

Institutional Effectiveness Report 2019-20

Program: Electrical Engineering BS

College and Department: College of Engineering Electrical & Computer Engineering

Contact: Allen MacKenzie

Mission: "Provide quality undergraduate and graduate education and perform research in the areas of electrical and computer engineering to enhance the competitiveness of our graduates and contribute to economic, scientific, and social development."

Note that the electrical engineering and computer engineering programs are based in the same department (electrical and computer engineering), share a common faculty, and have identical program goals and student outcomes. As such, the programs also share an assessment methodology; however, assessment data is disaggregated between the two programs where possible.

Program Goals:

Within a few years following graduation, our graduates will have:

- progressed in their careers as indicated by promotions, positions of leadership, awards, recognitions, entrepreneurial activities, products/processes developed, patents, and/or publications;
- advanced their knowledge and expertise as indicated by continuing education, advanced degrees, and/or professional registration;
- contributed to the profession and society as indicated by research, national and international collaboration, professional service, community service, and/or public service.

Student Learning Outcomes:

Students will demonstrate:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with

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
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

A departmentally developed curriculum map can be found in Appendix 1 that shows the connections between courses and student learning outcomes.

Relationship of Student Outcomes to Program Educational Objectives

Student Outcome	Program Educational Objective		
	i	ii	iii

2.

Results:

Student Outcome 1: Identify, Formulate, and Solve Complex Engineering Problems

Student outcome 1 is “an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.”

Historical Attainment of Student Outcome 1

	15-16	16-17	17-18	18-19	19-20
Capstone Assessment (New Rubric)	-	-	-	-	4.50
Final Exam Assessment	3.41	3.78	4.05	-	3.98
Senior Exit Survey	4.32	4.37	4.37	4.31	4.46
Faculty Course Assessment	4.36	4.25	4.17	4.29	4.02
Student Course Assessment	4.04	4.08	4.12	4.14	4.18

In Spring 2020, the format of the Capstone Assessment final presentations changed due to the ongoing pandemic. Instead of a longer oral presentation, a “virtual poster session” was held, in which the advisory board was given the opportunity to view a poster from each team (over a few days) and then each team made a short presentation (in a videoconference setting) describing their project and answering questions from the advisory board and from other students and faculty. Even with the change in venue, the Capstone Assessment had a highly satisfactory level of attainment (HS, >3.75). The Final Exam Assessment resumed for 2020 and continued to meet a highly satisfactory level of attainment (HS, >3.75). Although all indicators suggest strong attainment of this student outcome, we continue to monitor to ensure that the outcome is attained as directly measured by the FEA and Capstone Assessment.

Student Outcome 2: Apply Engineering Design

Student outcome 2 is “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.”

Historical Attainment of Student Outcome 2

14-15	15-16	16-17	17-18	18-19	19-20
-------	-------	-------	-------	-------	-------

Student Outcome 3: Communicate Effectively

Student outcome 3 is “an ability to communicate effectively with a range of audiences.”

Historical Attainment of Student Outcome 3

	15-16	16-17	17-18	18-19	19-20
Capstone Assessment (New Rubric)	-	-	-	-	4.35
Senior Exit Survey	4.00	4.03	4.08	4.13	4.13
Faculty Course Assessment	4.40	4.27	4.04	4.26	4.07
Student Course Assessment	4.20	4.28	4.22	4.05	4.19

All metrics met the highly satisfactory level of attainment (HS, >3.75) for ~~2019~~. Students demonstrated strong communication ability on the new Capstone Assessment even with the shift to an online environment. In general, student continue to perform very well on this student outcome.

Student Outcome 4: Recognize Ethical and Professional Responsibilities and Make Informed Judgments

Student outcome 4 is “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.”

Historical Attainment of Student Outcome 4

	15-16	16-17	17-18	18-19	19-20
Capstone Assessment (New)	-	-	-	-	3.70
Senior Exit Survey	4.28	4.26	4.26	4.19	4.21
Faculty Course Assessment	4.86	4.38	4.58	4.75	4.33
Student Course Assessment	4.44	4.50	4.42	4.43	4.40

The new Capstone Assessment measures as 3.70, which is above the target for satisfactory (S, > 3.0) but just below the threshold for highly satisfactory (HS, >3.75). All other metrics for this student outcome are highly satisfactory (HS, >3.75) for ~~2019~~. Given the satisfactory level of attainment and new nature of the Capstone Assessment rubric, thi

Students continue to excel in metrics related to functioning effectively as a team. All assessments are highly satisfactory (HS, >3.75) for **2020**.

Student Outcome 6: Develop and Conduct Appropriate Experimentation, Analyze and Interpret Data, and Use Engineering Judgment

Student outcome 6 is “an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.”

Historical Attainment of Student Outcome 6

	15-16	16-17	17-18	18-19	19-20
Laboratory Assessment	-	-	-	-	4.24
Senior Exit Survey	4.25	4.16	4.14	4.38	4.35
Faculty Course Assessment	4.50	4.31	3.92	4.10	3.90
Student Course Assessment	4.14	4.14	3.96	4.20	4.16

Starting this year, the new Laboratory Assessment separately assessed the ability of students to “develop and conduct appropriate experimentation” and to “analyze and interpret data.” The BSEE sub score for developing and conducting appropriate experimentation was 4.58; the BSEE sub score for analyzing and interpreting data was 3.89. All metrics were above the highly satisfactory level of attainment (HS >3.75).

Student Outcome 7: Acquire and Apply New Knowledge

answering questions from the advisory board and from other students and faculty. This format will continue until final presentations can be held in person.

Appendices

1. Curriculum Map

