



Final Annual Report

Tennessee Tech University

President

Provost

College of Engineering

Electrical and Computer Engineering

Electrical Engineering BS



Electrical Engineering and Computer Department

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Mission/Vision/Goal Statement

Mission Statement: "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."

Program Goals:

The Program Goals of TTU BSEE program are:

1. Within one year following graduation, our graduates will be:
 - i. working in the field of electrical and computer engineering and/or
 - ii. pursuing graduate studies contributed to the profession and society as indicated by research, national and international collaboration, professional service, community service and/or public service.

2. Within five years following graduation, our graduates will have:
 - i. progressed in their careers as indicated by promotions, positions of leadership, awards, recognitions, entrepreneurial activities, products or processes developed, patents, and/or publications;
 - ii. 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.

**Outcome a****Define Goal****Intended Outcomes / Objectives****Student Learning Outcomes:**

The program has 11 outcomes (a-k). The outcomes are subject to review and modification at any time upon approval by the ECE faculty.

TTU BSEE graduates will be able to demonstrate that they have:

- a. an ability to apply knowledge of mathematics, science, and engineering.

**Outcome b****Define Goal****Intended Outcomes / Objectives****Student Learning Outcomes:**

The program has 11 outcomes (a-k). The outcomes are subject to review and modification at any time upon approval by the ECE faculty.

TTU BSEE graduates will be able to demonstrate that they have:

- b. an ability to design and conduct experiments, as well as to analyze and interpret data.



Outcome c

Define Goal

Intended Outcomes / Objectives

Student Learning Outcomes:

The program has 11 outcomes (a-k). The outcomes are subject to review and modification at any time upon approval by the ECE faculty.

TTU BSEE graduates will be able to demonstrate that they have:

C. an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.



Outcome d

Define Goal

Intended Outcomes / Objectives

Student Learning Outcomes:

The program has 11 outcomes (a-k). The outcomes are subject to review and modification at any time upon approval by the ECE faculty.

TTU BSEE graduates will be able to demonstrate that they have:

d. an ability to function on multi-disciplinary teams.



Outcome e

Define Goal

Intended Outcomes / Objectives



Student Learning Outcomes:

The program has 11 outcomes (a-k). The outcomes are subject to review and modification at any time upon approval by the ECE faculty.

TTU BSEE graduates will be able to demonstrate that they have:

e. an ability to identify, formulate, and solve engineering problems.



Outcome f

Define Goal

Intended Outcomes / Objectives

Student Learning Outcomes:

The program has 11 outcomes (a-k). The outcomes are subject to review and modification at any time upon approval by the ECE faculty.

TTU BSEE graduates will be able to demonstrate that they have:

f. an understanding of professional and ethical responsibility.



Outcome g

Define Goal

Intended Outcomes / Objectives

Student Learning Outcomes:

The program has 11 outcomes (a-k). The outcomes are subject to review and modification at any time upon approval by the ECE faculty.

TTU BSEE graduates will be able to demonstrate that they have:



g. an ability to communicate effectively in both written and oral forms.



Outcome h

Define Goal

Intended Outcomes / Objectives

Student Learning Outcomes:

The program has 11 outcomes (a-k). The outcomes are subject to review and modification at any time upon approval by the ECE faculty.

TTU BSEE graduates will be able to demonstrate that they have:

h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.



Outcome i

Define Goal

Intended Outcomes / Objectives

Student Learning Outcomes:

The program has 11 outcomes (a-k). The outcomes are subject to review and modification at any time upon approval by the ECE faculty.

TTU BSEE graduates will be able to demonstrate that they have:

i. a recognition of the need for, and an ability to engage in, life-long learning.



Outcome j

Define Goal



Intended Outcomes / Objectives

Student Learning Outcomes:

The program has 11 outcomes (a-k). The outcomes are subject to review and modification at any time upon approval by the ECE faculty.

TTU BSEE graduates will be able to demonstrate that they have:

j. a knowledge of contemporary issues. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.



Outcome k

Define Goal

Intended Outcomes / Objectives

Student Learning Outcomes:

The program has 11 outcomes (a-k). The outcomes are subject to review and modification at any time upon approval by the ECE faculty.

TTU BSEE graduates will be able to demonstrate that they have:

k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.



Assessment Mapping: Course Contributions to Student Outcomes

Goal/ Outcome/ Objective: Student Outcomes a-k

Type of Tool:

Rationale

See attached mapping of Course Outcomes to Student Outcomes



Mapping Matrix



Frequency of Assessment: Yearly



Capstone Design Project

Goal/ Outcome/ Objective: Student Outcomes c, d, e, f, and g

Type of Tool: Capstone Project

Rationale

CAPSTONE is the culminating two semester course sequence in EE and draws on the technical skills developed through the curriculum. The evaluations ask questions that pertain directly or indirectly to the Student Outcomes. A numerical score from 0~5 is solicited. A target score greater than or equal to 3.5 is construed to indicate that each outcome is being met satisfactorily. They also ask for other general comments.

