CAL POLY POMONA
ASSESSMENT & PROGRAM REVIEW

Annual Assessment Report 2021-2022

BS Aerospace Engineering

Aerospace Engineering

College of Engineering

CONTACT

Name of Program Assessment Lead Subodh Bhandari

Name of Person Completing Report Steven Dobbs

DISCIPLINARY ACCREDITATION Yes

DEVELOPMENT AND DOCUMENTATION OF STUDENT LEARNING OUTCOMES

How were the program's SLOs developed? (select all that apply)

- Our disciplinary accrediting agency has required learning outcomes, so we use them.

Other than the CPP Catalog and the Office of Assessment and Program Review website, where else are your SLOs published? Select all that apply.

- Department Website - provide URL: https://www.cpp.edu/engineering/aro/about/objective.shtml

ASSESSMENT ACTIVITIES IN 2021-2022

This section provides the opportunity for programs to share and discuss assessment activities conducted in **AY 2021-2022.** This includes data collection, rubric development, data analysis, discussion of findings, development or implementation of closing the loop improvement strategies, update of your assessment plan and/or curriculum matrix, etc.

How many total SLOs does your program assess according to your assessment plan?

- 7

How many SLOs did your program assess this past year in 2021-2022?

- My program assessed SLOs in AY 2021-2022

Please list the SLOs examined

- SLO #1: 1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- SLO #2: 2. An ability to apply engineering design to produce solutions that meet specified needs with consideration for public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- SLO #3: 3. An ability to communicate effectively with a range of audiences.
- SLO #4: 4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impacts of engineering solutions in global, economic, environmental, and societal contexts.
- SLO #5: 5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plans tasks, and meet objectives.
- SLO #6: 6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- SLO #7: 7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Student Learning Outcome (SLO): 1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

Assessment Activities	Evidence Used	Evaluation and Interpretation of Evidence
• Collected direct evidence (e.g., student work, exam items, etc.) • Scored direct evidence of student learning • Interpreted and made meaning of findings for direct evidence	• Capstone product (e.g., project, senior thesis, etc) • Oral performance (e.g., presentation, defense, conference presentation, etc)	• Used rubric or scoring guide • Scored exams/tests/quizzes

Findings			
N of Artifacts	**Criterion Used**	**Goal Met**	**Eye-opening Result**
52 (Senior design = 30, Project Symposium = 22)	Rubric Score 0-5; 3 = acceptable	Yes	Meets expectations

Student Learning Outcome (SLO): 2. An ability to apply engineering design to produce solutions that meet specified needs with consideration for public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

Assessment Activities	Evidence Used	Evaluation and Interpretation of Evidence
• Collected direct evidence (e.g., student work, exam items, etc.) • Scored direct evidence of student learning • Interpreted and made meaning of findings for direct evidence	• Capstone product (e.g., project, senior thesis, etc)	• Used rubric or scoring guide • Scored exams/tests/quizzes

Findings			
N of Artifacts	**Criterion Used**	**Goal Met**	**Eye-opening Result**
52	Rubric Score 0-5; 3 = acceptable	Yes	Some students were able to design and build their test article with minimum supervision from faculty

Student Learning Outcome (SLO): 3. An ability to communicate effectively with a range of audiences.

Assessment Activities	Evidence Used	Evaluation and Interpretation of Evidence
• Collected direct evidence (e.g., student work, exam items, etc.) • Scored direct evidence of student learning • Interpreted and made meaning of findings for direct evidence	• Capstone product (e.g., project, senior thesis, etc) • Oral performance (e.g., presentation, defense, conference presentation, etc)	• Used rubric or scoring guide • Scored exams/tests/quizzes

Findings			
N of Artifacts	**Criterion Used**	**Goal Met**	**Eye-opening Result**
170 = Oral: 52 (sr Design + Sr. Projects) + 15 x 2 (ARO 4200) + 20 x 2 (ARO 2011L) + 48 (Written sp exec summaries)	Average score for oral and written presentations	Yes	Written communications literature search skills needs improvement

Student Learning Outcome (SLO): 4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impacts of engineering solutions in global, economic, environmental, and societal contexts.

