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1. Summary. This shall summarize in no more than five (5) pages the entire report. This includes all items listed in Section IV.

The School of Engineering is part of the College of Science. The School offers Bachelor’s degree programs in Construction Management, Industrial Engineering and Computer Engineering. We also offer Master’s degree programs in Engineering Management and Construction Management.

The Master of Science in Engineering Management started in the Fall quarter of 2006. The first cohort of students graduated with MS degrees in Winter quarter of 2008. Since then, the program has graduated more than 100 students with an MS degree in Engineering Management.

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>BS</th>
<th>MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010-2011</td>
<td></td>
<td>49</td>
</tr>
<tr>
<td>2011-2012</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>2012-2013</td>
<td></td>
<td>49</td>
</tr>
<tr>
<td>2013-2014</td>
<td></td>
<td>98</td>
</tr>
<tr>
<td>2014-2015</td>
<td></td>
<td>103</td>
</tr>
<tr>
<td>2015-2016</td>
<td></td>
<td>89</td>
</tr>
<tr>
<td>2016-2017</td>
<td></td>
<td>76</td>
</tr>
</tbody>
</table>

This degree is designed for working engineers and professionals who are in leadership/management positions or who are planning to advance their careers into the management of technical enterprises. It is also designed to benefit engineering or science graduates who are interested in assuming leadership positions within the industry. Students gain theoretical and practical training on how to plan, organize, allocate resources, and direct and control activities that have technological components. The curriculum is distinctive in that it provides a blend of qualitative management and quantitative industrial engineering skills. The courses are offered in engineering, business, computer science and statistics.

Students graduating from the Engineering Management program must meet the following program learning outcomes:

- Possess advanced analytical skills in optimization, planning and control, and other quantitative management techniques.
- Effectively manage teams of multi-disciplinary and multi-cultural professionals.
- Have the ability to effectively and persuasively communicate.
- Recognize the need for life-long learning and have the ability to continuously engage in it.

We have devised a comprehensive assessment plan and have implemented it over the past few years. The data indicates that all program outcomes have been achieved. However, we are continuously looking for opportunities to improve the program. To close the loop in assessment, evaluation and program improvement. We are illustrating the process, which is depicted in the figure below.
The advising process for the Engineering Management program is well organized. A designated graduate coordinator advises all EM students. This process has created consistency in advising and assuring that students follow the program road map.

The competing universities in the Bay Area that are offering MS degrees in Engineering Management are San Jose State University and Santa-Clara University. The program at SJSU places its emphasis on quality and business topics. Courses such as operations research and supply chain are considered electives. Management topics are the major portion of Santa Clara University’s EM program. Their program is designed specifically for students who already have an engineering degree.

The number of majors in Engineering Management as of Fall 2017 was 78. The student body in the School of Engineering and the Engineering Management are very diverse and adequately reflect the diversity of the Bay Area population. Most of our graduates end up working for local companies, with a few who choose to pursue a Ph.D. There has been a drop in the number of students in the past couple of years. The majority of this decrease can be attributed to the lower number of international students. In recent years, the government has implemented more stringent visa requirements. These newly sanctioned visa policies have had a negative impact on international students wanting to come to the U.S. As a result, we have shifted our efforts and recruiting strategies to attract more local students.

The faculty of the Engineering Management includes 3 tenure track, full time faculty and 2 part time lecturers. All tenure-track faculty hold Ph.D. degrees in Industrial Engineering. These EM faculty are also responsible for the undergraduate Industrial Engineering program. We have not hired any new faculty for these programs since 2004. The faculty have been relatively successful in receiving funding from internal and external sources. On-going grants such as the MESA Schools program and supplemental grants from the Chevron Corporation and Fulbright Scholar program are examples of external funds. The faculty members have also been successful in securing internal grants for the development of assessment processes and have obtained A2E2 funds for lab development. Most of the EM courses use...
computer labs, which include the Engineering Computer Lab (VBT 223). We have up-to-date software in various areas related to Engineering Management.

As part of the curriculum conversion to semester, we successfully transformed the curricula of the Engineering Management program. The new curricula is well suited for the engineers and scientists who are planning to manage technical organizations. We have also removed all the tiered courses within the Industrial Engineering program for undergraduates in order to be able to require substantial class projects and cover a higher level of technical content. The School of Engineering exclusively offers all of the required courses for the program. Therefore, the new offering of courses is more in-line with the graduation requirements for students. Students continue to have the chance to take courses from the College of Business and Economics as electives.

