

Program Plans: Outcomes and Assessment Methods



Program (CEAT) - ECE - Computer Engineering (BSCP) - 467

Program Mission Statement: The mission of the School of Electrical and Computer Engineering is to provide a high-quality, comprehensive electrical and computer engineering education for both undergraduate and graduate degree seeking students. The primary forms of educational delivery are classroom instruction, laboratory experiences utilizing both hardware and software technologies, and research experiences. To this end, the School offers the following degrees: Bachelor of Science in Electrical Engineering (BSEE), Bachelor of Science in Computer Engineering (BScPE), Master of Science in Electrical Engineering (MSEE), Master of Engineering in Electrical Engineering (MEngEE), and Doctorate in Electrical Engineering (PhDEE). The School is chartered to perform both basic and applied research in the broad areas of electrical and computer engineering. The School acquires external support to establish research enterprises for student-centric discovery that culminates in the publication of findings in international, peer-reviewed journals and conference proceedings of the highest reputation. Ancillary to the teaching and research mission of the School, the faculty of the School engage in extramural activities of service, extension, and outreach by serving the School, College, or University on internal committees, organizing conferences, developing short courses, reviewing papers, participating on professional committees, and the like.

Program Information

2019 - 2020

Program Information

Assessment Coordinator's Name: Keith A. Teague, Professor

Assessment Coordinator's E-mail Address: keith.teague@okstate.edu

Number of Students Enrolled in the Program: 152

Total Number of Students Graduated: 22

Number of Student Graduates from Stillwater Campus: 22

Were university assessment funds used by the department/program for assessment activities?: No

If yes, describe how funds were used and the contribution the funds had on the assessment process: n/a

Number of Student Graduates from Tulsa Campus: 0

Annual Executive Summaries

2019 - 2020

Program Assessment Coordinator: Keith A. Teague, Professor

Plan Review and Approval

Date Current Plan Was Reviewed and Approved: 09/15/2020

Date of Future Plan Review and Approval: 09/15/2025

Summary of Assessment Findings

Describe overall assessment findings and faculty members' interpretation of the assessment results: Overall results suggest the BS degree students in Electrical Engineering and Computer Engineering are meeting or exceeding our expectations for Student Outcomes.

This was the second full year for our new Student Outcomes specified by our accrediting agency, ABET, Inc., which changed from eleven outcomes that were previously in effect for approximately 19 years to a new set of seven outcomes. 2019-20 was the first year for which the new outcomes were fully in effect for an entire academic year. Although the new outcomes overlap the old ones in many cases, changes in wording and requirements have altered our assessment methods during the past two years. These methods continue to evolve as we gather data and experience.

Dissemination of Findings

Describe the individual(s) or committee responsible for reviewing and interpreting assessment data: Assessment data for the two undergraduate programs, Electrical Engineering and Computer Engineering, are collected, reviewed, and acted upon by the ECE Undergraduate Program and Assessment Committee, which is responsible for oversight of the BS degree programs in the School of Electrical and Computer Engineering. From a practical perspective, data are initially reviewed by the committee chair, Dr. Keith Teague, and the School Head, Dr. Jeffrey L. Young. The overall committee is brought in when important decisions need to be made. Data are reported to the overall faculty of the School typically twice yearly at a scheduled faculty meeting. When action is deemed necessary, a recommendation is generated to the School Head who in consultation with the faculty is ultimately responsible for further evaluation and possible action. Assessment data are reported to ABET, Inc., as part of our activities every six years in conjunction with our program reaccreditation.

Describe the process for sharing and discussing assessment findings with program faculty: Assessment information is shared with the faculty typically twice annually as part of regularly scheduled faculty meetings and/or the annual fall faculty retreat. The faculty are asked to review and approve the information presented. Annual review of the Program Educational Objectives and Student Outcomes is also performed.

Program Improvements Based on Assessment

Based on data collected this year, what changes are being considered or planned for the program?: No changes are anticipated during the 2020-21 academic year for Electrical Engineering or Computer Engineering.