Assessment Activities	Evidence Used	Evaluation and Interpretation of Evidence
• Collected direct evidence (e.g., student work, exam items, etc.) • Scored direct evidence of student learning • Interpreted and made meaning of findings for direct evidence	• Assignment/exam/paper completed as part of regular coursework • Capstone product (e.g., project, senior thesis, etc)	• Used rubric or scoring guide • Scored exams/tests/quizzes

Findings			
N of Artifacts	**Criterion Used**	**Goal Met**	**Eye-opening Result**
151 = ARO 2011L Ethics Module Quiz and homework 4 class sections assignment	Average score	Yes	Most students got an 'A' on the ethics homework and quiz

Student Learning Outcome (SLO): 5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plans tasks, and meet objectives.

Assessment Activities	Evidence Used	Evaluation and Interpretation of Evidence
• Collected direct evidence (e.g., student work, exam items, etc.) • Scored direct evidence of student learning • Interpreted and made meaning of findings for direct evidence	• Capstone product (e.g., project, senior thesis, etc) • Oral performance (e.g., presentation, defense, conference presentation, etc)	• Used rubric or scoring guide

Findings			
N of Artifacts	**Criterion Used**	**Goal Met**	**Eye-opening Result**
52 team presentations	Average score from a rubric given to industry evaluators	Yes	Scores were similar to previous years

Student Learning Outcome (SLO): 6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Assessment Activities	Evidence Used	Evaluation and Interpretation of Evidence
• Collected direct evidence (e.g., student work, exam items, etc.) • Scored direct evidence of student learning • Interpreted and made meaning of findings for direct evidence	• Assignment/exam/paper completed as part of regular coursework • Capstone product (e.g., project, senior thesis, etc)	• Used rubric or scoring guide • Scored exams/tests/quizzes

Findings			
N of Artifacts	**Criterion Used**	**Goal Met**	**Eye-opening Result**
70 = Senior projects 22 team experiments + 48 Senior Project exec summaries for engineering judgement	Average score 3 out of 5 was acceptable	yes for experiments, However, 1 aspect of Engineering judgement needs slight improvement	Complexity of senior project experiments exceeded expectations. The "Perspective of the student/Others/Intro" was at the development level instead of the desired "Proficient" level, and needs an improvement plan for literature search skills.

Student Learning Outcome (SLO): 7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Assessment Activities	Evidence Used	Evaluation and Interpretation of Evidence
• Collected direct evidence (e.g., student work, exam items, etc.) • Scored direct evidence of student learning • Interpreted and made meaning of findings for direct evidence	• Assignment/exam/paper completed as part of regular coursework	• Used rubric or scoring guide

Findings			
N of Artifacts	**Criterion Used**	**Goal Met**	**Eye-opening Result**
48	Executive summary: Scoring 1= novice, 2= Developing. 3 = Proficient, 4 = Mastery	Partially	Scored 2 out of 5 for literature search skills, need improvement plan

IMPROVING THROUGH ASSESSMENT

Overall, what best describes how the program used the results in 2021-2022? Select all that apply.

- Course-level changes (e.g., syllabus, content, pedagogy)
- Personnel changes (e.g., faculty, laboratory staff, academic advisors etc.)
- Resource allocation changes (e.g., funding for professional development, workshops, etc.)

Ideas to improve student learning can come from different constituents. With whom did the program discuss assessment planning and/or share results during AY 2021-2022? Select all that apply.

- Program/department faculty as whole
- Program/department assessment committee
- College curriculum committee
- College assessment committee
- Advisory board(s): Industry Advisory Council

The past academic year posed both challenges and opportunities. Please share any assessment discoveries (e.g., insights about assessment procedures, great achievements, etc.) regarding program assessment in 2021-2022 so that others may learn from your experiences.

Great Achievements: 1. Opening of $2.4M Liquid Rocket Lab expands student "hands-on Learning and research opportunities. 2. Expansion of $2.5M UAV lab expands student "hands-on Learning and research opportunities.

CPP's GI2025 goals What assessment-related efforts do you already implement, or would implement to support the campus' diversity, equity, and inclusion (DEI) efforts? (e.g., planned or current disaggregation of assessment data by race/ethnicity, etc.) Undergraduate programs may wish to refer to CPP's GI2025 goals. (Not Mandatory)

The Aerospace Faculty is already very diverse in cultural background, gender, and years of professional experience. These are role models for the students for diversity. No significant diversity issues have occurred in the ARO department to our knowledge.

Does the program offer a certificate or credential (e.g., teaching credential)?

- No

The most current assessment plan and curriculum matrix we have on file for your program may be found here. To ensure we have the most updated assessment plan and curriculum matrix for your program, and for posting on our website, please upload the following documents:

Assessment Plan

Yes

Curriculum Matrix

Yes