# Assessment Cycle

# Academic Year 2016 – 2017

## Engineering and Technology (EET, BS)

**Division or Department: College of Business and Technology**

**Prepared by: Ali Ahmad** **Date: 6/19/2017**

**Approved by: Margaret Kilcoyne** **Date: 6/19/2017**

**Northwestern Mission:** Northwestern State University is a responsive, student-oriented institution that is committed to the creation, dissemination, and acquisition of knowledge through teaching, research, and service. The University maintains as its highest priority excellence in teaching in graduate and undergraduate programs. Northwestern State University prepares its students to become productive members of society and promotes economic development and improvements in the quality of life of the citizens in its region.

**College of Business and Technology Mission:** The College of Business and Technology is dedicated to providing a high quality – market responsive business and technology education, preparing students for successful careers and enriched lives in the public, private and nonprofit sectors, and enhancing our students' academic experiences through our research and scholarly activities.

**Engineering Technology Department Mission:** The Engineering Technology Department is dedicated to delivering high quality education in the areas of engineering technology, electronics engineering technology, and industrial engineering technology, as well as pre-engineering preparation. The department prepares students for successful careers and enriched lives in the public, private and nonprofit sectors, and promotes economic development and enrichment of the communities we serve.

**Electronics Engineering Technology Mission Statement:** The mission of BS in Electronics Engineering Technology is to produce four-year graduates with the breadth and depth of knowledge in electronics engineering technology to become lifelong productive members of the regional workforce and the local society.

**Purpose:** The Bachelor of Science in electronics engineering technology program will prepare students to: 1) Analyze, test, build, operate, and maintain electronic systems, and 2) Manage, maintain and install low voltage/power systems, automation, and controls. It prepares students for entry positions in government and the private sector in which the ability to implement changes, upgrade operations, set- up equipment, analyze problems, and modify if necessary is increasingly critical. It will also prepare interested students for the pursuit of advanced degrees in Engineering and Technology at other institutions.

**Methodology:** The assessment process for the BS in Electronics Engineering Technology program is as follows:

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(1) Data from assessment tools (both direct – indirect, quantitative and qualitative) are collected and returned to the department head and ET ABET committee

(2) The department head and ET ABET committee analyze the data to determine whether students have met measurable outcomes

(3) Results from the assessment are discussed with the program faculty

(4) The department head, in consultation with the Engineering Technology Advisory Board, will propose changes to measurable outcomes, assessment tools for the next assessment period and, where needed, curricula and program changes

**Student Learning Outcomes (SLOs):**

**SLO 1. Ability to apply the electronics engineering technology knowledge, skills, and tools to real-world problem solving (ETAC of ABET Outcome a).**

Course Map: Tied to course syllabus objectives.

EET 1331: DIGITAL ELECTRONICS I LABORATORY
EET 3340: ADVANCED ELECTRONICS

**Measure 1.1. (Direct – Knowledge)**

Every fall semester, students' grades on the EET 1331 Final Exam are used to assess the attainment of SLO 1. The acceptable target is 80% of students score C or better on final examination.

**Finding:** Target met. 5 out of 5 (100%) scored C or better on the final examination

**Analysis:** Students' performance in the past (12-13 and 13-14) did not meet the performance target; however, in the recent years, the performance index was 100%. Faculty teaching this course had left the university and a new faculty was hired to teach this course. Since then, the performance has been satisfactory and steady, which will be continually monitored in future academic years to evaluate if any decision or recommendation is required.

**Action - Decision or Recommendation:** No program changes were recommended.

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## Academic Year 2016 – 2017

