2023-24 Program Review

Program Name: Engineering
Program Contact: Jose Gutierrez
Academic Year: 23-24
Status: Submitted for review
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1. Description of Program (200-400 words)

The engineering program provides the lower division engineering classes necessary for transfer to baccalaureate programs in various engineering fields. Though occupational demand in specific fields fluctuates over time, engineers and the problem-solving skills developed through an engineering education are considered critical to the region's economic development. The engineering program prepares students for high-demand careers and by offering classes in both on campus and hybrid modes. Engineering students typically take Math (251, 252, 253, 270, 275), Chemistry (210, often 220), and Physics (250, 260, 270). Depending on transfer school and major, students also take up to 6 engineering classes and up to 4 CIS classes along with general education requirements. Due to the continued diversification of lower division transfer requirements and the increased popularity of majors such as bio/biomedical engineering and environmental engineering, some students who transfer in engineering may not take any engineering courses. However, the presence of an engineering program may be part of what initially draws these students to CSM. Although the program offers an A.S. degree in engineering, the B.S. degree is considered necessary for work in the field and most students do not take classes beyond the many required for transfer. The engineering program at CSM remains committed to providing students with a high-quality education that prepares them for transfer to four-year universities and for careers in engineering. The program is also committed to serving all students, regardless of their race, ethnicity, gender, sexual orientation, socioeconomic status, or disability.

2. Results of Previous Program Review (200-500 words)

a) Describe the results of your previous Program Review's action plan and identified equity gaps.

Key goals from previous Program Review:

"We would like to work with programs like Umoja to increase African American enrollment in the engineering program. We will partner with Mana in order to recruit Pacific Islander students to enroll engineering. Additionally we will continue to work with METas and MESA to ensure the continued success for Hispanic student population.

Additionally the engineering department is looking for potential opportunities to collaborate with the year 1 promise program to boost minority and women enrollment in the engineering program."

Since the last Program Review many of the outlined things have been accomplished, while we acknowledge that there is still room for improvement with regards to improving equity gaps. Enrollment of underrepresented minorities still is a challenge and needs ongoing work to address.

b) Explain any curriculum or programmatic changes since last program review

Since the last program review, Engineering has not added or dropped any course offerings. Course SLO's have been review by the new full-time faculty member and align with Statewide and Industry standards.

c) Discipline-level and SLO (Student Learning Outcomes) assessment/Student Services and SAO (Service Area Outcomes) assessment: Describe learning or area assessment plans implemented since last Program Review, including any activities undertaken to address equity or delivery mode gaps. Your summary should explain:

Since our last Program Review, we have implemented a robust assessment plan focused on Student Learning Outcomes (SLOs) in our engineering courses. Our efforts have been rooted in equity, aiming to provide every student with enriching experiences to enhance their understanding of technical materials. All assignments, Labs, Readings, Projects, Exams, Quiz's and course content were evaluated to ensure they were aligned to course SLO's and with a lens of equity to ensure that they empowered all students to succeed.

In our previous Program Review, faculty evaluated student work, received feedback from students via anonymous student surveys, and found positive outcomes. Students demonstrated their understanding of key SLOs through various assessments and project-based learning activities. Overall the Engineering Programs curriculum is doing a fantastic job at addressing student learning and evaluating key SLOs.

1. Current Program Review (200-400 words)

Please use the statistics below, which are college-wide, as a reference. Please refer to the Program Review website for individual program data.

College Stats 2022-23	Ethnicity	First Gen	Age	Gender	Total
Headcount (unduplicated)	Latinx 32% White 26% Asian 20% Filipino 7% Multiracial 7% Black 3% Pacific Islander 2% Unknown 3% Native American 0%	45% of our students are the first in their family to go to college.	66% 24 yrs. and under 18% Ages 25-34 17% over 35 yrs.	49% Female 48% Male 3% Non-disclosed or non-binary	13,180 students
Enrollments (duplicated)	Latinx 35% White 26% Asian 16% Filipino 6% Multiracial 8% Black 3% Pacific Islander 3% Unknown 3% Native American 0%	47% of enrollments were by students who are the first in their family to go to college.	76% 24 yrs. and under 13% Ages 25-34 11% over 35 yrs.	48% Female 50% Male 2% Non-disclosed or non-binary	37,014 enrollments

a) **Student population equity:** Discuss any gaps in student success, persistence, satisfaction, utilization or enrollment across student populations (statistics provided for ethnicity, first-generation, age, gender and total enrollment), or student population served.

