

UNIT REPORT

**Computer Engineering BS - Final
Annual Report**

Generated: 9/13/18, 10:16 AM

Electrical and Computer Engineering Department**Start:** 07/01/2017**End:** 06/30/2018**Reporting Year:** 2017-2018**Providing Department:** Computer 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."

The Program Goals of TTU BSCmpE 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

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:****Program Goals:****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 BSCmpE graduates will be able to demonstrate that they have:

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

Outcome b

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 BSCmpE 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

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 BSCmpE 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

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 BSCmpE graduates will be able to demonstrate that they have:

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

Outcome e

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 BSCmpE graduates will be able to demonstrate that they have:

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

Outcome f

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 BSCmpE 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 BSCmpE 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 BSCmpE 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 BSCmpE 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 BSCmpE graduates will be able to demonstrate that they have:

j. a knowledge of contemporary issues.

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 BSCmpE 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.

Capstone Design Project Assessment

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

Frequency of Assessment: Each Semester

Rationale:

CAPSTONE is the culminating two semester course sequence in CmpE 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

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.

Attached Files

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

Senior Exit Interview Assessment

Goal/ Outcome/ Objective: Student Outcomes a-k

Type of Tool: Survey

Frequency of Assessment: Each Semester

Rationale:

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.

Attached Files

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

Student Course Assessment

Type of Tool: Survey

Rationale:

Student Course Assessments (SCA):

With the exception of the following, all Course Instructional Outcomes in Fall 2016 were greater than 3.0:

ECE 3020

Outcome 4 - Use basic filter design methods to design FIR and IIR filters.

Outcome 6 - Implement FIR and IIR filters using Matlab

ECE 3710

Outcome 4 – Calculate the bit rate, symbol rate and estimate the bandwidth for a simple M-ary digital modulation system.

Outcome 5 - Given a discrete memoryless source calculate the entropy and design a compact binary code (Huffman code).

Outcome 6 - Calculate the average mutual information of a discrete memoryless channel.

ECE 4630

Outcome 2 - Design, analyze and perform a computer simulation of converters.

Outcome 4 - Develop a professional report and make a presentation.

With the exception of the following, all Course Instructional Outcomes in Spring 2017 were greater than 3.0:

ECE 3010

Outcome 9 - Design analog filters using Matlab software.

Outcome 10 - Use Matlab software for signal and system analysis.

ECE 3610

Outcome 5 – Describe the role of power electronics converters in speed and torque control of motor drives, and design speed controllers.

Outcome 6 – Use MATLAB to solve the problems in homework and design.

Figures 1 and 2 plot the Student Outcomes a-k as a function of academic year and the 3-year running average.

When all instructional outcomes were mapped to the ABET Student Outcomes, the general trend is to maintaining or improving scores. Contemporary Issues (student outcome j) has shown a significant increase as a result of focused effort in the Professional Issues course.

Recommendation: Monitor Outcomes h and j, currently exhibiting a negative trend.

Attached Files

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

Assessments Summary

Results:

Please see attached report

Attachments: Attached Files

[Summary Report F16-S17.pdf](#)

Capstone Design Project

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

Results:

- a. 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 the 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:

- a. Attached Reports for Fall 2016 and Spring 2017.

Attachments: Attached Files

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

Senior Exit Interview

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

Results:

Senior Exit Interview Assessment Report

Fall 2016 and Spring 2017

For both EE and CmpE students (Figures 1 and 2), 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 the Fall 2016, Spring 2017 Student course assessments. Details of student course assessments and the 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.