Frequency of Assessment: Each Semester



Faculty Course Assessment

Goal/ Outcome/ Objective: Student Outcomes: a - k

Type of Tool: Other

Rationale

- Faculty Course Assessments (FCA). These survey ask for ratings and comments pertaining to each of the Course Outcomes specific to each course. A numerical score from 0~5 is solicited. A target score greater than or equal to 3.5 is construed to indicate that the outcome is being met satisfactorily. The surveys also ask for general comments and about the adequacy of preparation through prerequisites. Faculty surveys also ask if any changes are needed in the syllabus.

Frequency of Assessment: Yearly



Final Exam Assessment

Goal/ Outcome/ Objective: Student Outcome a

Type of Tool: Other

Rationale

Specific exam questions for specific core EE courses are used to directly assess Student Outcome a.

The final exam assessment report is based on selected four course to assess students' ability to apply knowledge of mathematics, science and engineering [Student Outcome a)]. The four selected course are:



ECE3020 Discrete-time Signals & Systems

ECE3300 Electronics I

ECE3120 Microcomputer Systems

ECE3510 Electromagnetic Fields I

The first two courses are required for both EE and CmpE programs. The third is required in CmpE program and is an elective in EE program. The fourth is required in the EE program but is an elective in the CmpE program.

Frequency of Assessment: Each Semester

Senior Exit Interview Assessment

Goal/ Outcome/ Objective: Student Outcomes a-k

Type of Tool: Other

Rationale

All Student Learning Outcomes are rated as to the level of satisfaction with a target score of 3.5. Other general comments are solicited about the faculty and staff. The forms are submitted anonymously. Oral remarks are made in a meeting attended by the graduating seniors, the Chairperson and a departmental secretary.

Frequency of Assessment: Each Semester

Student Course Assessment

Goal/ Outcome/ Objective: Student Outcomes a-k

Type of Tool: Survey

Rationale

Student Course Assessments (SCA): This survey ask for ratings and comments pertaining to each of the Course Outcomes specific to each course. A numerical score from 0~5 is solicited. A target score greater than or equal to 3.5 is construed to indicate that the outcome is being met satisfactorily. The surveys also ask for general comments and about the adequacy of preparation through prerequisites.

Frequency of Assessment: Yearly



Assessment Summary

Goal/Objective/Outcome Number:

Results

Summary of analysis made by the Assessment Committee

for Fall 2015 – Spring 2016

1 - Timeline:

These results are from assessments of the Fall 2015 ~ Spring 2016 academic year. They were studied by the ECE Assessment Committee during the Fall 2016 ~ Spring 2017 academic year. An assessment report was created and presented to the ECE faculty during the Spring 2017 semester.

For Summary, please see attached file.

Attachments

 Summary Report Rev 3



Capstone Design Project

Goal/Objective/Outcome Number: Student Outcomes c, d, e, f, and g

Results

All outcomes assessed by the survey were highly satisfactory.

Attachments

 Capstone Design summary_f15-S16



Faculty Course Assessment

Goal/Objective/Outcome Number: Student Outcomes a-k

Results

Faculty Course Assessment (FCA)


Faculty Course Assessment for Fall 2015 and Spring 2016

**Summary:**

The faculty course assessment (FCA) is strong for all Student Outcomes except j, Contemporary issues. However, Fall 14 - Spring 15 saw a significant increase due to specific content changes in ECE 3920 – Professional Issues, which is the only course with major contributions. There was a decreased in Fall15-Spring 16.

Recommendations: Continue to monitor Course Instructional Outcomes and Student Outcome j: Contemporary Issues. Explore possibility to include Student Outcome j: Contemporary Issues in other senior-level courses.

Attachments

 Faculty Course Assessment Summary

**Final Exam Assessment**

Goal/Objective/Outcome Number: Student Outcome a.

Results

The final exam assessment report is based on selected four course to assess students' ability to apply knowledge of mathematics, science and engineering [Student Outcome a)]. The four selected course are:


ECE3020 Discrete-time Signals & Systems

ECE3300 Electronics I

ECE3120 Microcomputer Systems

ECE3510 Electromagnetic Fields I

Attachments

 Final Course Assessment Summary



Senior Exit Interview

Goal/Objective/Outcome Number:

Results

Senior Exit Interview Assessment Report

Fall 2015 and Spring 2016

The Exit Interview Assessment responses in Fall 2015 indicate that both EE and CmpE programs, met the satisfactory achievement of all student outcomes (above 3.0). The least score was for student outcome J, which was 3.5 for EE students.

The Exit Interview Assessment responses in Spring 2016 indicate that both EE and CmpE programs, met the satisfactory achievement of all student outcomes (above 3.0). The score for student outcome J for EE students increased to 4.0..

Attachments

 Senior Exit Interview Assessment Report



Student Course Assessment

Goal/Objective/Outcome Number: Student Outcomes a-k

Results

Summary:

This summary is for the Fall 2015, Spring 2016 Student course assessments. Details of student course assessments and weighted average for course outcomes are attached.

Attachments

 Student Course Assessment



Program Continuous Improvement

Goal/Objective/Outcome Number:

**Program Changes and Actions due to Results****Recommendation:**

1. Continue to monitor Course Instructional Outcomes and Student Outcome j: Contemporary Issues. Explore possibility to include Student Outcome j: Contemporary Issues in other senior-level courses.

Link to Assessment**Link to Flight Plan:**

 **Process Improvement****Improvements to Assessment Plan****Recommendation:**

1. Analyze best way to evaluate results of Final Exam Assessment.