unambiguous terms. For example, rather than saying “satisfactory completion,” indicate the criteria that define satisfactory completion such as “with a 2.5 GPA.”
Please use any catalog copy format required by your own university. The key is to make sure all required information is included.

4. Curriculum

a. These program proposal elements are required:

- Institutional learning outcomes (ILOs)
- Program learning outcomes (PLOs)
- Student learning outcomes (SLOs)

Describe outcomes for the 1) institution, 2) program, and for 3) student learning. Institutional learning outcomes (ILOs) typically highlight the general knowledge, skills, and dispositions all students are expected to have upon graduating from an institution of higher learning. Program learning outcomes (PLOs) highlight the specific discipline’s knowledge, skills, and dispositions students are expected to know as program graduates. Student learning outcomes (SLOs) clearly convey the specific and measureable behaviors students will demonstrate in order to achieve the program’s outcomes. They will also determine the type of assessments to be used to assess if the desired level of learning has been achieved.

(WASC 2013 CFR: 1.1, 1.2, 2.3)

Institutional learning outcomes (ILOs)

Overall, ILOs are the collective expression of the learning environment the university offers to any enrolled student. It is beneficial to examine ILOs at the beginning of the program development process to make sure program and student learning outcomes will be progressively more narrow extensions of the university outcomes.

Examples of institutional learning outcomes (ILOs):

Graduates of XXX University will:

- think critically and creatively and apply analytical and quantitative reasoning to address complex challenges and everyday problems;
- communicate ideas, perspectives, and values clearly and persuasively while listening openly to others;
- apply knowledge of diversity and multicultural competencies to promote equity and social justice in our communities;
- work collaboratively and respectfully as members and leaders of diverse teams and communities;
• act responsibly and sustainably at local, national, and global levels;

• demonstrate expertise and integration of ideas, methods, theory and practice in a specialized discipline of study.

Program learning outcomes (PLOs)

PLOs reflect the core themes and discipline content areas of the major and should be natural outgrowths of the university ILOs. Program outcomes are best written with a strong focus on describing the characteristics of an ideal program graduate within the specific discipline. Five or six program outcomes tend to be both adequate and manageable.

Examples of program learning outcomes (PLOs):

Biological Science program graduates will:

• apply a rich body of relevant biological sciences knowledge and information to solve complex scientific problems and challenges

• integrate the scientific method in field, lab, or research settings through critical analysis, problem solving, and collaborative communication techniques

• advocate for biological sciences equity and social justice in diverse and multicultural local, national and global contexts

Student learning outcomes (SLOs)

Student learning outcomes clearly state the specific and measurable behaviors students will display to verify learning has occurred. Key characteristics of student learning outcomes include 1) clarity, 2) specificity, (this means they are worded with active verbs stating observable behaviors) and, 3) measurability. Every student learning outcome should be directly aligned with and related to one or more program learning outcomes. SLOs should be limited in number (eight or less) to maintain manageability. An SLO (or a combination of two SLOs) can be assessed with only one assignment and in only one course.

Constructing Student Learning Outcomes (SLOs): Bloom’s Taxonomy of Educational Objectives is an extremely useful tool for creating meaningful student learning outcomes. Effective programs utilize all six levels of the taxonomy with the majority of cognitive outcomes focused on levels 4, 5, and 6 for both undergraduate and graduate program. For graduate programs, it is especially important to have a higher concentration of
outcomes constructed at the top three levels.

<table>
<thead>
<tr>
<th>Bloom's Taxonomy Levels (lowest to highest levels of learning)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge: To know and remember</td>
</tr>
<tr>
<td>2. Comprehension: To understand, interpret, and compare</td>
</tr>
<tr>
<td>3. Application: To apply knowledge</td>
</tr>
<tr>
<td>4. Analysis: To identify parts and relationships</td>
</tr>
<tr>
<td>5. Synthesis: To create something new from parts</td>
</tr>
<tr>
<td>6. Evaluation: To judge and assess quality</td>
</tr>
</tbody>
</table>

Examples of Student Learning Outcomes (SLOs):

Physical and Biological Sciences:
- Using at least three large sets of scientific data related to specific areas of scientific interest (e.g., cell, behavioral, molecular biology, genetics, etc.), students will analyze and synthesize the data to solve a scientific problem.
- Students will design and conduct a scientific experiment using all steps in the scientific method and report the findings.
- Students will analyze and evaluate multiple perspectives and interpretations associated with various biological science theories and defend or refute their merits.