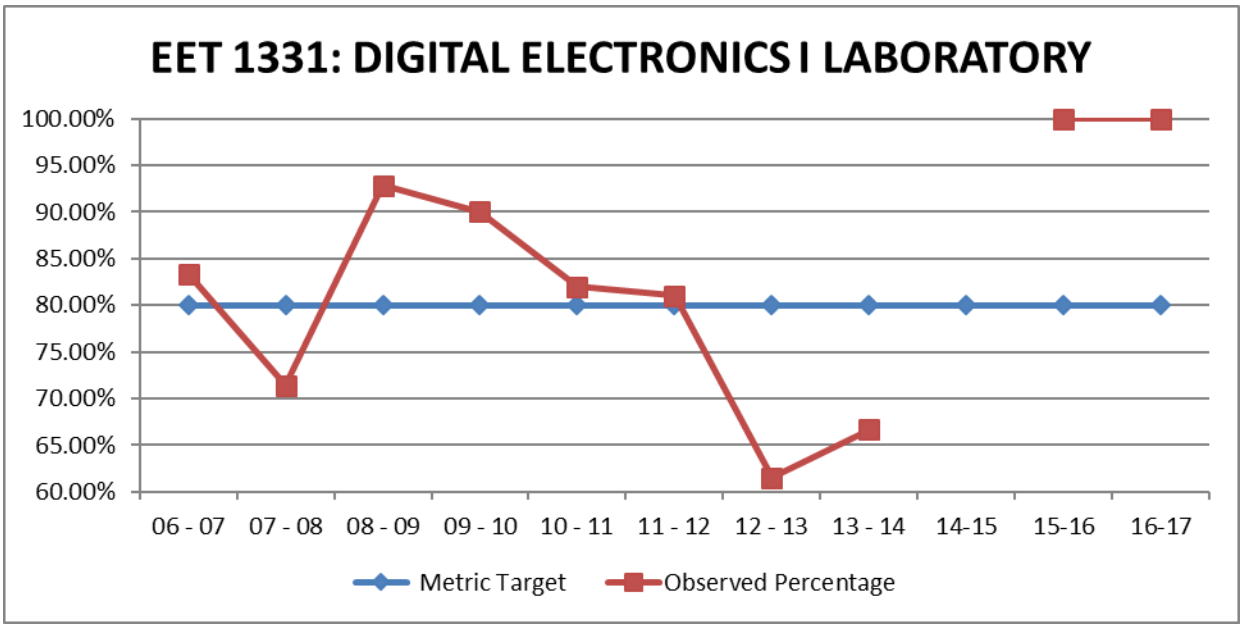


**Figure 1. Percentage of students scoring C or better in final examination.**

**Measure 1.2. (Direct – Knowledge/Skill)**
Every spring semester, students' grades on the EET 3340 Test 1 are used to assess the attainment of SLO 1. The acceptable target is 80% of students score C or better on Test 1.

**Finding:** Target met. 16/17 (95%) scored C or better on Test 1.

**Analysis:** Overall student performance in the past several years was barely meeting the target. After hiring a new faculty member to teach this course, the performance has been satisfactory and steady, which will be continually monitored in future academic years to evaluate if any decision or recommendation, is required.

**Action - Decision or Recommendation:** No program changes were recommended.

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## Academic Year 2016 – 2017