2. **Self-Study** Each program shall utilize the Academic Performance Review Statistics from Planning and Institutional Research, Analysis and Decision Support (IRADS) (available annually for all programs, including those not undergoing an Academic Review). In the year of a Five-Year Review, the last five years of data, including the review year, will be used to support the program’s Self-Study. In addition, the program will provide the following information in the Self-Study:

2.1. **Summary of Previous Five-Year Review and Plan and subsequent Annual Program Reports.** N/A

2.2. **Assessment and Curriculum:** This section should contain a summary and analysis of the program’s Assessment Plan. Reports that include multiple programs must contain a separate assessment summary for each program. This summary should contain:

a) A list of the program’s learning outcomes (PLOs).
b) A curriculum map demonstrating the alignment of courses to PLOs.
c) A description of what assessment measures have been used to measure each of the PLOs.
d) A summary of the findings from the program learning outcomes assessed since the last program review. In addition, an indication if the desired levels of learning were achieved from each of these assessments.
e) A discussion of any program improvement actions taken based on the findings.

If the program offers General Education courses, a summary of data for program learning outcomes will be included along with a discussion of program or course offerings on the three campuses (Hayward, Concord, and Online), the Oakland Professional Center, and other venues.

a) The Program Learning Outcomes for the MS in Engineering Management are as follows:

Students graduating from the Engineering Management program must:

- Possess advanced analytical skills in optimization, planning and control and other quantitative management techniques.
- Effectively manage teams of multi-disciplinary and multi-cultural professionals.
- Understand the impact of engineering and management decisions in a global, economic, environmental, and societal context.
- Exercise the ability to effectively and persuasively communicate.
- Recognize the need for, and have an ability to engage in, life-long learning.
b) Mapping of courses to outcomes

The following table below depicts the mapping of the program curriculum to program learning outcomes.

<table>
<thead>
<tr>
<th>COURSE NUMBER</th>
<th>Title</th>
<th>Course Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Program Outcomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>ENGR 640</strong></td>
<td>Engineering Sustainable Supply Chains</td>
<td>M</td>
</tr>
<tr>
<td><strong>ENGR 660</strong></td>
<td>Sustainable Product Process Design</td>
<td></td>
</tr>
<tr>
<td><strong>ENGR 620</strong></td>
<td>Systems Simulation</td>
<td></td>
</tr>
<tr>
<td><strong>ENGR 630</strong></td>
<td>Quality and Reliability Management</td>
<td></td>
</tr>
<tr>
<td><strong>ENGR 610</strong></td>
<td>Analytical Methods in EM (OR goes here)</td>
<td></td>
</tr>
<tr>
<td><strong>ENGR 650</strong></td>
<td>Project Mgmt</td>
<td></td>
</tr>
<tr>
<td><strong>ENGR 615</strong></td>
<td>Finance for Engineers</td>
<td></td>
</tr>
<tr>
<td><strong>ENGR 689</strong></td>
<td>Project</td>
<td></td>
</tr>
<tr>
<td><strong>ENGR 688</strong></td>
<td>Applied Research in Engineering Management</td>
<td></td>
</tr>
<tr>
<td><strong>Electives (6 units)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ENGR 670</strong></td>
<td>Design and management of human Work Systems</td>
<td></td>
</tr>
<tr>
<td><strong>ENGR 680</strong></td>
<td>Engineering Systems Modeling</td>
<td></td>
</tr>
<tr>
<td><strong>ENGR 690</strong></td>
<td>Independent Studies</td>
<td></td>
</tr>
</tbody>
</table>
Assessment activities:

Program Learning Outcome(s) Assessed in 2018:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Which SLO(s) to assess</td>
<td>SLO e - Recognize the need for and have an ability to engage in life-long learning.</td>
</tr>
<tr>
<td>2. Assessment indicators</td>
<td>Capstone projects</td>
</tr>
<tr>
<td>3. Sample (courses/# of students)</td>
<td>ENGR 6800</td>
</tr>
<tr>
<td>4. Time (which quarter(s))</td>
<td>Spring 2018</td>
</tr>
<tr>
<td>5. Responsible person(s)</td>
<td>Prof. Farnaz Ganjeizadeh</td>
</tr>
<tr>
<td>6. Strategies on reporting (how, to, who)</td>
<td>Peer evaluations of group team projects are used as a means to assess the quality of projects and reporting. In addition, faculty who is responsible for the course and other faculty attending project presentations are evaluating students’ work. Faculty oversee the completion of rubrics for the evaluation of the project reports and presentations.</td>
</tr>
<tr>
<td>7. Strategies on closing the loop</td>
<td>More stringent requirements on the project originality and possible implementation of research results.</td>
</tr>
</tbody>
</table>

C. Summary of Assessment Results: The majority of projects are based on real data from industry. As part of this research, students perform a comprehensive literature review and identify a research problem. A comprehensive report and presentation of research work is required. Alumni have evaluated the course material and deemed it as valuable in their professional careers. The performance indicators for assessment of this outcome and the rubric used for assessing projects and weighting are as follows:

<table>
<thead>
<tr>
<th>Title</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Idea Originality</td>
<td>10%</td>
</tr>
<tr>
<td>PowerPoint Presentation</td>
<td>5%</td>
</tr>
<tr>
<td>Professional Attire – Visual Appearance</td>
<td>5%</td>
</tr>
</tbody>
</table>
### Methodology | 10%
---|---
### Literature Research | 15%
### Team Coordination | 5%
### Analysis | 15%
### Individual Contribution | 10%
### Peer Evaluation | 10%
### Viva- Q/A | 10%
### Conclusion/Future Endeavors | 5%

According to this rubric, 70% of the grade is based on students' research and analytics. For the 16 students who participated in this evaluation, the average grade was 85% with the lowest grade at 70% and the highest at 95%. The majority of students achieved this outcome.

**Program Learning Outcome(S) Assessed in 2017:**

<table>
<thead>
<tr>
<th>(1)</th>
<th>Year 4: 2016-2017</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <em>Which SLO(s) to assess</em></td>
<td>SLO d - Have the ability to effectively and persuasively communicate</td>
<td></td>
</tr>
<tr>
<td>2. <em>Assessment indicators</em></td>
<td>Team project</td>
<td></td>
</tr>
<tr>
<td>3. <em>Sample (courses/# of students)</em></td>
<td>ENGR 6200</td>
<td></td>
</tr>
<tr>
<td>4. <em>Time (which quarter(s))</em></td>
<td>Winter 2017</td>
<td></td>
</tr>
<tr>
<td>5. <em>Responsible person(s)</em></td>
<td>Prof. Ganjeizadeh</td>
<td></td>
</tr>
<tr>
<td>6. <em>Strategies on reporting (how, to who)</em></td>
<td>Project presentation evaluation scores are reported by faculty to the School chair via a Faculty Self-Assessment form.</td>
<td></td>
</tr>
<tr>
<td>7. <em>Strategies on closing the loop</em></td>
<td>Interaction between chair, faculty and industry advisory board.</td>
<td></td>
</tr>
</tbody>
</table>
Summary: This course involves hands-on lab activities related to the application of theory in solving engineering problems. Alumni have evaluated the course material as valuable to their professional careers. The performance indicators for the assessment of this outcome and the rubric used are as follows:

- Project topic originality: 5%
- Methodology: 8%
- Application: 5%
- Written report: 20%
- Team Presentation: 20%
- Team member evaluation: 5%
- Peer evaluation: 2%
- Clarity of Presentation: 10%
- Presentation material: 10%
- Team transactions: 5%
- Individual presentation ability: 10%

According to this rubric, 70% of the grade is based on the students’ communication skills. For the 25 students participating in this evaluation, the average grade was 87% with the lowest grade at 70% and the highest at 95%. The majority of students achieved the communications skill outcome.

c) **Summary of Assessment Results:** Outcomes e and d, have been assessed since 2017. The results indicate that majority of the students achieved these outcomes.

e) Program improvement process:

The figure below shows a flow diagram on the process for assessment and evaluation of the level of achievement for program outcomes and the continuous program improvement process. The assessment process has become an integral part of the course evaluations. So much so, that it requires minimal extra work for faculty conducting the assessments.

Although students on average achieved program-learning outcomes, they indicated concerns about shared courses with undergraduate students. There were also complaints about the difficulty of taking required courses from the College of Business and Economics. To remedy these concerns and as part of the program transformation for semester implementation, we separated all of the graduate and undergraduate courses. As a result, we developed new courses on finance and management topics underneath Engineering umbrella. This way the School of Engineering controls its course offerings. We also increased the number of elective offerings to facilitate on-time graduation.
2.3. Student Success:

“Programs should discuss how they are addressing student success particularly with reference to retention rates, graduation rates, achievement gaps, course bottlenecks, use of high impact practices, advising, course redesign and other measures.”

The advising process for Engineering Management program is well organized. A specific faculty advisor (graduate coordinator) is in charge of advising students in the program. This process has created consistency in advising and assuring that students follow the program road map. In addition, the graduate coordinator is in charge of career development and advice for Engineering Management students. The graduate coordinator helps students in obtaining internships by informing them of available internship and employment opportunities. By the time of graduation, the majority of Engineering Management students are either already employed or have secured employment opportunities in engineering enterprises.

2.4. External Comparisons:

“This section shall provide a review, showing how the department’s course offerings and requirements compare to those of corresponding programs in the CSU system and to nationally recognized programs in the field.”

The closest Engineering Management programs with a similar nature at the graduate level reside at San Jose State University. As indicated in the previous sections, our program is specifically designed to train graduates who have a breadth of knowledge in both the quantitative and qualitative aspects of engineering management. Class offerings are offered in the late afternoons to evening times in order to accommodate working students.
2.5. General Program Discussion:

“The program should discuss in detail the data provided by IRADS; outline the current position of the program in terms of its resources; and how the program is seeking to address its program goals, program level objectives and university goals in the context of current resources and future trends. The program discussion should include, at a minimum, the following topics:”

a) Student demographics of majors, minors, and options:

The number of majors in Engineering Management as of Fall 2017 was 78.
The student demographics for the School of Engineering is shown in the following table. The Engineering Management program has a larger proportion of international students than the School of Engineering as a whole.

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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>0.0%</td>
<td>1.0%</td>
<td>0.7%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Asian</td>
<td>18.1%</td>
<td>7.0%</td>
<td>6.4%</td>
<td>6.5%</td>
<td>8.3%</td>
</tr>
<tr>
<td>Black/African American</td>
<td>8.4%</td>
<td>10.0%</td>
<td>9.2%</td>
<td>7.1%</td>
<td>6.9%</td>
</tr>
<tr>
<td>Hawaiian/Pacific Islander</td>
<td>2.4%</td>
<td>0.0%</td>
<td>0.7%</td>
<td>0.6%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>30.1%</td>
<td>29.0%</td>
<td>19.1%</td>
<td>26.0%</td>
<td>28.3%</td>
</tr>
<tr>
<td>White</td>
<td>27.7%</td>
<td>27.0%</td>
<td>20.6%</td>
<td>20.8%</td>
<td>23.4%</td>
</tr>
<tr>
<td>Two or More Races</td>
<td>2.4%</td>
<td>4.0%</td>
<td>2.8%</td>
<td>3.2%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Unknown</td>
<td>2.4%</td>
<td>2.0%</td>
<td>5.0%</td>
<td>2.6%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Non-Resident Alien</td>
<td>8.4%</td>
<td>20.0%</td>
<td>35.5%</td>
<td>33.1%</td>
<td>26.2%</td>
</tr>
</tbody>
</table>
b) Faculty and academic resource allocation
There are 3 full-time tenure-track faculty that serve both undergraduate Industrial Engineering and the graduate Engineering Management programs. There has not been any tenure-track recruitment for this program since 2004. Typically, faculty teach one or two graduate and two undergraduate courses per semester. We hire part-time lecturers to cover electives or required topics such as finance.

Course data:

"Included will be summaries of climate and advising or scheduling surveys, as well as information on recruitment activities and materials. A discussion of the impact on the program quality of trends in enrollment, student-faculty ratio, percentage of courses and students taught by regular faculty, number of majors, and other relevant information must be included. If the diversity of the student body varies from the campus at large, discuss the potential reasons for this difference and the impact on program(s)."

The advising process is through a single advisor, the graduate coordinator, who is in charge of student advising and career development. Students need to meet with the graduate advisor before they can register for courses.

All required courses for the program are offered at least once annually. Therefore, the students are able to complete the program in three to four semesters. The student population was steadily growing until two years ago. Since then there has been a drop in the student population. This is mostly due to a decrease in the international student enrollment. This trend appears to be nationwide. We are increasing our recruitment efforts to attract more local students to the program.

The SFR for Engineering Management program is 22, which is comparable with other Engineering Management programs.

c) If the diversity of the tenure track faculty and lecturers varies from the campus at large, discuss the potential reasons for this difference and the impact on program(s).

Two of the three tenure-track faculty are female and one male. We have not recruited any new faculty since 2004.

d) Discuss the ratio of students who start out as first time freshmen in your program to those who started at the University as transfers, and the impact on program(s).

N/A

e) Discuss the distribution of teaching resources in lower and upper division courses and the implications of this distribution on program(s).

N/A
Similarly, discuss the ratio of tenure track faculty to lecturers teaching in lower division courses and in upper division courses and the impact of those ratios on program(s).

In a typical semester an average of two graduate courses are offered by lecturers.

g) Discuss the ratio of students in lower division courses between the program and general education and how that proportion affects the courses and the program(s).
N/A

h) Discuss the ratio of students in upper division courses between the program and General Education and how that proportion affects the courses and the program(s).
N/A

i) Discuss the courses and programs offered at Concord, including the number of each; potential changes to the offerings in the next five years; how the program in Concord aligns with programs at Hayward, Online, or other venues; and the impact of the programs/courses.
N/A

j) Discuss the courses and programs offered online, including the number of each; potential changes to the offerings in the next five years; how the online program dovetails with programs at Hayward, Concord, or other venues; and the impact of the online programs/courses.
N/A

k) For graduate programs, provide application and enrollment data over the review period, and discuss any trends and their effect on program quality.

The number of applicants over the review period is about 200/year. This number has recently decreased due to a decrease in international student application numbers. The number of graduate students entering the program is about 20 per year.

<table>
<thead>
<tr>
<th>Program</th>
<th>Fall 2012</th>
<th>Fall 2013</th>
<th>Fall 2014</th>
<th>Fall 2015</th>
<th>Fall 2016</th>
<th>Fall 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.S. EM</td>
<td>36</td>
<td>49</td>
<td>98</td>
<td>103</td>
<td>89</td>
<td>76</td>
</tr>
</tbody>
</table>

2.6. Faculty: a copy of any applications submitted for new tenure-track positions since the last review will be attached, along with a discussion of progress toward achieving these positions.

We have not recruited any tenure-track faculty since 2004.

2.7. Resources: The program’s reliance on campus support units will be discussed and a response from any units from which the program requires additional or unusual services (for example, Library, Information Technology, Assistive Technology, Instructional Support, Facilities, Center for Community Engagement, etc.) shall be attached.

We have been receiving adequate support from various units on-campus. We are regularly submitting proposals for A2E2 equipment money and other sources of funding for laboratory development. The library has adequate support for the program.
2.8. Requirements: Justification for programs requiring more than the typical minimum number of units (120), (the larger number of units required for the baccalaureate degree) shall be included. N/A

3. Plan. The Academic Program review will describe plans for change and improvement in order to maintain leadership in the respective fields. Therefore, each program shall develop a plan for the next five years. Development of this plan should benefit programs applying for new tenure-track positions by providing information to support and justify these requests.

The Five-Year Plan will address the recommendations and concerns identified in the Self-Study. The plan will take into account what the faculty has learned from the Outcomes Assessment process. A draft of the Plan will be provided to the External Reviewer. After receiving the External Reviewer’s Report, the program review committee shall either amend the draft plan to comply with the recommendations of the External Reviewer or explain why no amendment is necessary.

In creating this plan, the program shall address the following five areas (these questions provide guidelines):

3.1. Curriculum. What curricular changes do you envision during the next five years? What developments are likely to cause you to change the curriculum? Discuss prospects and changes relevant to all campuses and locations relevant to your program—Hayward, Concord, Online, the Oakland Center, etc. What changes are planned for General Education? Discuss any relevant changes to a multicultural learning experience. Discuss any changes to your curriculum associated with SB1440 The STAR Act for Associate Degree transfer, if applicable.

We transformed the curriculum as part of a program conversion to the semester offering. The new curriculum for the MS in Engineering Management reflects the current industry trends. It includes topics such as sustainability, human work systems and engineering finance. We do not anticipate major changes in the next five years. The following is a sample road map for the semester curricula.
Engineering Management Degree Requirements (30 units)

The prerequisites or foundation coursework below (or their equivalents) are required for all students in the MS in Engineering Management program. Please check individual course requirements for additional prerequisites. These prerequisites must be completed before beginning graduate-level coursework. This area may require 0-13 units that are not included in the major units:

- **ACCT 210 - Introduction to Financial Accounting** Units: 3
- **ENGR 320 - Engineering Economics** Units: 3

And, one (1) of the following for 3 units:

- **INDE 330 - Engineering Statistics and Probability** Units: 3
- **STAT 316 - Statistics and Probability for Science and Engineering** Units: 3
- **STAT 330 - Statistical Inference** Units: 3

### I. Core Courses

The following 21 units of core coursework are required:

- **ENGR 610 - Analytical Methods In Engineering Management** Units: 3
II. Elective Courses

Choose two (2) courses for 6 units:

- **ENGR 670 - Design and Management of Human Work Systems** *Units: 3*
- **ENGR 680 - Engineering Systems Modeling** *Units: 3*
- **ENGR 690 - Independent Study** *Units: 3*
- Or another 600-level course with departmental approval for a minimum of 3 units.

III. Capstone Requirement

Choose one (1) of the following options of capstone coursework for 3 units:

- **ENGR 693A - Applied Research in Engineering Management** *Units: 3*
- **OR**
- **ENGR 693B - Master’s Project Capstone** *Units: 3*
- **OR**
- Comprehensive Exam and one (1) additional 600-level elective course for a minimum of 3 units with departmental approval.

3.2 Assessment. *What is the program’s assessment plan for the next five years? What if any changes will you make to your Program Learning Outcomes? What is your schedule for assessing your PLOs? What assessment processes will you be using to assess your PLOs?*

The following table depicts the five-year assessment plan and mapping of program outcomes to institutional learning outcomes.

**CSUEB Engineering Program Mission Statement**

The Engineering Management program is designed to develop qualitative and quantitative management skills of engineers and scientists to enable them to manage complex technological enterprises.
### Students graduating with a M.S. in Engineering Management will be able to:

<table>
<thead>
<tr>
<th>SLO a</th>
<th>ILO 1, 6</th>
<th>Develop advanced analytical skills in optimization, planning and control, and other quantitative management techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLO b</td>
<td>ILO 3, 4</td>
<td>Effectively manage teams of multi-disciplinary and multi-cultural professionals.</td>
</tr>
<tr>
<td>SLO c</td>
<td>ILO 5</td>
<td>Understand the impact of engineering and management decisions in a global, economic, environmental and societal context.</td>
</tr>
<tr>
<td>SLO d</td>
<td>ILO 2</td>
<td>Have the ability to effectively and persuasively communicate.</td>
</tr>
<tr>
<td>SLO e</td>
<td>ILO 6</td>
<td>Recognize the need for and have an ability to engage in, life-long learning.</td>
</tr>
</tbody>
</table>

#### Year 1: 2018-2019

1. **Which SLO(s) to assess**
   - SLO a - Develop advanced analytical skills in optimization, planning and control and other quantitative management techniques

2. **Assessment indicators**
   - Queuing midterm exam question

3. **Sample (courses/# of students)**
   - INDE 520 System Modeling with Simulation

4. **Time (which quarter(s))**
   - Fall 2018

5. **Responsible person(s)**
   - Prof. Zong

6. **Strategies on reporting (how, to who)**
   - The results will be reported by faculty to the department chair via completion of the course Faculty Self-Assessment form.

7. **Strategies on closing the loop**
   - Interaction between chair, faculty and industrial advisory board

#### Year 2: 2019-2020

1. **Which SLO(s) to assess**
   - SLO b - Effectively manage teams of multi-disciplinary and multi-cultural professionals.

2. **Assessment indicators**
   - Final exam performance on related question

3. **Sample (courses/# of students)**
   - ENGR 670 Design and Management of Human Work Systems

4. **Time (which quarter(s))**
   - Spring 2020

5. **Responsible person(s)**
   - Prof. Bowen

6. **Strategies on reporting (how, to who)**
   - The results will be reported by faculty to the department chair via completion of the course Faculty Self-Assessment form.

7. **Strategies on closing the loop**
   - Interaction between chair, faculty and industrial advisory board

#### Year 3: 2020-2021

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1. **Which SLO(s) to assess**  
   SLO c - Understand the impact of engineering and management decisions in a global, economic, environmental, and societal context

2. **Assessment indicators**  
   Midterm performance on related question

3. **Sample (courses/# of students)**  
   ENGR 660 Sustainable Product and Process Design

4. **Time (which quarter(s))**  
   Spring 2021

5. **Responsible person(s)**  
   Prof. Bowen

6. **Strategies on reporting (how, to who)**  
   The results will be reported by faculty to the department chair via completion of the course Faculty Self-Assessment form.

7. **Strategies on closing the loop**  
   Interaction between chair, faculty and industrial advisory board

### Year 4: 2021-2022

8. **Which SLO(s) to assess**  
   SLO d - Have the ability to effectively and persuasively communicate

9. **Assessment indicators**  
   Team project

10. **Sample (courses/# of students)**  
    ENGR 650 Project Management

11. **Time (which quarter(s))**  
    Fall 2021

12. **Responsible person(s)**  
    Prof. Ganjeizadeh

13. **Strategies on reporting (how, to who)**  
    Oral presentation scores results will be reported by faculty to the department chair via completion of the course Faculty Self-Assessment form.

14. **Strategies on closing the loop**  
    Interaction between chair, faculty and industrial advisory board

### Year 5: 2022-2023

1. **Which SLO(s) to assess**  
   SLO e - Recognize the need for, and have an ability to engage in, life-long learning

2. **Assessment indicators**  
   Capstone project

3. **Sample (courses/# of students)**  
   ENGR 688 Applied Research in Engineering Management

4. **Time (which quarter(s))**  
   Spring 2023

5. **Responsible person(s)**  
   Prof. Motavalli

6. **Strategies on reporting (how, to who)**  
   The results will be reported by faculty to the department chair.

7. **Strategies on closing the loop**  
   Interaction between chair, faculty and industrial advisory board

### 3.3. Students’ Success. Do you see the number of students majoring in your program increasing or decreasing during the next five years? Refer back to the statistics provided in your Self-Study. Do you
anticipate new programs or outreach to new student populations? Will the career opportunities open to your graduates change during the next five years? How will your program adjust its curriculum and program practices to prepare students for those opportunities? Do you expect your total enrollment to increase or decrease during the next five years? What are your plans for improving advising and retention for students in the program? Are changes needed in the program’s learning goals? How will you assist students in attaining those goals during the next five years? What are your specific plans in the areas of curriculum change, outreach, scheduling and retention to increase student success? If your program has inadequate resources to serve your students, what does the program require? Are the lines of communication open between students and faculty? Are there other important climate issues that should be addressed? Please support assertions with reference to relevant program data. Assertions regarding career opportunities, job demand, changes in the field of study, etc. must be supported by appropriate sources and data.

We anticipate that the number of graduate students in the program will level off right above the current numbers. Besides the drop in international students, the strong job market typically dampens demand for graduate studies. We expect our enrollment numbers to moderately increase in the next five years. We have already revised our program such that students have opportunities to use the latest software tools needed for management of technology enterprises. We have also made all program changes deemed necessary through transformation to the semester curriculum. We assist our students to attain their goals by providing many opportunities to intern during their schooling. In order to ensure success in this area, we have scheduled our courses in the evenings, typically two to three nights a week, so students can intern during the day in school year as well as during Summers. We are currently receiving enough support and resources to successfully carry forward. Through singular separate advisors at undergraduate and graduate levels, we are ensuring that the students are receiving ample attention to ensure their retention and success in the program.

3.4. Faculty. What changes do you foresee for the program faculty? What does the University need to do to maintain or improve the current faculty? Do you anticipate that you will be requesting new regular faculty members? If so, what will be the basis for these requests? Are the lines of communication open between leadership and faculty? Are there other important climate issues that should be addressed? What special challenges involve workload and RTP issues? Is advising shared fully by the faculty?

As indicated before, we have not hired any new faculty for this program since 2004. It is essential for the current state of the program to hire new full-time Faculty. We will be requesting a tenure-track position for this program next year.

3.5. Resources. Will your current level of resources (staff, equipment, library resources, travel funds, etc.) be adequate to permit the maintenance or improvement of program quality during the next five years? Identify needs based up on program priorities. Elements of the preceding five areas (3.1 – 3.5) addressed in the Plan should include the following, where relevant: The expected action/change to be taken, e.g., revision of curriculum, addition of faculty, purchase of equipment, etc.

ii. A specific time line for completing the task.
iii. Person(s) responsible for carrying out the needed change.
iv. Anticipated cost.
We have been successful through A2E2 proposals and requests for laboratory development resources from the University. The ITS is in the process of upgrading the Engineering Computer Laboratory. We do not anticipate large equipment purchases in the next few years.
Appendix A Five-year strategic plan for the M.S. in Engineering Management

The Following paragraphs illustrates the five-year plan for the program:

1. **Curriculum**: The curriculum transformation that was achieved as part of conversion to semester resulted in fundamental improvements to the EM curricula. We analyzed the EM curricula from institutions around the nation to identify the core areas of the Engineering Management body of knowledge. The greatest elements of these curricula were selected as core. In addition to this analysis, we received great input received from our annual Industry Advisory Board meetings with regard to new trends in industry. The revised curriculum touches on contemporary issues in engineering such as sustainability, global and social issues. The continuous improvement process that is in place is well established. On-going and necessary changes will be made during the next five years as a result of the assessment and evaluation process.

2. **Assessment**

The following Table indicates the 5-year assessment plan for Engineering the Management program. We consider this the minimum requirement as we assess all program outcomes within a three-year cycle.

<table>
<thead>
<tr>
<th>Year 1: 2018-2019</th>
<th></th>
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<td>13. Strategies on reporting (how, to who)</td>
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### 4. Faculty

The Industrial Engineering BS and Engineering Management MS programs are supported by three full time tenure-track faculty and two part-time lecturers. We have not added new faculty to these programs since 2004. We plan to request a tenure-track position in the coming academic year. This is essential to the current state of the program.

### 5. Resources

Most of the laboratory requirements for the Engineering Management program are software and computer laboratories. We have up-to-date software and computer systems that are adequate for the program. We will be requesting equipment money by applying A2E2 grants.

**Request for Resources** (suggested length of 1 page)
Upkeep of the laboratory software and hardware, access to large computer lab/classes for some of the courses.

Request for Tenure-Track Hires:

We will request a tenure-track position in the upcoming academic year.

Continued support for upkeep and advancement of the computer laboratories.
Appendix B:

California State University East Bay

Master of Science in Engineering Management (MSEM) Program Reviewer Report

Prepared by: S. Hossein Cheraghi (Professor and Dean, COE, Western New England University)

Date of Visit: March 25, 2018

Disclosure:

This report summarizes my findings and observations during the campus visit, and has been prepared for the use of the Engineering Management (EMGT) faculty members and program administrators at CSUEB. All comments/suggestions are offered in good faith, and in an effort to improve the overall quality of the program.

Summary

This visit took place on March 25, 2019. During the visit I met with the Dean, the School’s Chair, two faculty members, and visited a classroom to speak to the students. I also visited some the labs in the engineering building. In my review of the program factors such as viability and sustainability of the program, availability of resources including faculty, budget and labs, appropriateness of the curriculum, frequency of course offerings, etc. were considered. In summary, I found the program to be on solid grounds offering a set of courses and skills designed for the community in Northern California. No shortcomings were found during this visit. In the following sections, I summarize the strengths of the program as well as my recommendations for improving the overall quality of the program.

Highlights:

- The program is housed in the School of Engineering. The School of Engineering is part of the College of Science. The main campus of CSUEB is located in East Bay, with two satellite campuses in Concord and Oakland.
- The MSEM program started in Fall quarter of 2006. The first cohort of students graduated with MS degree in Winter quarter of 2008. Since then, the program has graduated more than 100 students.
- Located in the large technology hub in Northern California, it provides the University with an advantage over its competition in terms of access to projects, practitioners, and professionals.
- The EMGT program has switched from quarter system to semester system since fall 2018, which seems to be attractive to the students. However, faculty load has temporarily increased due to extra preparation.
- Classroom and labs seem to be adequate and in good order.
- Courses are offered on a regular basis with enough frequency to allow students to graduate on-time.
- The curriculum is designed in response to the needs of the local industry.
- Enrollment in the program has seen a decrease in the past couple of years due to visa and immigration restrictions. It is expected that the enrollment numbers will stabilize at its current level for the next few years.
- Program enrollment is heavily reliant on international students.
- Students are happy with the program, but complain about difficulty to access the computer labs and software.
- Faculty are very happy with the leadership of the school, which is a strength of the program.
- The program seems to have adequate budget.
- The program has an assessment plan in place and measures students learning outcomes on a regular basis.
- Program support seem to be adequate. As the program grows, the need for additional faculty will be apparent. In the meantime, the program can complement its resource needs by hiring working professional as adjuncts.

**Strengths of the EM Program:**

- EM classes are scheduled mostly in the evening to allow working individuals to attend the classes.
- The School’s Chair is highly regarded by his faculty and staff.
- Both School Chair and College Dean are very supportive of the EM program.
- Full time faculty teach most of the graduate level courses, which increase the quality of the program.

**Recommendations:**

1. Allocate a computer lab with needed software to graduate students and allow them access based on their needs. This is especially important for courses such as simulation.
2. As mentioned above, majority of the students in the program are international students. In order to attract quality domestic students, the following recommendations are made:
   - Offer courses in a hybrid mode (online/on campus) to remove any physical or time barrier for working individuals to participate in the program.
   - Repackage courses to form certificate programs that focus on skill sets required for professional development by working individuals.
   - Offer accelerated 5-year BS/MSEM program. Extend that opportunity to students from all engineering and perhaps Science fields. This will encourage quality undergraduate students from CSUEB to continue their education at the MS level with reduced credit loading requirement.
3. The program currently requires a number of UG courses as pre-requisites for the MSEM program. Students taking these do not get credit towards their graduate studies. It is recommended to combine these courses into one course and offer that at the graduate level. This may make the program more attractive to applicants.
Appendix C: Program Response to Reviewer Comments

Dr. Cheraghi conducted the program review on March 25th, 2019. He met with E.M. faculty, Chair and students. We also gave him a tour of our facilities.

The following is a response to valuable suggestions of the reviewer.

1. **Comment:** “Allocate a computer lab with needed software to graduate students to allow them access based on their needs. This is especially important for courses such as simulation.”

   Response: We are planning to open the engineering computer laboratory on Saturdays. It requires us to assign a student assistant to leave the lab open.

2. **Comment:** “As mentioned above, majority of the students in the program are international students. In order to attract quality domestic students, the following recommendations are made:

   - Offer courses in a hybrid mode (online/on campus) to remove any physical or time barrier for working individuals to participate in the program.
   - Repackage courses to form certificate programs that focus on skill sets required for professional development by working individuals.
   - Offer accelerated 5-year BS/MSEM program. Extend that opportunity to students from all engineering and perhaps Science fields. This will encourage quality undergraduate students from CSUEB to continue their education at the MS level with reduced credit loading requirement.”

   Response: We agree with the reviewer that offering hybrid courses could attract more domestic student. We will discuss this matter with the faculty and Industry Advisory Board in the upcoming meeting next May. We used to have packaged certificate programs under quarter system. However, they did not attract many students. Therefore, we did not continue them in the semester curriculum. Students that graduate from an industrial engineering degree program are able to finish the MS program in one year.

3. **Comment:** “The program currently requires a number of UG courses as pre-requisites for the MSEM program. Student taking these do not get credit towards their graduate studies. It is recommended to combine these courses into one course and offer that at the graduate level. This may make the program more attractive to applicants.”

   Response: We agree with this suggestion and we will discuss this matter in our upcoming Industry Advisory Board meeting in May.
Appendix D

Engineering Management Five Year Review Visit Schedule
Dr. Hossein Cheraghi
March 25th, 2018

Breakfast On our own
10:00-11:00 a.m. meet with Dean Jason Singley
11:15-12:00 a.m. Meet with Dr. Zong
12:00-2:00 p.m. Lunch with faculty
2:00-2:45 p.m. Meet with Dr. Ganjeizadeh
3:00 -3:45 Tour of facilities
4:00-4:45 p.m. Visit Classroom ENGR 620, SSc 138
4:15- 5:00 p.m. Meet with Department Chair
5:15 -6:00 p.m. Meet with CAPR Liason (Dr. Nidhi Khosla)
6:30 p.m. Dinner with faculty