Languages and Literature:
- Using critical terms and appropriate methodology, students will complete a literary analysis following the conventions of standard written English.
- French students will make an oral presentation with suitable accuracy in pronunciation, vocabulary, and language fluency.
- French students will accurately read and translate multiple French text passages.

Mathematics:
- Students will apply algorithmic techniques to solve problems and obtain valid solutions.
- Students will evaluate and judge the reasonableness of obtained solutions and defend their position.

Humanities and Fine Arts:
- Using various industry standard protocols, students will analyze and critique works of art and visual objects and render their conclusions.
- Students will identify musical elements, take them down at dictation, and perform them by sight.
Students will communicate both orally and verbally about music of all genres and styles in a clear and articulate manner.

Social Sciences:
- Students will test hypotheses and draw correct inferences using both quantitative and qualitative analysis.
- Students will evaluate theory and critique research within the discipline and defend their positions.

Business
- Students will work in groups and display professional business standards dispositions as part of an effective team.
- Students will recognize and accurately diagnose accounting problems.

(Sample student learning outcomes are adapted and augmented from the Stanford University assessment support website and Fresno City College Student Learning Outcome Handbook)


The table below provides some examples of verbs to consider when constructing student learning outcomes at each level of Bloom’s Taxonomy.

<table>
<thead>
<tr>
<th>Sample action verbs at each level of Bloom’s Taxonomy to assist in creating observable and assessable program Student Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
</tr>
<tr>
<td>define, describe, identify, outline, select</td>
</tr>
<tr>
<td>Comprehension</td>
</tr>
<tr>
<td>classify, discuss, distinguish, estimate, infer, summarize</td>
</tr>
<tr>
<td>Application</td>
</tr>
<tr>
<td>apply, compute, illustrate, interpret, prepare, solve, write</td>
</tr>
<tr>
<td>Analysis</td>
</tr>
<tr>
<td>analyze, compare, contrast, criticize, differentiate, model</td>
</tr>
<tr>
<td>Synthesis</td>
</tr>
<tr>
<td>categorize, construct, design, generalize, reconstruct, synthesize</td>
</tr>
<tr>
<td>Evaluation</td>
</tr>
<tr>
<td>appraise, argue, defend, evaluate, judge, justify, interpret, support</td>
</tr>
</tbody>
</table>

The verbs listed above represent just a fraction of those contained at each level.

Additional suggested resources:

taxonomy for learning, teaching, and assessing: A revision of bloom’s taxonomy of educational objectives. New York: Longman.


**Online resources for constructing course or program level learning outcomes:**

WASC 2013 definition of “outcome”:

A concise statement of what the student should know or be able to do. Well-articulated learning outcomes describe how a student can demonstrate the desired outcome; verbs such as “understand” or “appreciate” are avoided in favor of observable actions, e.g., “identify,” “analyze.” Learning outcomes can be formulated for different levels of aggregation and analysis. Student learning outcomes are commonly abbreviated as SLOs, course learning outcomes as CLOs, program learning outcomes as PLOs, and institution-level outcomes as ILOs. Other outcomes may address access, retention and graduation, and other indicators aligned with institutional mission and goals (WASC, 2013, Handbook of Accreditation, p. 51).

**Connecting the outcomes:**

**Sample outcomes for a Bachelor of Science degree in Biological Science**

<table>
<thead>
<tr>
<th>ILO – Institutional Learning Outcome</th>
<th>PLO – Program Learning Outcome</th>
<th>SLO – Student Learning Outcome</th>
<th>Where is the SLO assessed?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduates will think critically and creatively and apply analytical and quantitative reasoning to complex problems.</td>
<td>Graduates will solve complex biological science problems.</td>
<td>Using biological science data sets, students will analyze and synthesize the data to solve a scientific problem in their interest area.</td>
<td>BIOL 101: Keys to General Biology and Biodiversity.</td>
</tr>
</tbody>
</table>

Note: Not all courses in the major will be designated as an
The ILO is quite global. The PLO funnels the learning down to the specific discipline. The SLO outcome data will verify if the PLO and the ILO have been achieved. Note the connectivity (highlighted in yellow) between the ILO, PLO and SLO above. The relationship between the outcomes is significant as it demonstrates coherence between outcome levels.

b. These program proposal elements are required:

- Comprehensive program assessment plan addressing all assessment elements
- Curriculum map matrix indicating where student learning outcomes are introduced (I), developed (D), and mastered (M)

The Comprehensive Assessment Plan

The comprehensive assessment plan displays all elements of the assessment cycle. Assessment elements are coordinated to match many accreditation agency assessment requirements, e.g., WSCUC, ABET, NASM and many others. Please see Appendix A for an example.

