

## UNIT REPORT

**Electrical Engineering BS - Final  
Annual Report**

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**Electrical Engineering and Computer Department****Start:** 07/01/2017**End:** 06/30/2018**Reporting Year:** 2017-2018**Providing Department:** Electrical Engineering BS**Department/Unit Contact:** Omar Elkeelany**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****Progress:** Completed**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**

**Progress:** Completed

**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**

**Progress:** Completed

**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**

**Progress:** Completed

**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**

**Progress:** Completed

**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**

**Progress:** Completed

**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**

**Progress:** Completed

**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**

**Progress:** Completed

**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**

**Progress:** Completed

**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

**Progress:** Completed

**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

**Progress:** Completed

**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

**Frequency of Assessment:** Yearly

**Rationale:**

See attached mapping of Course Outcomes to Student Outcomes

Attached Files

[Mapping Matrix](#)

## Capstone Design Project

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

**Type of Tool:** Capstone Project

**Frequency of Assessment:** Each Semester

**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.

## Faculty Course Assessment

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

**Type of Tool:** Other

**Frequency of Assessment:** Yearly

**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.

## Final Exam Assessment

**Goal/ Outcome/ Objective:** Student Outcome a

**Type of Tool:** Other

**Frequency of Assessment:** Each Semester

**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.

## Senior Exit Interview Assessment

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

**Type of Tool:** Other

**Frequency of Assessment:** Each Semester

**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.

## Student Course Accessment

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

**Type of Tool:** Survey

**Frequency of Assessment:** Yearly

**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.

## Assessment Summary

**Results:**

Summary of analysis made by the Assessment Committee

for Fall 2016 – Spring 2017

## 1 - Timeline:

These results are from assessments of the Fall 2016 ~ Spring 2017 academic year. An assessment report was created and presented to the ECE faculty during the Fall 2017 semester.

**For Summary, please see attached file.**

**Attachments:** Attached Files

[☐ Summary Report F16-S17.pdf](#)

## 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:** Attached Files

[☐ Capstone Design Project Review F16-S17.pdf](#)

## Faculty Course Assessment

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

### Results:

**Faculty Course Assessment (FCA)**

Faculty Course Assessment for Fall 2016 and Spring 2017

### Summary:

The faculty course assessment (FCA) is strong for all Student Outcomes and shows a significant increase in Student Outcome j, Contemporary issues

**Recommendations:** Continue to monitor Course Instructional Outcomes and Student Outcome j: Contemporary Issues. Focus Area Groups, Course Instructors, and Course Coordinator should review relation between FCA and SCA by semester and Instructional Outcome.

**Attachments:** Attached Files

[☐ Faculty Course Assessment F16-S17.pdf](#)

## 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:** Attached Files

[Final Exam Assessment F16-S17.pdf](#)

## Senior Exit Interview

**Results:**

Senior Exit Interview Assessment Report

Fall 2016 and Spring 2017

For both EE and CmpE students, the scores for all Student Outcomes were 3.5 or greater. For EE students, Outcomes b (an ability to design and conduct experiments, as well as to analyze and interpret data), 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) and g (an ability to communicate effectively in both (a) written and (b) oral forms) are all exhibiting a generally decreasing trend. Outcome j (a knowledge of contemporary issues) had a significant increase in Spring 2016, but a slow decrease since. For CmpE majors, Outcome 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) is showing an increasing trend.

**Recommendations: Monitor Outcomes b, c and g for EE students, currently trending negative.**

**Attachments:** Attached Files

[Senior Exit Interview Assessment F16-S17.pdf](#)

## Student Course Assessment

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

**Results:**

**Summary:**

This summary is for Fall 2016, Spring 2017 Student course assessments. Details of student course assessments and weighted average for course outcomes are attached.

**Attachments:** Attached Files

[Student Course Assessment F16-S17.pdf](#)

## Program Continuous Improvement

**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.

## Process Improvement

**Improvements to Assessment Plan:**

**Recommendation:**

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