College	Science
Department	Engineering
Program	B.S. Industrial Engineering
Reporting for Academic Year	2022-2023
Last 5-Year Review	09/2022
Next 5-Year Review	2027-2028
Department Chair	Farnaz Ganjeizadeh
Date Submitted	10/1/2023

ANNUAL PROGRAM REPORT

SELF-STUDY   *(suggested length of 1-3 pages)*

A. Five-Year Review Planning Goals

1. The semester –based Industrial Engineering curriculum is designed such that students have many opportunities to achieve program-learning outcomes. We just completed and external review by the Accreditation Board of Engineering and Technology (sept 2022). We have submitted an interim report and awaiting the response

2. Faculty: We have not hired any faculty in this program since 2004.

3. Research: The Industrial Engineering faculty are active in research and are publishing in refereed journals. They have strong industry connections and as such, our students have the opportunity to complete several real-life projects before graduation

4. Laboratory Development: We have been successful in receiving A2E2 funds for lab development every year. Our labs are up-to-date.

5. Equipment: Through A2E2 annual funding and the normal refresh cycle of computers by IT, we are keeping the Industrial Engineering Laboratories current. The refresh of the Engineering computer laboratory was completed last year.

6. Enrollment: Student enrollment in Industrial Engineering program has been declining in recent years. We believe that some of this decline is due to pandemic. However, we are expecting upward trend due to offering more engineering disciplines which would attract a larger freshmen and transfer students to engineering who might transfer to IE.

7. Excess credits: The program requires 121 credit hours to complete. The transformed curriculum just meets the minimum accreditation requirements in areas of basic science and engineering hours. No engineering electives could be added to the program.

B. Progress Towards Five-Year Review Planning Goals

1. We transformed the senior design course in accordance to program reviewers feedback.

2. Due to current pandemic the new manufacturing equipment have not been fully utilized.
3. Assessment and continuous improvement of the program is an ongoing process.

C. Program Changes and Needs

Overview: The industrial engineering program started in the year 2000 and had been steadily growing until 2018. During the past couple of years, we have observed a decline in enrollment. We contribute this decline in large part to the decreasing number of international students and pandemic. We expect the enrollment to start an upward trend.

The program has 2.5 full-time equivalent faculty and two lecturers. There is a need for new faculty to keep the program current.

Curriculum: The transformed curriculum is designed to include more active learning practices and includes courses and material that are in line with the industry trends in industrial engineering.
Students: Demand for industrial engineering graduates are relatively strong. Most of our graduates are employed in engineering positions, mainly in the Bay Area. We have a strong advisory board that its members routinely hire our graduates to permanent positions and our students as interns.
Faculty: Since 2004 we have had 3 faculty dedicated to the industrial engineering and M.S. in engineering management programs. These include Helen Zong (currently in FERP program), David Bowen, Saeid Motavalli and Farnaz Ganjeizadeh (current Chair of the School of Engineering). The program needs new faculty to stay current.

Staff: The College of Science has recently reorganized the staff support for all departments. Enginnering and computer science are served by three full time staff work are working in CS/ENGR hub. We also have an SSP staff, Mrs. Lisa Holmstrom and a laboratory technician, Mr. Linh Nguyen. The School is fully supported by the staff.

Resources: We have upgraded our Manufacturing processes equipment and the engineering computer laboratory, VBT 223.

Assessment: An extensive assessment process is in place for the industrial engineering program. Sample results are provided in the following section.

II. SUMMARY OF ASSESSMENT

A. Program Learning Outcomes (PLO)

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. (ILO 1)
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. (ILO 1 & 5)
3. An ability to communicate effectively with a range of audiences. (ILO 2)
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. (ILO 3, 4 & 5)
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. (ILO 3 & 4)

6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. (ILO 1 & 2)
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies. (ILO 1, 2, & 4)

B. **Program Learning Outcome(S) Assessed**

We have assessed the following SLO for the Industrial Engineering program during the 2019-20 Academic Year:

Year 4: 2022-2023	
1. *Which PLO(s) to assess*	5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. (ILO 3 & 4).
2. *Is it aligned with an ILO*	Yes, ILO 3 and 4
3. *Sample (courses/# of students)*	c-INDE 460
4. *SLO from the course*	The outcome is assessed through a semester-long group project on a system life cycle analysis. Students worked in teams on real-life problems. They had collaborative sessions, two preliminary reports and a comprehensive team project. They presented the projects and wrote a Collaborative report as well as an individual summary of their learning and thoughts.
5. *Assessment indicators*	c-Two Exams, HW, lab reports and team project presentations and reports.
6. *Assessment instrument*	Department rubric
7. *Time (which semester(s))*	c-Spring 2023
8. *Responsible person(s)*	c-Prof Ganjeizadeh
9. *Ways of reporting (how, to who)*	The results (qualitative and quantitative) will be reported by faculty to the department chair via completion of the course Faculty Self-Assessment form.
10. *Ways of closing the loop*	Interaction between chair, faculty and industrial advisory board

C. SUMMARY OF ASSESSMENT PROCESS:

Main Findings:
Outcome 5

"An ability to acquire and apply new knowledge as needed, using appropriate learning strategies." This

outcome was measured using the following courses INDE 460 .