The comprehensive assessment plan should identify:

- a. Institutional learning outcomes: institutional learning outcomes (ILOs) typically highlight the general knowledge, skills, and dispositions all students are expected to have upon graduating from an institution of higher learning.

- b. Program learning outcomes: program learning outcomes (PLOs) highlight the specific discipline’s knowledge, skills, and dispositions students are expected to know as program graduates.

- c. Student learning outcomes: student learning outcomes (SLOs) clearly convey the specific and measureable behaviors students will demonstrate in order to achieve the program’s outcomes.

- d. The course(s) where each student learning outcome is assessed: specific courses in the major can be designated as SLO assessment courses. Not all courses in a major will be designated as an SLO assessment course.

- e. An assessment activity (also called signature assignment): a reliable and valid assignment that directly measures the stated behavior in the
SLO. Examples include (but not limited to): final exam, presentation, project, performance, observations, classroom response systems, computer simulated tasks, analytical paper, case study, portfolio, critique, policy paper, comparative analysis project, qualifying or comprehensive examination, project, thesis, dissertation, and many others. Only one assessment activity is needed to assess an SLO. It is possible that one major assessment will assess between one and three SLOs.

f. Assessment tool: an instrument used to score or evaluate the assessment activity. Examples include: rubrics (that produce scores based on established criteria), observational checklists, observational narratives, video or audio recording with written analysis, rating scales.

g. Assessment schedule: the timeline for administering the assessments and collecting the data. Examples include staggering SLO assessments over a five-year period.

h. How the assessment data and findings will be quantitatively or qualitatively reported: examples of ways to report assessment data include the number/percentage of those scoring at or above 4.0 on a 5.0 point scale on the assessment used to measure mastery of a specific SLO; number or percentage of students scoring at the highly proficient level; instructor observational narrative that includes analysis and findings to qualitatively show trends and patterns; mean scores of all who exhibited desired traits or behaviors on an observational checklist.

i. Who will collect, analyze, and interpret student learning outcome data: possibilities include a faculty committee, college or university assessment office personnel, assessment coordinator or college administrator who assumes data collection, analysis and interpretation responsibilities.

j. Program data/findings dissemination schedule: the frequency data will be disseminated to identified stakeholders.

k. Anticipated strategies on how outcome data will be used to “close the loop”: how data will be used to respond to issues or areas of concern. Examples include revising a) syllabi, b) SLOs, c) assessment assignments, d) teaching methods, e) program curriculum.

The basic template below provides a sequential and developmental picture of every component in the assessment plan. Graphically displaying ILOs, PLOs and SLOs show the unifying thread between all outcome levels.
Sample Template: Comprehensive Assessment Plan

<table>
<thead>
<tr>
<th>a</th>
<th>h</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
<th>i</th>
<th>j</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILOs</td>
<td>PLOs</td>
<td>SLOs</td>
<td>Course where each SLO is assessed</td>
<td>Assessment activity/assignment used to measure each SLO</td>
<td>Assessment tool used to measure outcome success</td>
<td>Assessment schedule – how often SLOs will be assessed</td>
<td>How data/findings will be quantitatively or qualitatively reported</td>
<td>Designated personnel to collect, analyze, and interpret student learning outcome data</td>
<td>Program data/findings dissemination schedule</td>
<td>Closing the loop strategies</td>
</tr>
</tbody>
</table>

It is expected that assessments will be refined or changed as a program develops and matures. In graduate degree programs, if an assessment to measure a SLO occurs outside of a course setting, (such as a comprehensive exam, exam through an outside accrediting agency, or a thesis or project), please indicate.

**Curriculum Map Matrix**

The curriculum map matrix identifies the observable and measureable student learning outcomes (SLOs), the courses where they are found, and where content is “introduced (I),” “developed (D),” and “mastered (M).” The map insures that all student learning outcomes are represented across the curriculum at the appropriate times. Please see Appendix B for an example.