During the previous year we continued refining the new Electric Circuits course, ECEN2714, and replaced PHYS3313 with a new course ECEN3903, Semiconductor Physics, that is being taught by ECE faculty members. A clinical faculty member became fully onboard to teach and manage the Capstone Design sequence, ECEN4013 and ECEN4024 with more consistency and rigor. Additional changes were made in course sequencing in the sophomore and junior years. A new course, ENSC2611, Electrical Fabrication Lab was added to provide experience in this important area. The CEAT Professional School concept was eliminated in ECE to support smoother progression of students through the curriculum.

As a result of feedback from our constituencies, discussion has begun regarding adding a degree option in Software Engineering.

Based on this year's findings, what (if any) changes are planned for the assessment process?: No changes are anticipated for the assessment process during the 2020-21 academic year, other than continued refinement and improvement of our assessment of student outcome #4 related to ethics and professionalism. Our assessment in this particular area is relatively young and developing, while the rest of the assessment process is well developed and implemented.

Describe the process for implementing these changes/planned program improvements: n/a

Program Improvements Made in the Last Year: Course Improvements, Curriculum Improvements, Assessment Measure Improvements

"Other" Improvements:

Goals for the Coming Year: Our next accreditation visit is scheduled during fall 2021. Our primary goals are to collect one more complete set of high quality data over the full set of student outcomes, and to complete additional refinement of the assessment and accompanying continuous improvement process where needed. Discussion will continue regarding a new option in Software Engineering.

Is this Summary Report Complete?: Yes

List all individuals associated with this report preparation: Keith A. Teague, Professor; Jeffrey L. Young, Professor and Head

Outcome: ABET1: Identify, Formulate and Solve Problems

An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

Outcome Status: Active

Planned Assessment Year: 2016 - 2017, 2017 - 2018, 2018 - 2019, 2019 - 2020, 2020 - 2021, 2021 - 2022, 2022 - 2023, 2023 - 2024

Start Date:

Archived Date:

Outcome Type: Skills

Reason for Archival:

Assessment Methods

Capstone Assignment - Capstone Project Proposal (ECE) / Concept Design Review (interdisciplinary) (Active)

* **Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

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Timeline for Assessment: Semester - fall and spring

Other Assessment Type:

Capstone Assignment - Final Team Project Oral Presentation (Active)

*** Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Capstone Assignment - Final Project Design Demonstration/Examination (Active)

*** Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Analysis of Written Artifacts - Capstone Final Project Report (Active)

*** Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Outcome: ABET2: Solutions to Meet Needs

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

Outcome Status: Active

Planned Assessment Year: 2018 - 2019, 2019 - 2020, 2020 - 2021, 2021 - 2022, 2022 - 2023, 2023 - 2024

Start Date:

Archived Date:

Outcome Type: Knowledge

Reason for Archival:

Assessment Methods

Capstone Assignment - Capstone Project Proposal (ECE) / Concept Design Review (interdisciplinary) (Active)

*** Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment:

Other Assessment Type:

Capstone Assignment - Final Team Project Oral Presentation (Active)

*** Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Capstone Assignment - Final Project Design Demonstration/Examination (Active)

*** Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Analysis of Written Artifacts - Capstone Final Project Report (Active)

*** Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

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Other Assessment Type:

Outcome: ABET3: Effective Communication

An ability to communicate effectively with a range of audiences

Outcome Status: Active

Planned Assessment Year: 2016 - 2017, 2017 - 2018, 2018 - 2019, 2019 - 2020, 2020 - 2021, 2021 - 2022, 2022 - 2023, 2023 - 2024

Start Date:

Archived Date:

Outcome Type: Skills

Reason for Archival:

Assessment Methods

Capstone Assignment - Capstone Project Proposal (ECE) / Concept Design Review (interdisciplinary) (Active)

* **Learning Outcome Goal/Benchmark:** Minimum 70% average over all students

Timeline for Assessment:

Other Assessment Type:

Capstone Assignment - Final Team Project Oral Presentation (Active)

* **Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Capstone Assignment - Final Project Design Demonstration/Examination (Active)

* **Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Analysis of Written Artifacts - Capstone Final Project Report (Active)

* **Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Outcome: ABET4: Ethics and Professionalism

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

Outcome Status: Active

Planned Assessment Year: 2016 - 2017, 2017 - 2018, 2019 - 2020, 2020 - 2021, 2021 - 2022, 2022 - 2023, 2023 - 2024

Start Date:

Archived Date:

Outcome Type: Knowledge

Reason for Archival:

Assessment Methods

Project & Assignments - Probability, Statistics and Ethics/Professionalism Assignment (Active)

* **Learning Outcome Goal/Benchmark:** 70% minimum average over all students

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Timeline for Assessment: Semester

Other Assessment Type:

Project & Assignments - Ethics activity in ECEN4013, Design of Engineering Systems (Active)

* **Learning Outcome Goal/Benchmark:** 70% minimum average over all students

Timeline for Assessment: Semester

Other Assessment Type:

Outcome: ABET5: Teamwork

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

Outcome Status: Active

Planned Assessment Year: 2016 - 2017, 2017 - 2018, 2018 - 2019, 2019 - 2020, 2020 - 2021, 2021 - 2022, 2022 - 2023, 2023 - 2024

Start Date:

Archived Date:

Outcome Type: Skills

Reason for Archival:

Assessment Methods

Capstone Assignment - Capstone Project Proposal (ECE) / Concept Design Review (interdisciplinary) (Active)

* **Learning Outcome Goal/Benchmark:** Minimum 70% average over all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Other - CATME Team/Peer Evaluation Instrument (Active)

* **Learning Outcome Goal/Benchmark:** Minimum overall average of 70% of the class achieving a score of 4.0/5.0 with a minimum number of students scoring below 3.0/5.0

Timeline for Assessment: Semester

Other Assessment Type: Nationally developed and vetted evaluation instrument/survey

Capstone Assignment - Final Team Project Oral Presentation (Active)

* **Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Outcome: ABET6: Experiment, Analyze and Interpret Data

An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

Outcome Status: Active

Planned Assessment Year: 2016 - 2017, 2017 - 2018, 2018 - 2019, 2019 - 2020, 2020 - 2021, 2021 - 2022, 2022 - 2023, 2023 - 2024

Start Date:

Archived Date:

Outcome Type: Skills

Reason for Archival:

Assessment Methods

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Capstone Assignment - Final Team Project Oral Presentation (Active)

* **Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Capstone Assignment - Final Project Design Demonstration/Examination (Active)

* **Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Analysis of Written Artifacts - Capstone Final Project Report (Active)

* **Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Outcome: ABET7: Acquisition of New Knowledge

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

Outcome Status: Active

Planned Assessment Year: 2016 - 2017, 2017 - 2018, 2018 - 2019, 2019 - 2020, 2020 - 2021, 2021 - 2022, 2022 - 2023, 2023 - 2024

Start Date:

Archived Date:

Outcome Type: Knowledge

Reason for Archival:

Assessment Methods

Capstone Assignment - Capstone Project Proposal (ECE) / Concept Design Review (interdisciplinary) (Active)

* **Learning Outcome Goal/Benchmark:** Minimum of 70% average over all students

Timeline for Assessment:

Other Assessment Type:

Capstone Assignment - Final Team Project Oral Presentation (Active)

* **Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Capstone Assignment - Final Project Design Demonstration/Examination (Active)

* **Learning Outcome Goal/Benchmark:** Minimum 70% average across all student teams

Timeline for Assessment: Semester

Other Assessment Type:

Outcome: Program Criterion Prob and Stat

Probability and statistics with applications appropriate to the program name

Outcome Status: Active

Planned Assessment Year: 2018 - 2019, 2019 - 2020, 2020 - 2021, 2021 - 2022, 2022 - 2023, 2023 - 2024

Start Date:

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Archived Date:

Outcome Type: Knowledge

Reason for Archival:

Assessment Methods

Course Exam(s) - Evaluation of targeted final exam problems in ECEN4503 Random Signals (Active)

* **Learning Outcome Goal/Benchmark:** At least 70% or better average over all students

Timeline for Assessment: Annual

Other Assessment Type:

Outcome: Program Criterion Discrete Math

Discrete mathematics

Outcome Status: Active

Planned Assessment Year: 2019 - 2020, 2020 - 2021, 2021 - 2022, 2022 - 2023, 2023 - 2024

Start Date:

Archived Date:

Outcome Type: Skills

Reason for Archival:

Assessment Methods

Course Exam(s) - Evaluation of targeted final exam problems in CS3653 Discrete Mathematics (Active)

* **Learning Outcome Goal/Benchmark:** At least 70% average over all ECE students

Timeline for Assessment: Annual

Other Assessment Type: