



Memorandum of Understanding

This MOU has been read and approved by:

Department Chair: *Lisa Star* Date: 2/20/2024
Lisa Star

Dean, College of Engineering: *Jinny Rhee* Date: 2/21/2024
Jinny Rhee

Vice Provost Academic Programs: *Jody Cormack* Date: 2/21/2024
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Institutional and Program Assessment Council (IPAC)

Program Review Report and MOU

Department of Civil Engineering and Construction Engineering Management

Degree programs:

Master of Science in Civil Engineering

2/19/2024

California State University, Long Beach Program Review and MOU

NARRATIVE AND ANALYSIS

Overview of the review process

The Master of Science (MS) in Civil Engineering degree program is offered by the Department of Civil Engineering and Construction Engineering Management in the College of Engineering. The MS program offers four concentrations: 1) Structural Engineering, 2) Geotechnical/Transportation Engineering, 3) Environmental/Water Resources Engineering, and 4) Construction Management. The Department requires the completion of 30 semester units for the MS degree.

Note 1: The Department elevated the option on Construction Management to its own degree as of Fall 2023. For this review, it will be considered as an option, and not an individual degree.

Note 2: The BS program for this Department is reviewed separately by the Accreditation agency American Council for Construction Education (ACCE).

The Civil Engineering MS program was last reviewed in 2013. Following the last MOU, progress has been made toward all actional items. The table below was included in the Self-Study (Section 3) to outline the progress been made:

Goals	Actions to be undertaken	Progress towards the goals
Create a program that is focused and deliverable.	Comprehensive curricular revision to reduce or consolidate the number of emphases and courses offered. (#1)	The number of emphases is reduced from six to four by merging geotechnical and transportation emphases into one and by merging water resources and environmental emphases into one. Furthermore, the number of graduate courses within is reduced from 50 to 38 to improve the coherence of different emphasis.
Establish sequences of courses to be offered routinely.	Develop 2-year and 4-year roadmaps for the newly consolidated emphases. (#2)	Two-year course offerings are defined for each emphasis (see Error! Reference source not found.). Math courses are offered every year. Core courses are offered either every or every other year. Elective courses are offered every other year. This schedule of courses allows students to graduate in 1.5 to 2 years. The roadmap towards graduation is individualized for each student based on the capacity at which they can enroll in classes.
Help students make timely progress to degree.	Monitor retention and graduation rates and develop strategies for helping students. (#3)	The advising of graduate students has greatly changed since 2013 in the following ways: <ol style="list-style-type: none"> 1) In addition to a graduate program coordinator (GPC), one academic advisor was assigned to each emphasis. 2) Orientation sessions for new graduate students are held before each semester by a GPC. At this time, graduation requirements and the major milestones towards graduation are clearly outlined. 3) Prior to enrolling in classes, students are required to attend mandatory advising with their academic

		<p>advisor to create their academic plan, which needs to be approved by GPC.</p> <p>4) GPC monitors retention and graduation rates and provides help to those students who need it. As a result, the 4-year graduation rate has been in the range from 70 to 88% in this cycle of review (See Figure 11). Notice that the gap between the 2-year graduation rate and the 4-year rate has been substantially narrowed.</p>
Shorten time to degree and reduce costs to the program and the student.	Consider reduction of the number of units to graduation, update the website and catalog information. (#4)	<p>The following changes have been made:</p> <ol style="list-style-type: none"> 1) The number of units to graduation is reduced from 37 to 30. 2) The website is updated to present graduation requirements for each emphasis and is compatible with the catalog (https://www.csulb.edu/college-of-engineering/cecem-graduate-programs).
The COE will support the department's need to replace faculty members who retire.	Hire new faculty, as needed. (#5)	<p>Since 2013, each retired faculty was replaced with a new faculty member and in some cases, additional faculty lines were opened. As a result, the number of T/TT faculty has increased from 14 (Fall 2013) to 18 (Fall 2020) (See <i>Section 4: Faculty</i>)</p>

The Self-Study of the CE MS program was submitted in Fall 2022. The external review team included Dr. Lelli Van Den Einde, Professor of Structural Engineering from the University of California, San Diego, and Dr. Udem J. Ndon, Professor of Civil Engineering, Former Chair of Civil Engineering from the San Jose State University. They interviewed the program via Zoom on 10/6/2022, and the External Review was submitted on 10/22/2022. Members of the University Program Review Committee (UPRC) team attended some of the meetings with the external reviewers, faculty, and students.

As part of this review the following resources were consulted:

1. Civil Engineering MS program Self-Study, Fall 2022
2. External Reviewer's Report, 10/22/2022
3. UPRC report written by Sharon Teng (DPT) and Jun Yan (HRM), March 2023
4. MOU for the Civil Engineering MS program, 2013
5. Department website: <https://www.csulb.edu/college-of-engineering/civil-engineering-construction-engineering-management>
6. CSULB Catalog website (http://catalog.csulb.edu/preview_entity.php?catoid=6&ent_oid=840)
7. Institutional Research and Analytics website (<https://www.csulb.edu/institutional-research-analytics/program-assessment-review-council>)

The final report relies heavily upon the UPRC report summary.

COMMENDATIONS

The following commendations were noted:

SECTION I: PROGRAM MISSION, VISION, GOALS & EDUCATIONAL PROGRAMS*Program's mission aligns with State of California employment and civic needs and addresses changes in the discipline*

The mission is appropriate and aligned with the University and CA workforce needs.

The Department is commended for the changes and progress it has made since the last review to better meet the State of California employment and civic needs. For example, the Department recently restructured the MS Civil Engineering degree program with four areas of emphasis: Structural Engineering, Geotechnical/Transportation Engineering, Environmental/Water-Resource Engineering, and Construction Management. Another example is that the Department has introduced new courses to meet the growing interest, especially in the State of California, in improving green design and construction and responding to water sustainability.

Section V: Improving Student Engagement*Program supports the academic success of diverse learners.*

The Program has a mixture of students with diverse different needs and interests. The international students are often full time while traditional local students often work full time and come back to get their degree while working full time and thus can only take courses in the evenings. The Department is commended for the MS program's flexibility in serving both working and part-time students. For example, as cited in the external review report, "Students love the flexibility of being able to work full time and take classes in the evenings."

CONCERNS

The following concerns and / or gaps were noted:

SECTION III: IMPROVING STUDENT LEARNING*Assessment conducted and reported over cycle**Assessment Findings / Closing the Loop*

It is unclear whether the CE MS program implemented program assessment. The external reviewers underscored that "there is no indication of the existence of program assessment process for the MS degree program." (External Review). The Self Study does state that assessment "will" be performed bi-annually (Note: this requirement changed to annual for the university in 2018), and an Annual Assessment Report for Graduate Program was included in Self-Study, Appendix 2. It evaluated one Program Learning Outcome (PLO), the ability of students to analyze, design, or manage a complex system or process in a specialized technical field, during the academic year 2018-2019. However, no other annual assessment reports were included. The program is recommended to develop a comprehensive multi-year assessment plan as an immediate priority and engage in annual assessment using direct and indirect methods to measure student learning as well as "closing-the-loop" activities for continual improvement.

Curricular Revisions for EO 1071

As of the time of the review, the Department had not yet submitted a plan to demonstrate how EO 1071 standards for a common core will be met within the MS degree. This curricular plan should be prioritized and submitted to Academic Affairs.

OPPORTUNITIES

The following future opportunities for the program were noted:

SECTION I: PROGRAM MISSION, VISION, GOALS & EDUCATIONAL PROGRAMS

Faculty resources / sufficiency in relation to program offerings

Opportunities exist for the Department to improve the alignment between the MSCE program's faculty demographic mix and that of its students. The Department should continue to explore a strategic plan to increase the racial/ethnic and gender diversity of candidates recruited for T/TT and lecturer positions faculty, according to available resources.

Faculty Headcount

The Department also anticipates increased need for faculty in the environmental/water resources area, due to increased student interest and community need to address issues related to climate change and water security. As reported in the self-study, "jobs for Environmental Engineers are expected to increase by 7.8 percent, or 700 jobs between 2018 and 2028."

Section II: Student Success

Graduate Students Applications, Admissions and Enrollments, Headcount of Graduate Majors

The Department might consider modifying its entrance requirements for graduate student admissions (without jeopardizing the integrity and quality of the program) to encourage more students to apply and increase enrollments. Based on department self-study and external review report, the enrollment rate in 2019, 2020 and 2021 was around 40% and even lower in some concentrations, leading to some last minutes cancellation of courses.

The external report included some specific recommendations that the program should explore and consider: requiring MS students to choose electives from a concentration that is different from their concentration, explore implementing a 4+1 blended program, and consider admitting student that are Mathematics and Sciences BS degree holders (but not necessarily BS in Civil Engineering majors) into the graduate program (and, consider offering summer courses for students needing deficiency courses as possible according to available resources). The Department should also more actively market the fact that the program is well suited for part-time students who work or have families since classes are mostly taught in the evenings. In addition, some of the low enrollment courses could be open to non-civil engineering students (e.g. Geology, Environmental Science, etc.) This may help to increase enrollments in some of the lower enrolled courses.

Section IV: Improving Graduate Education

Nature of Graduate Experience

While graduate students are appreciative of Graduate Advisors and their mentoring, the external report indicated areas of advising that could be standardized and clarified. Students mentioned that a flowchart of class requirements and timeline would be helpful, including assistance in selecting electives and understanding priorities of pre-requisite courses.

SECTION V: IMPROVING STUDENT ENGAGEMENT

Service-learning opportunities in place for students

While students in the Civil Engineering MS program participate in a number of high impact practices, such as internships, collaborative learning, etc., service-learning opportunities were not provided or mentioned in either the Self Study or External Review.

RECOMMENDATIONS

To the Department of Civil Engineering and Construction Engineering Management in collaboration with the College of Engineering and Academic Affairs it is recommended to:

1. Develop a comprehensive assessment plan in order to complete annual assessments using direct and indirect methods and report on closing the loop activities to illustrate that continuous learning outcome data are used to inform decision making. Provide an annual update (due June 1) on progress made towards MOU actions to the COE dean, the Vice Provost for Academic Programs, and the Coordinator of Program Review and Assessment. Your review cycle will therefore be from 2023-2030. A comprehensive self-study will be due June 2030 for a 2030-2031 Academic Year review process;
2. Submit a plan to Academic Affairs that demonstrates how EO 1071 standards for a common core will be met within the MS degree (*note – this was completed after the review period*);
3. Continue to develop and implement a strategic hiring plan to improve the alignment between the MSCE program's faculty demographic mix and that of its students, with consideration for possible faculty in the environmental/water resources area, according to available resources;
4. Explore opportunities to mitigate enrollment barriers to and increase the enrollment rate of low enrollment concentrations;
5. Explore areas of advising that could be standardized and clarified, including a flowchart of class requirements and timeline, and assistance in selecting electives and understanding priorities of pre-requisite courses;
6. Take advantage of the flexibility of the program for working and part time students and market the program more broadly to increase enrollment, especially for some of the lower enrollment tracks;
7. Explore opportunities for service-learning experiences for its' MSCE students.

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