(WASC 2013 CFR: 2.4, 2.5, 2.6, 2.7)
## Curriculum Map Matrix (Sample Template)
*Where are SLOs Introduced, Developed, and Mastered?*

| SLO 1:  
(write SLO here) | COURSE # XXX: Title | COURSE # XXX: Title | COURSE # XXX: Title | COURSE # XXX: Title | COURSE # XXX: Title |
|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| SLO 2:  
(write SLO here) |                     |                     |                     |                     |                     |
| SLO 3:  
(write SLO here) |                     |                     |                     |                     |                     |
| SLO 4:  
(write SLO here) |                     |                     |                     |                     |                     |
| SLO 5:  
(write SLO here) |                     |                     |                     |                     |                     |
| SLO 6:  
(write SLO here) |                     |                     |                     |                     |                     |
| SLO 7:  
(write SLO here) |                     |                     |                     |                     |                     |

Place an I, D, or M in each cell above to indicate where the program content related to each SLO is introduced (I), developed (D), and/or mastered (M). SLO content may be delivered in more than just six courses as indicated in the above table.
c. Indicate total number of units required for graduation.

*Please indicate the total number of units required for graduation from the program and indicate whether they are semester or quarter units. The total should include all prerequisites.*

d. Include a justification for any baccalaureate program that requires more than 120-semester units or 180-quarter units. Programs proposed at more than 120 semester units will have to provide either a Title 5 justification for the higher units or a campus-approved request for an exception to the Title 5 unit limit for this kind of baccalaureate program.

*Every attempt should be made to design the curriculum efficiently to meet the Title 5 requirement limiting program units to 120/180. This could involve program learning outcome revisions, extensive curriculum content analysis, combining and streamlining course content, or a re-examination of and realignment with accreditation agency required outcomes, for example.*

e. If any formal options, concentrations, or special emphases are planned under the proposed major, identify and list the required courses. 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.

*To ensure the integrity of degree programs, each approved degree title is to be associated with only one set of curricular requirements. Requirements in addition to the core curriculum may be achieved through use of a subprogram (an option, concentration, or special emphasis), as noted in Executive Order 1071. An option, concentration, or special emphasis must constitute less than one half of the units required in the major core to insure that the program’s student learning outcomes can be achieved by all enrolled students, regardless of subprogram pursued. Indicate which courses are the foundational and those that extend foundational learning.*

f. List any new courses that are: (1) needed to initiate the program and (2) needed during the first two years after implementation. Include proposed catalog descriptions for new courses. For graduate program proposals, identify whether each new course would be at the graduate-level or undergraduate-level.

*Only a list of the new courses and the proposed catalog descriptions are required for this section.*

(WASC 2013 CFR: 2.1, 2.2)
g. Attach a proposed course-offering plan for the first three years of program implementation, indicating likely faculty teaching assignments.

(WASC 2013 CFR: 2.2b)

In table format, list the courses to be offered each year of the program. Indicate in which semester or quarter the courses will be offered and who might teach the course.

h. For master’s 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.

Title 5 states that all master’s degree programs must have a culminating experience. Programs can include any one of the following three options: 1) a thesis, 2) a project, or 3) comprehensive examination. Be sure to indicate which type of culminating experience will be required. If a thesis or project, sufficient narrative should address the research skills required to meet the culminating experience requirements.

i. For master’s degree proposals, cite the corresponding bachelor’s program and specify whether it is (a) subject to accreditation and (b) currently accredited.

Not all master’s degrees will have a corresponding bachelor’s degree program. If that is the case, please indicate.

(WASC 2013 CFR: 2.2b)

j. For graduate degree programs, specify admission criteria, including any prerequisite coursework.

List all admission criteria to the program as well as any prerequisites that must be completed before formal acceptance into the program. The criteria should match the catalog description in 3b above.

k. For graduate degree programs, specify criteria for student continuation in the program.

Describe the academic criteria that must be met in order for a student to remain in the program.

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

Provide specific examples of community college programs contacted or those where articulation agreements have been explored or adopted.
m. Provide advising “roadmaps” that have been developed for the major.

