Fullerton College

Self-study for Engineering Program
2025

Section 1: Introduction

1. Briefly describe your program, make sure to include how your program helps the College achieve its mission.

The engineering department is small. Our purpose is to offer a few carefully chosen courses that will be useful to a variety of Engineering majors for transfer to four-year universities. There are many students who want to be Engineers, enough to support this department, but not enough students who want to be any single type of Engineer to support specialty courses that only apply to one major. We start students off with ENGR 110 Introduction to Engineering, in order to help them learn about the variety of Engineering opportunities out there and then progress to courses that are required for multiple specific Engineering majors at local universities. For example, ENGR 203/203L Electric Circuits, is required for Mechanical Engineering and Aerospace Engineering majors and not just Electrical Engineering majors.

In order to offer classes that are helpful to most students of any type of Engineering, we keep the number of different courses offered small and slowly grow as we see demand and opportunities to do so. We offered our newest course ENGR 220 Matlab a few times during this past program review cycle, and have experimented with offered some of our courses during different session and in

different formats.

Currently the biggest challenge to student success in the Engineering course are the effects of AB705 and AB1705, as well as post-pandemic effects. We notice a large increase in the students entering our courses with weak Math and Physics skills. We believe these effects are a result of less rigorous preparation in foundational understanding of mathamatical concepts at the pre-calculus levels due to AB 1705. In addition, the prevelance of online classes post pandemic, as well as a change in attitude towards the effort needed to thoroughly learn concepts, has led to weaker skills in incoming students. We also believe that some students fail out of the STEM pipeline altogether due to the lack of course options at pre-calculus and below if they arrive at college under prepared. This results in lower enrollments at the higher levels of STEM majors including Engineering.

It remains difficult to get meaningful data to measure outcomes related to equity due to small sample sizes, so our analysis is limited. Continuing to increase our offerings should help with our goal of being more equitable with students of various backgrounds.

The main goal of the Engineering program is to prepare engineering students to be successful in transferring and pursuing a bachelor's degree after transfer to a four-year institution. In order to achieve this goal, students have to become successful learners that have the ability to solve complex problems. The Engineering program is dedicated to developing general problem-solving skills, which is reflected in the Student Learning Outcomes of the Engineering courses as well as the Program SLOs. Each course teaches the students to combine knowledge and skills from supporting fields such as Mathematics and Physics with Engineering concepts to solve Engineering problems.

The Engineering program represents a commitment to providing access to education in a traditional and innovative field for a diverse population of students from the surrounding community. It provides a pathway for non-traditional students that may not have been accepted directly into Engineering programs at the University level, as well as a lower cost option for well-prepared students.

Section 2: Students

2.1 Student Demographics and Enrollment Trends

1. Using the data provided by the OIE, describe the student population your department serves. Which demographic groups have the most enrollments in your program? Which student groups are underrepresented in your program? Has the demographic profile of your program changed

over the last four years?

With a total of around 150 students per year the sample sizes for each demographic group are too small for statistical anaylsis to be meaningful.

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2. Briefly describe course-level enrollment trends in your program over the past five years. Have the enrollment trends in your program changed over the last five years? To what do you attribute any changes or lack of changes?

Over the past five years the program enrollment has remained pretty steady. The small drop in enrollment in the 200 level courses is due to fewer students meeting the high MATH and PHYS pre-requisites.

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3. How do you monitor and modify course offerings, including time and modality, to ensure that students' needs are being met?

The program is very small with only 7 courses in ENGR total. Most of these courses are offered only once or twice per year. With so few sections we try to vary the time of day in alternating years whereever possible. In general, most course have high enrollment, and we are increasing the number of sections offered as budgets allow. Currently ENGR 201 seems to have the highest demand not being met judging by its fill-rate and we hope to offer an additional section in the future, including during summer session.

The majority of major preparation courses for Engineering majors are in MATH and PHYS, where multiple sections of the relevant courses are offered at various times. For the highest level course that only offer a single section per semester or per year, we endevour to coordinate schedules between departments to avoid time conflicts for students who need to take courses in multiple departments.

2.2 Student Achievement

1. Using data provided by the OIE, describe overall student achievement counts, rates, and trends in your program over the past five years, these include: course success rates, degrees/certificates completion counts, transfer counts, licensing, job placement, wage improvements (not all of these measures apply to every program).

Success rates are steady, except for the Covid years when more online sections were offered, which have lower success rates. Completetion of the AS degree has increased from around 15 to just over 20 in the last few years. ENGR majors generally take few GE classes before

transfer since they need to focus on major preparation courses. We are hoping that with the reduction in GE requirements more ENGR majors will complete the AS before transfering.

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2. Are there student groups whose success rates are below the institution-set standard or whose success rates are below other student groups? What factors can explain this?

Sample sizes for each demographic group are too small for statistical anaylsis to be meaningful.

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3. In terms of your degree and certificate completers, are there any groups who are underrepresented in your completion data compared to the overall enrollment in your program?

Sample sizes for each demographic group are too small for statistical anaylsis to be meaningful.

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4. Are your students completing your degree and certificate program requirements in the expected time frame? Are there certain groups whose rates are below other student groups? Discuss any efforts to improve time to completion.

Most Engineering students transfer withour obtaining an AS degree, because they need to focus on major preparation courses such as MATH, PHYS and CHEM, and do not take enough GE to qualify for an AS degree. Engineering students typically take some of their GE in their Junior and Senior year. Sample sizes for each demographic group are too small for statistical anaylsis to be meaningful.

2.3 Student Learning Outcomes

1. Describe your program's processes and practices for defining, assessing, and analyzing student learning outcomes at the course (CSLO) and program (PSLO) level. Include a discussion of how your program uses the results of CSLO/PSLO data to inform course and program improvement efforts.