Note: An outcome is considered achieved if 70% of students perform above 70.

INDE 460 - Service and Manufacturing Systems Modeling

Each team selected a real-life project and conducted research on the application of three different quantitative methodologies for systems analysis. This required acquiring additional insight for each method and detailing pros and cons. Then, they analyzed the data and used a multi- criteria decision-making model to make decisions. The project required a team presentation and a written report.

87.75 % of the students performed above the threshold.

The distribution of the project grades are:

77.05%	B-
85.56%	B+
86.49%	B+
65.72%	C
94.88%	A
86.14%	B+
89.91%	A-
87.21%	B+
89.95%	A-
97.09%	A
94.12%	A
95.00%	A
89.30%	A-
100.93%	A
87.57%	B+

Recommendation for Program Improvement:

I am planning to develop several projects with data already provided for the Spring 2024 offering of the course. The quality of most of the projects were acceptable to good.

Next Steps for Closing the Loop:

This outcome will again be assessed in the Spring semester of 2024. The results will be discussed with IE faculty and will be presented in our next Advisory Board meeting. The continuous improvement process will continue on an annual basis.

Assessment Plan for Next Year

According to our proposed assessment plan for the semester curriculum the following PLOs will be assessed:

| Year 5: 2023-2024	
1. *Which PLO(s) to assess*	3. An ability to communicate effectively with a range of audiences. **(ILO 2)**
2. *Is it aligned to ILO*	Yes, ILO 2

3. Sample (courses/# of students)	c-INDE 492 Senior Design	
4. SLO from the course	Analyze novel situations and identify engineering skills and standards that are most applicable -Critically review and improve technical written reports -Communicate technical results confidently and persuasively in multiple modalities - Assess ethical implications associated with engineering practice	
5. Assessment indicators	c-Capstone project	
6. Assessment instrument	Capstone design rubric	
7. Time (which semester(s))	c-Spring 2024	
8. Responsible person(s)	c-Prof. Bowen	
9. Ways of reporting (how, to who)	The results (qualitative and quantitative) will be reported by faculty to the department chair via completion of the course Faculty Self-Assessment form.	
10. Ways of closing the loop	Interaction between chair, faculty and industrial advisory board	

III. DISCUSSION OF PROGRAM DATA & RESOURCE REQUESTS

The industrial engineering program started in the Fall of 2000 and has been steadily growing until two years ago when we started to experience a decline in enrollment. Some of this decline can be attributed to the reduction in international student enrollment. Since 2004 we have not hired any faculty for this program. We just completed an accreditation visit (Sept 19-21). We will know the results by July 2022

Discussion of Trends & Reflections

The following table is enrollment data extracted from Pioneer Data Warehouse.   This data indicates that the Industrial Engineering enrollment has decline to around 71 for Fall of 2020. The current enrollment is 73 undergraduate students. The current faculty of Industrial Engineering are; David Bowen, Saeid Motavalli and Helen Zong (FERP program).
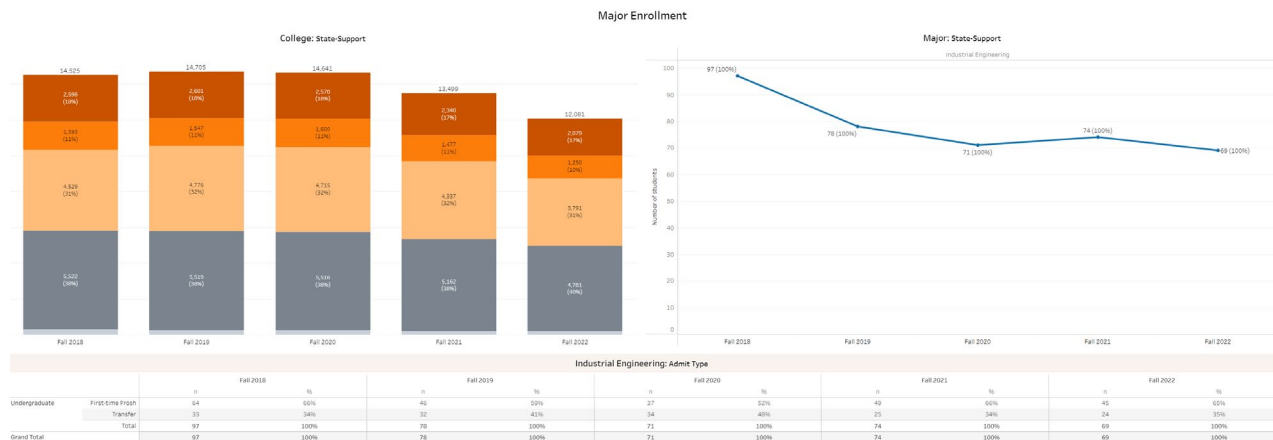