For this section, a table or chart providing several options for students to follow that include which classes to take and when to take them for all years while enrolled in the program is helpful. This will assist students to stay on track to graduate in a timely manner.
Example:

<table>
<thead>
<tr>
<th>Program Name - Advising Roadmap - Recommended Course Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Freshman Year (xx units)</strong></td>
</tr>
<tr>
<td>Fall</td>
</tr>
<tr>
<td>-------</td>
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<td></td>
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  **Total:** **Total:** **Total:**

<table>
<thead>
<tr>
<th><strong>Sophomore Year (xx units)</strong></th>
</tr>
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<tbody>
<tr>
<td>Fall</td>
</tr>
<tr>
<td>------</td>
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<tr>
<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
</tbody>
</table>

  **Total:** **Total:** **Total:**

<table>
<thead>
<tr>
<th><strong>Junior Year (xx units)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
</tr>
<tr>
<td>------</td>
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</tbody>
</table>

  **Total:** **Total:** **Total:**

<table>
<thead>
<tr>
<th><strong>Senior Year (xx units)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
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</tr>
</tbody>
</table>

  **Total:** **Total:** **Total:**

  **Total Units:**

n. Describe how accreditation requirements will be met, if applicable, and anticipated date of accreditation request (including the WASC Substantive Change process).

*If applicable, indicate in addition to WSCUC, the name of the accreditation agency, the discipline specific accreditation requirements, and the intended date of application.*

(WASC 2013 CFR: 1.8)

**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’s degree major program.

**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**

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

*Please provide a list of at least three other CSU campuses currently offering or planning to offer the same degree major program. Provide a list of at least three other public (outside the CSU system) or private institutions in the immediate vicinity also offering the program. If there are no programs offering the same program or if less than three, please indicate.*

b. Describe differences between the proposed program and programs listed in Section 5a above.

*The most efficient way to respond to this prompt is to make a side-by-side comparison of courses offered in the proposed program against those offered in the other programs listed in 5a above. Highlight those courses in the proposed program that are different from the others. Add a brief narrative, if needed, to further explain how the proposed program differs.*

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

*Investigate if there are other programs on the campus offered via any format (self support, online, program in other departments, etc.) that are similar in content and/or purpose to the proposed program. Make a side-by-side comparison chart of the courses in each.*

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

*List all who participated in the planning/development of the program and their professional credentials.*

e. Provide applicable workforce demand projections and other relevant data.
In order to respond to this prompt, use government statistics or other credible evidence such as employer letters attesting to the need of graduates in the field. Overall, the narrative must show the demand for graduates trained in the curricula offered in this program. The key to completing this section successfully is the strength, type and extensiveness of the evidence provided.

Note: Data Sources for Demonstrating Evidence of Need

APP Resources Web http://www.calstate.edu/app/resources.shtml
US Department of Labor, Bureau of Labor Statistics
California Labor Market Information

6. 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.

The evidence of student interest must be specific and compelling. Please include as many pieces of solid evidence as possible indicating students will indeed enroll in the program. Student petitions gathered over several semesters, prospective candidate surveys indicated intent to enroll if offered, and increased enrollments over time in the related field at feeder institutions are just a few examples of strong and compelling evidence.

b. Identify how issues of diversity and access to the university were considered when planning this program. Describe what steps the program will take to insure ALL prospective candidates have equitable access to the program. This description may include recruitment strategies and any other techniques to insure a diverse and qualified candidate pool.

When responding to this prompt, possible diversity categories could include race, ethnicity, social class, gender, sexual orientation, disability or exceptionality, second language and linguistic considerations, culture, economics, philosophy, religion, and politics. Evidence of insuring equitable access and consideration might include a brief description of recruitment procedures, candidate selection and evaluation procedures or an application rating rubric identifying multiple measures of evaluation.

c. For master’s degree proposals, cite the number of declared undergraduate majors and the degree production over the preceding three years for the corresponding baccalaureate program, if there is one.
A simple table listing the number of declared undergraduate majors and number of degrees produced is sufficient for this section.

d. Professional uses of the proposed degree program.

Include a description of how a graduate of the program will be able to use the degree in the professional world. What specific jobs or employment opportunities will be available for possible employment?

e. Specify the expected number of majors in the year of initiation and three years and five years thereafter.

A simple table projecting the number of majors in years one, three, and five is adequate for this section.

7. Existing Support Resources for the Proposed Degree Major 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.

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. Note: For all proposed graduate degree programs, there must be a minimum of five full-time faculty members with the appropriate terminal degree. (Coded Memo EP&R 85-20)

Please provide a complete listing of all proposed faculty who would teach in the program. Be sure to provide information addressing all areas requested.

b. Describe facilities that would be used in support of the proposed program.