Overall the PRIE data shows encouraging results, Student success in Engineering is very high 85.1% which is fantastic for a challenging STEM major where students have to complete a rigorous academic schedule for transfer.

Looking into the data by demographics it is very encouraging to see that many minority groups are seeing success in engineering. For example, the Hispanic student population percent success is 89.3%, African American student is at 80%, Filipino 87.5%, Multi Races at 85.2%, and low income students at 79.6% . This is likely due to the work from METas, and increased support for students through tutors, S.I.s as well as having continuity in engineering faculty who are delivering course content with an equity first mindset.

b) **Modes of Delivery equity:** Discuss any gaps in student success, persistence, satisfaction, utilization or enrollment, and student population served across different delivery modes. Please comment on in person services/instruction vs hybrid services options/instruction vs completely online services/instruction.

With Regards to modes of delivery, % success is similar in the F2F (81.6) and Synchronous Online (86.7).

(c) **Challenges and Opportunities:**
While the PRIE data is encouraging there is still room for improvement. Overall enrollment for women (59) and unrecorded gender (14) is falling be behind men (327), this is typical for engineering departments in higher education but something that we can hopefully improve at CSM. Additionally enrollment of African American students, Native American, and Pacific Islander students remains low and need improvement.

4. Planning

a) **Discipline-level and SLO (Student Learning Outcomes) assessment/Student Services and SAO (Service Area Outcomes) assessment for 2023-2025:** Describe learning or area assessment plans for this Program Review cycle, **including any activities planned to address equity or delivery mode gaps**. Your summary should explain:

Our assessment will primarily focus on evaluating the effectiveness of our engineering program in fostering inclusivity and equity in student outcomes. The assessment will be course specific and focused on project based learning. SLO assessment will involve a comprehensive review of student performance data related to each SLO within our engineering courses. This will include the analysis of assessment scores, project outcomes, and student feedback.

PRIE Support: We will seek support from the Program Review, Institutional Effectiveness (PRIE) team to assist with data analysis, survey design, and the overall assessment process. One area of interest to investigate is the effect that ENGR 100 has on student success in transfer. Getting data from PRIE comparing student success between students who have taken ENGR 100

to students who have not would help the department understand how to better prepare students for success in the challenging STEM courses they will need to complete to transfer.

In conclusion, our SLO assessment will be a focused effort to evaluate the equity and inclusivity of our engineering program. By collecting and analyzing relevant data, we aim to make informed decisions that will enhance the learning experiences of all our students and align our program with our districts commitment to diversity and equity.

b) **Program goals**

Based on your current review of your program's equity gaps, learning assessments and challenges and opportunities, identify specific goals and plans. Please note that whereas SLOs/SAOs involve assessing and measuring a specific skill or knowledge students will be able to do/understand upon successful completion of a course, program, service, and/or degree/certificate, program goals reflect overall aspects of your program or service you hope to improve.

Please note that closing equity gaps is a College-wide priority. If there are significant equity gaps in student success, persistence, satisfaction, utilization or enrollment, and student population served in your program, these should be addressed in at least one of your goals (see 3a and 3b).

For each goal, you should include:

- A brief description of the issue being addressed (equity gap, etc.)
- What actions you plan to take
- What measurable outcomes you hope to achieve
- A timeline
- Who is responsible
- What support do you anticipate needing in order to achieve your goals and plans, including:
    - Professional development activities
    - Institutional support
    - Collaborations
    - Training
    - Resources

Goal	Actions	Measurable Outcomes	Timeline	Responsible Party	Support Needed
1. Increase enrollment of Women and Undisclosed genders in the	Getting improved visibility of the Engineering Program for students looking to choose a	Measured Increase enrollment of Women and Undisclosed genders in the Engineering program	2 yr	Engineering Department, Promise Program, Counseling, MESA	Having Counseling, and Promise Program suggest Engineering as a major for non male identifying students

Engineering program	major, including help from counseling and the promise program				
2. Improve student Success for Low Income Students (79.6% vs 88.5% for not low income)	Collaborating with resources for low income students to help with their success. Looking for ZTC options for courses	Data in Prie reflecting this outcome	2 yr	Engineering Department, Spark Point, MESA	Continued support from Spark Point, MESA and other programs at CSM