Notable Trends:

1. Some downturn in enrollment for the last three years

2. Strong industry demand for the graduates

3. Active Advisory Board Council

4. Maintaining accreditation

5. Diverse student body

Reflections on Trends and Program Statistics:
Nationally the industrial engineering programs draw students from other majors in the colleges of engineering. Such that student enter other more recognized engineering programs such as mechanical, electrical or civil engineering and then transfer to industrial engineering. Therefore, typically freshmen enrollment in IE is low. We expect that with the addition of Civil Engineering program, the enrollment in industrial engineering would also be positively affected.
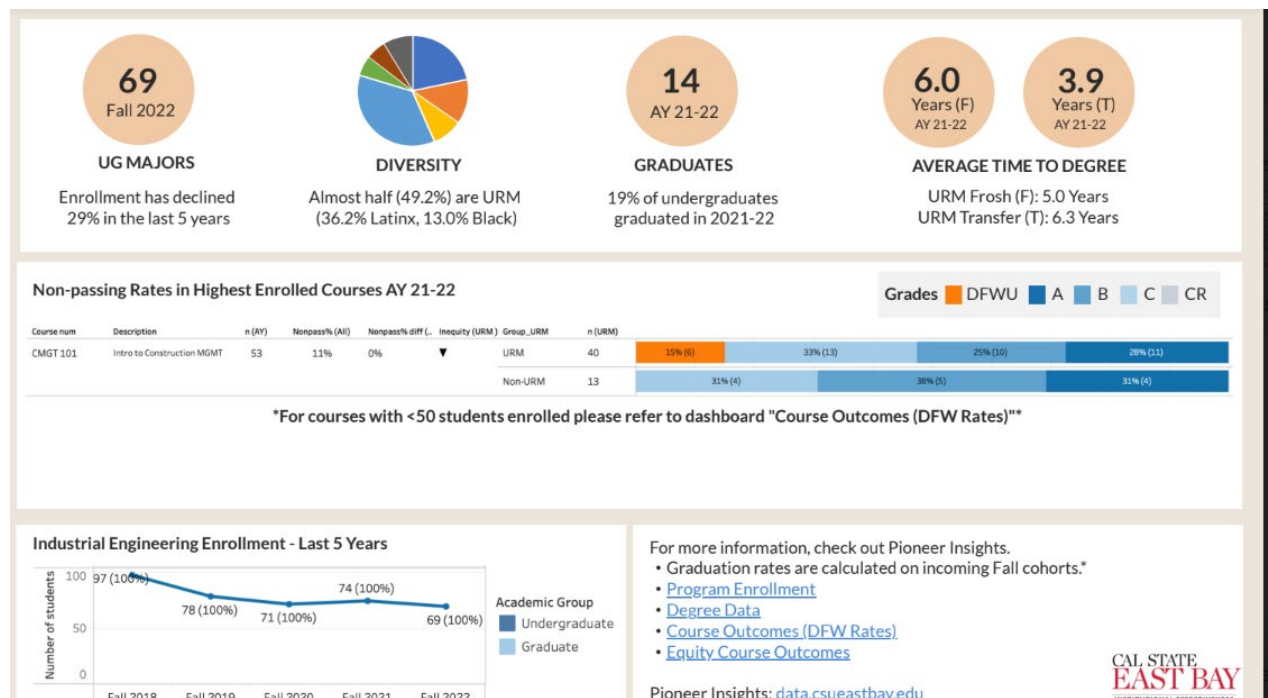
Request for Resources*:* We have upgraded the manufacturing laboratory and the Engineering Computer Lab.

Request for Tenure-Track Hires: We have to add a tenure-track faculty within the next academic year to keep the program current and to comply with accreditation requirement.

Request for Other Resources:

N/A