If existing space and facilities will be used to support the program, include a brief description of the type of space and facilities that will be utilized. This might include a listing of the number and types of classrooms, labs, or off campus facilities. If a self-support program, be sure to note any facilities fees in the budget.

c. Provide evidence that the institution provides adequate access to both electronic and physical library and learning resources.

The library should provide a report on the resources currently available to support the program. This might include counts and holdings of hard copies of
books and periodicals and also a listing of the appropriate data bases and online resources that are held by the library to support the program.

d. Describe academic technology, equipment, and other specialized materials.

Provide a listing of the applicable technology, equipment and any other materials utilized to support the program. Depending on the discipline, examples might include computer labs (including iPads, other tablets, smartphones, software simulations, etc.), distance learning technology, digital production equipment, etc.

8. Additional Support Resources Required

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. Describe additional faculty or staff support positions needed to implement the proposed program.

If new positions will be required to offer this program, provide a cogent argument why the position(s) is needed. Justify the reasons which might include accreditation requirements, retirements, need for specialized skills, etc. The level of support from the responsible administrator will be a key factor in determining the strength of the argument.

b. Describe 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. Major capital outlay construction projects are those projects whose total cost is $610,000 or more (as adjusted pursuant to Cal. Pub. Cont. Code §§ 10705(a); 10105 and 10108).

As in “a” above, a cogent argument will be needed to justify a request for additional space requiring additional financial resources. Written support from the responsible administrator will strengthen this request.

c. Include a report written in consultation with the campus librarian which indicates any necessary library resources not available through the CSU library system. Indicate the commitment of the campus to purchase these additional resources.
A letter from the library indicating the extent of current holdings and a commitment to securing additional library resources if needed will support this section.

d. Indicate 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.

9. Self-Support Programs

a. Confirm that the proposed program will not be offered at places or times likely to supplant or limit existing state-support programs.

*In order to meet this requirement, self-support programs are generally offered in the evenings or on weekends. They can also be offered at off-site facilities with approvals from the appropriate off-site administrator.*

b. Explain how state-support funding is either unavailable or inappropriate.

*Simply stating state-support funds are not available is not sufficient. Compelling evidence, such as a statement from the responsible administrator or other forms of documentation), is needed. An example of inappropriate use of state general fund appropriations would include courses or programs delivered primarily out of state.*

c. Explain how at least one of the following additional criteria shall be met:

i. The courses or program are primarily designed for career enrichment or retraining;

*Generally, if the program is for career enrichment, accepted students should already be in the designated field or have had prior job experience in the same discipline. An admission requirement may even include current employment in the field or in a related discipline. If retraining, students may have already been in the workforce for a period of time. They may need retraining due to job obsolescence, reduction in force, etc.*

ii. The location of the courses or program is significantly removed from permanent, state-supported campus facilities;

*Please note “significantly removed” refers to geographical location.*

iii. The course or program is offered through a distinct technology, such as online delivery;
iv. For new programs, the client group for the course or program receives educational or other services at a cost beyond what could be reasonably provided within CSU Operating Funds;

*Many programs require intense supervision or individual advising on an ongoing basis. These types of services require extra time that would not normally be provided in a state-support program.*

v. For existing programs, there has been a cessation of non-state funding that previously provided for educational or other services costing beyond what could be reasonably provided within CSU Operating Funds.

d. For self-support programs, please provide information on the per-unit cost to students and the total cost to complete the program (in addition to the required cost recovery budget elements listed in the checklist found earlier in this document).

*Successful proposals include a detailed budget addressing each element in the self-support program proposal budget checklist. It is important to clearly identify all sources of revenue and all anticipated expenditures. The budget must document the program will be sustainable over several years and that expected revenue will not exceed program costs. An Excel budget spreadsheet is an excellent tool to present budget data showing multiple cohorts if two or more cohorts overlap. It is also helpful to define any line items that may be unique to a specific campus. This will insure budget reviewers understand all types of revenue and expenditures listed. Please see Appendix C for a sample budget template. Campuses are not required to use this template, but at a minimum, budgets should include all line items on the sample. More line items may be added as appropriate to the specific program.*
Appendix A
Example of a Comprehensive Program Assessment Plan