Most ENGR courses are taught by a single instructor. We have found assessing CSLOs provides no useful information, since that instructor knows where students struggle without the need for additional paperwork. Due to the continued increase in administrative tasks on faculty and especially department coordinators (with no release time) we have decide to not assess SLOs.

2. (OPTIONAL/NOT REQUIRED) Using the data provided by OIE, describe the most salient results of CSLO or PSLO mastery rates. Did you find significant differences by race, ethnicity, gender, and other categories?

N/A

Section 3: Other Areas of Program Effectiveness

1. Document any substantial changes to your program curriculum since the last review and discuss what prompted these changes. Looking forward, what changes to the curriculum do you plan based on the emerging needs of your discipline, industry, student population, etc.

No substantial changes made and none are planed. Engineering transfer requirements have not changed.

2. Please briefly describe opportunities your students have to apply and deepen knowledge and skills through projects, apprenticeship, internships, co-ops, clinical placements, group projects outside of class, service learning, study abroad, and other experiential learning activities that you intentionally embed in coursework or elsewhere in your program.

N/A

3. Describe any laws, regulations, trends, policies, procedures, or other influences that have an impact on your program. These can include things like Vision 2030, CALGETC, Common Course Numbering, etc.

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Section 4: Faculty and Staff

4.1 Population and Demographics

1. Using the data provided by OIE, describe your program's staff (full-time/part-time faculty, nonfaculty, classified). How reflective of your program's student population is your staff?

The total load in ENGR supports a around 1.3 FTEF. Two FTF serve partially in ENGR who also both teach full-time in MATH. Serving in two divisions brings additional workload due to dual demand for administrative tasks. Three to four additional adjunct faculty cover specialty courses or summer offerings.

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2. Describe your program's staffing changes since fall 2021. How have these changes impacted your program's ability to achieve its strategic action plans?

none

4.2 Staff Support and Professional Development

1. Describe the regular discussions your program faculty are having about equitable grading, attendance, late work, extra credit policies, and other strategies to support equitable student success.

Most instructors have grading policies that allow for exceptions to due dates, and back-up assignments such as dropped HW and quizzes. However, in order to prepare students for the demand of the workplace in Engineering, some regular deadlines are needed. Time management skills are an essential component of the Engineering curriculum and are developed in our courses with the policies we have set.

The Engineering Liaison Council is the state wide intersegmental organization dealing with Engineering transfer issues. The department coordinator or another designated faculty member regularly attend the Engineering Liaison Council meetings which has recently added a session on equity, and they bring strategies designed to close the equity gap specifically in Engineering back to the campus.

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2. How have these conversations shaped practices or polices in your program? What action has arisen from these discussions? If no action has been taken, why not?

The department coordinator or another designated faculty member regularly attend the Engineering Liaison Council meetings (see below). Information about strategies to close the equity gap specifically in Engineering are discussed with other faculty.

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3. What additional areas of professional development could help your faculty and staff engage in this work?

The Engineering Liaison Council is the state wide intersegmental organization dealing with Engineering transfer issues. The department coordinator or another designated faculty member regularly attend the Engineering Liaison Council meetings which has recently added a session on equity, and they bring strategies designed to close the equity gap specifically in Engineering back to the campus.

Section 5: Program Planning

5.1 Progress on Previous Strategic Action Plans

1. Please discuss the goals (Strategic Action Plans, SAPs) from your last self-study. Assess and explain your progress on each of the SAP.

SAP#1: Not Funded.

SAP#2: Not Funded.

SAP#3: Not Funded.

Lack of designated classroom space with storage for equipment and adaptable computer tables still limits the avilable time options for scheduling most ENGR classes.

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2. If additional funds were NOT allocated to you in the last review cycle, how did the LACK of funds have an impact on your program?

SAP#1: Not Funded.

SAP#2: Not Funded.

SAP#3: Not Funded.

Lack of designated classroom space with storage for equipment and adaptable computer tables still limits the avilable time options for scheduling most ENGR classes.

Resource Requests

Software for ENGR 203/203L

Enhancement:
ENGR 203/203L needs particular software for student use during the lab components of the class. The software for ENGR 203L: National Instrument's Multisim was last updated in 2014 and is no longer compatible with updated operating systems. Requesting funding for one perpetual classroom licence of 30 seats.

Personnel-Related:
na

Resource Category:
Computer Software

Quantity:
1

Unit Cost:
$7,000.00

TotalCost:
$7,000.00

Software for ENGR 220

Enhancement:
• ENGR 220 needs particular software for student use during the lab components of the class. The software for ENGR 220: Matlab was last updated in 2020. Requesting funding for one perpetual remote classroom licence of 30 seats.

Personnel-Related:
na

Resource Category:
Computer Software

Quantity:
1

Unit Cost:
$7,000.00

TotalCost:
$7,000.00

Multi-use classroom with smart desks for ENGR 110, ENGR 203/203L and ENGR

220 and other Tech division courses

Enhancement:

• The conversion of a regular classroom to a multi-use classroom with smart desks (raise and lower monitor) cost in total about $100,000 per room. This conversion includes furniture (smart desks, chairs), robust computers, network wiring and electrical conduit work. Some rooms in the 700 building have already been converted, but the need for those rooms has outpaced the speed of conversions. Computer lab space for ENGR 110, ENGR 203/203L and ENGR 220 needs to be available at the times needed to fit the overall scheduling grid for the ENGR students. This classroom conversion should be funded as a division allocation with the Engineering department as one sharing partner, as well as other departments such as DRAF, ARCH, HORT, MACH and CSTR. The division dean is responsible for coordination.

Personnel-Related:

na

Resource Category:

Equipment

Quantity:

1

Unit Cost:

$100,000.00

TotalCost:

$100,000.00