<table>
<thead>
<tr>
<th>Year 1: 2019-2020</th>
<th>2. Which PLO(s) to assess</th>
<th>PLO a – Ability to apply knowledge of mathematics, science, and engineering. PLO f – Understanding of professional and ethical responsibility.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Year 2: 2020-2021</th>
<th>2. Which PLO(s) to assess</th>
<th>PLO b - Ability to design and conduct experiments, as well as to analyze and interpret data. PLO g - Ability to communicate effectively.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Year 3: 2021-2022</th>
<th>3. Which PLO(s) to assess</th>
<th>PLO c - Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability. PLO h - Broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Year 4: 2022-2023</th>
<th>4. Which PLO(s) to assess</th>
<th>PLO e - Ability to identify, formulate and solve engineering problems. PLO j - Knowledge of contemporary issues.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Year 5: 2023-2024</th>
<th>5. Which PLO(s) to assess</th>
<th>PLO d - Ability to function on multidisciplinary teams.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Year 6: 2024-2025</th>
<th>6. Which SLO(s) to assess</th>
<th>PLO i - Recognition of the need for, and an ability to engage in, lifelong learning. PLO k - Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.</th>
</tr>
</thead>
</table>

Appendix B
Curriculum Mapping Matrix
### Courses in the Curriculum

<table>
<thead>
<tr>
<th>General Education</th>
<th>Introduce (I), Practice (P), Master (M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>I</td>
</tr>
<tr>
<td>Natural Sciences</td>
<td>I</td>
</tr>
<tr>
<td><strong>Civil Engineering Core</strong></td>
<td></td>
</tr>
<tr>
<td>CIVE 206 Engr. Materials &amp; Lab</td>
<td>I P I</td>
</tr>
<tr>
<td>CIVE 319 Fluid Mechanics</td>
<td>P</td>
</tr>
<tr>
<td>CIVE 330 Strength of Materials</td>
<td>I</td>
</tr>
<tr>
<td>CIVE 350 Geotechnical Engineering</td>
<td>I P P</td>
</tr>
<tr>
<td>CIVE 361 Transportation Engineering</td>
<td>P I P</td>
</tr>
<tr>
<td>CIVE 385 Structural Analysis</td>
<td>P P P</td>
</tr>
<tr>
<td>CIVE 410 Hydraulics and Water Resources</td>
<td>P P P</td>
</tr>
<tr>
<td>CIVE 421 Structural Engineering Design</td>
<td>P</td>
</tr>
<tr>
<td>CIVE 430 Environmental Engineering and Sustainability</td>
<td>P P I P</td>
</tr>
<tr>
<td>CIVE 435 - Highway and Pavement Design</td>
<td>P I</td>
</tr>
<tr>
<td>CIVE 440 Construction Engineering</td>
<td>P P M</td>
</tr>
<tr>
<td>CIVE 492 Senior Design Project</td>
<td>M M M M M M M M M P M</td>
</tr>
<tr>
<td>CMGT 201 Surveying</td>
<td>I I</td>
</tr>
<tr>
<td>ENGR 200 Intro to Engineering &amp; Design</td>
<td>I I I</td>
</tr>
<tr>
<td>ENGR 220 Statics</td>
<td>P P</td>
</tr>
<tr>
<td>ENGR 215 Comp. in Engr.</td>
<td>I I</td>
</tr>
<tr>
<td>ENGR 320 Engineering Economics</td>
<td>P P M M</td>
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<tr>
<td>INDE 330 Engineering Statistics and Probability</td>
<td>M M</td>
</tr>
</tbody>
</table>

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Appendix C

Sample Budget Format

PROJECTIONS - MS Construction Management - 30-33 units

2% Attrition Rate

<table>
<thead>
<tr>
<th></th>
<th>YR 1 - FY 17/18</th>
<th>YR 2 - FY 18/19</th>
<th>YR 3 - FY 19/20</th>
<th>YR 4 - FY 20/21</th>
<th>YR 5 - FY 21/22</th>
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<tbody>
<tr>
<td>Tuition per unit</td>
<td>$ 500</td>
<td>$ 500</td>
<td>$ 525</td>
<td>$ 525</td>
<td>$ 535</td>
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<tr>
<td></td>
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<tr>
<td>Cohort 1 Number of students</td>
<td>25</td>
<td>23</td>
<td>25</td>
<td>23</td>
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<tr>
<td>Units Students take in FY</td>
<td>15</td>
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<tr>
<td>Cohort 2 Number of students</td>
<td>25</td>
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<td>25</td>
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<tr>
<td>Units Students take in FY</td>
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<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
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<tr>
<td>Cohort 3 Number of students</td>
<td>25</td>
<td>23</td>
<td>25</td>
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<td>25</td>
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<td>Units Students take in FY</td>
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<tr>
<td>Cohort 4 Number of students</td>
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<tr>
<td>Units Students take in FY</td>
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<td>15</td>
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<tr>
<td>Cohort 5 Number of students</td>
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<td>Units Students take in FY</td>
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<td><strong>Total Units</strong></td>
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<td>Other</td>
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<tr>
<td><strong>Total Revenue</strong></td>
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<table>
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<td>Other</td>
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<tr>
<td><strong>Total Direct Expenses</strong></td>
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</table>

| Operating Income/Margin |                 |                 |                 |                 |                 |

| Indirect Expenses     |                 |                 |                 |                 |                 |
|                       |                 |                 |                 |                 |                 |
| Other                 |                 |                 |                 |                 |                 |
| **Total Indirect Expenses** |                 |                 |                 |                 |                 |

| Total All Expenses    |                 |                 |                 |                 |                 |

| Net Gain/Loss         |                 |                 |                 |                 |                 |

| Residual Reserve %    |                 |                 |                 |                 |                 |

| Loss Carry Forward    |                 |                 |                 |                 |                 |

Template originally created by Regina Eisenbach and San Marcos Extended Education budget department.
Appendix D

November 19, 2017

To whom it may concern,

Library resources in support of Civil Engineering should be adequate. Through a combination of locally held resources, as well as timely interlibrary loan service, students should be well supported in their research.

In terms of monographs, the CSUEB University Library provides access to about 1000 monographs with some version of the subject heading Civil Engineering. These monographs are available either physically within the Library or online through our various eBook vendors. Access to monographs is further supported through the use of CSU+ to allow for requests for other monographs held by other sister campuses throughout the system.

Regarding serials, the CSUEB University Library is lacking access to specific journal packages though ACSE, that would provide students with current literature related to Civil Engineering. Though access to these articles is provided through our Interlibrary Loan service, it would be beneficial for students to be able to have quicker access to these journals. A subscription to these journal packages is under consideration by our Collections Committee; however, given the Library budget constraints, access to these journals may not happen in a timely manner.

Andrew Carlos, Senior Assistant Librarian
Engineering Liaison
Appendix E

Section 8d: Additional academic technology

1- Hydraulic Flow Demonstrator
Hydraulic Flow Demonstration with Direct Reading. Price: $25,676.00

2- Fluid Properties & Hydrostatics Bench
Fluid Properties and Hydrostatics Bench. Price: $26,260.00

3- Soils Testing (Master Loader Load Frame)
Confined soils testing machine and accessories. Price: $15,000
4- Additional equipment for structural testing on the universal machine. Price: $43,509

Total: $110,445
Date: April 18, 2018

To: Timothy White, Chancellor, California State University

From: Jason Singley, Dean, College of Science

Subject: Support for the BS in Civil Engineering proposal

The College of Science is in support of the proposed Bachelors of Science degree in Civil Engineering. This new degree program is in line with the campus’ mission to “meet the educational needs and to contribute to the vitality of the East Bay, the state, the nation, and global communities.” Cal State East Bay is a regional University that primarily serves the nearly 3 million residents in Alameda and Contra Costa Counties. The University first started offering engineering programs on campus 20 years ago and now has undergraduate degrees in Industrial Engineering, Computer Engineering, and Construction Management, and graduate programs in Engineering Management and Construction Management. The addition of Civil Engineering is part of the campus’ strategic vision to offer a broad array of engineering programs to the diverse population of the East Bay in order to meet the large demand for professionals in these fields in the Bay Area, State, and Nation.

The College of Science is prepared to offer this degree program with existing resources and without negatively impacting current academic programs. In part this is possible due to the close alignment between our existing Construction Management programs and the proposed Civil Engineering degree. Three of our current tenure-track faculty have Ph.D.’s in Civil Engineering and we would be able to start the program without needing to hire additional permanent faculty. Likewise, our current facilities used in Construction Management will also support the Civil Engineering classes. The college is currently designing a new Applied Science Center, and has already raised half of the funding necessary for construction, which will allow us to accommodate long-term growth in engineering and the sciences.

xc: Edward Inch, Provost and Vice President, Academic Affairs