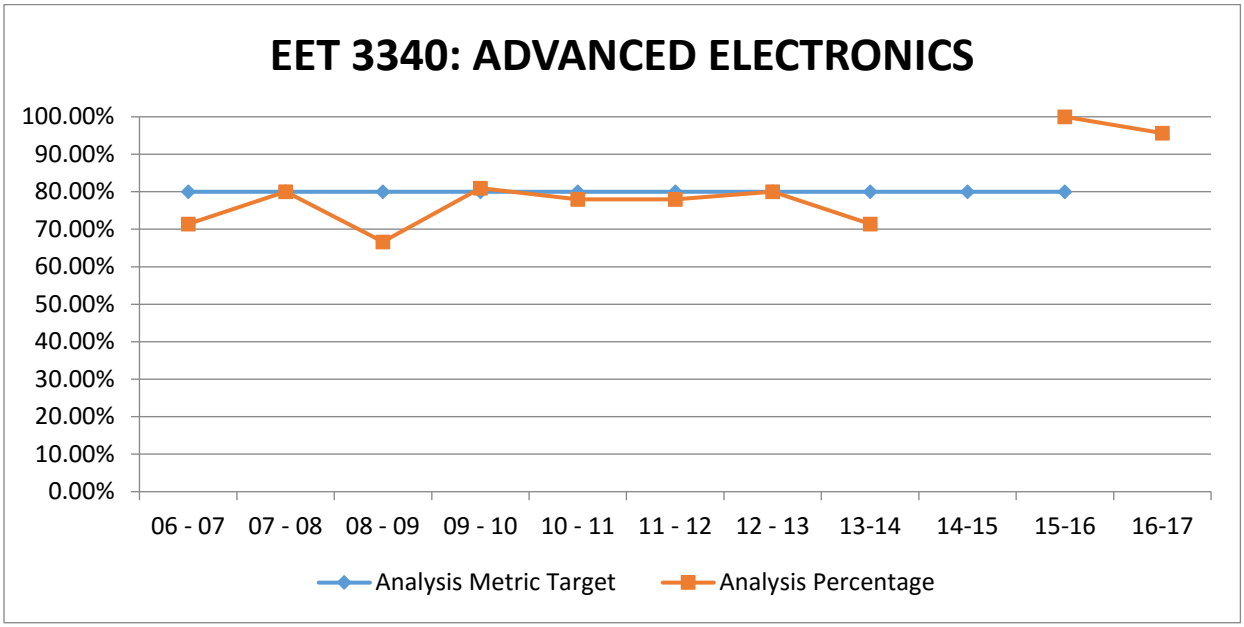


**Figure 2.Percentage of students scoring C or better in Test 1.**

**SLO 2. Ability to perform tests, measurements and experiments (ETAC of ABET Outcome b).**

Course Map: Tied to course syllabus objectives.

EET 3340: ADVANCED ELECTRONICS
EET 4310: COMMUNICATION ELECTRONICS
EET 4311: COMMUNICATION ELECTRONICS LABORATORY

**Measure 2.1. (Direct – Knowledge/Skill)**

Every spring semester, students' grades on the EET 3340 Test 2 are used to assess the attainment of SLO 2. The acceptable target is 80% of students correctly applying calculus to the solution of integrator and differentiator problems on Test 2.

**Finding:** Target met. 14 out of 17 (82 %) of students correctly applied calculus to the solution of integrator and differentiator problems on Test 2.

**Analysis:** Most of the time, over the last several years, the performance target was met, except once, which may be a random event. Therefore, continual monitoring of the performance is necessary to evaluate student progress, and accordingly, any decision or recommendation for the course in future.

**Action - Decision or Recommendation:** No program changes were recommended.

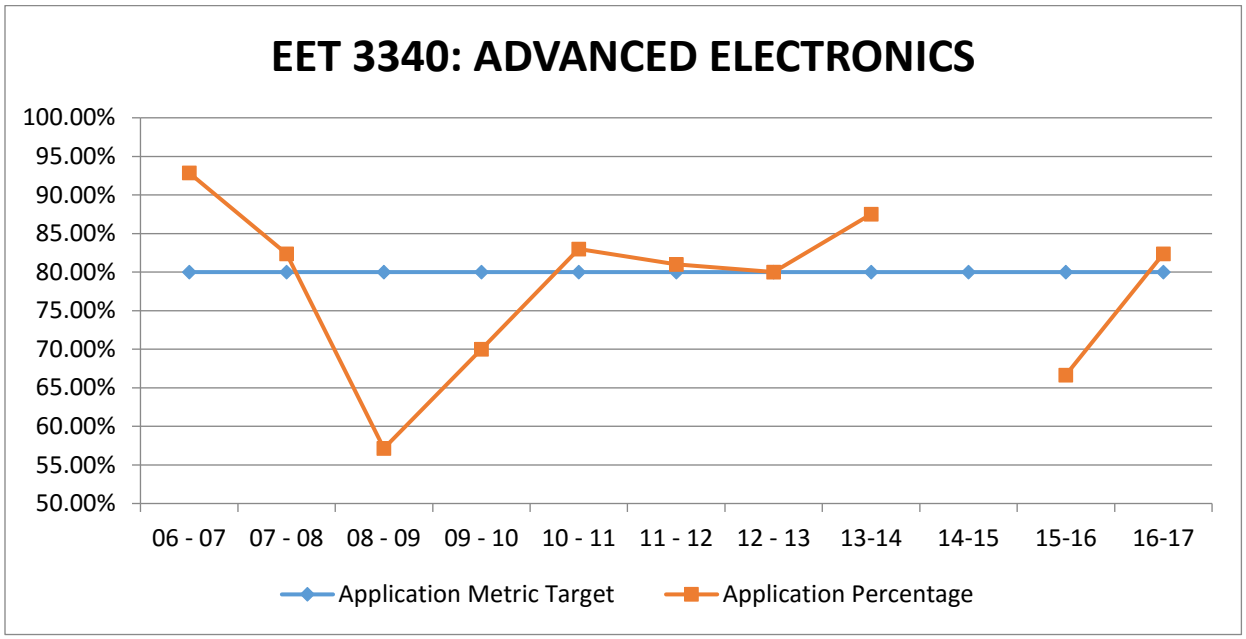


**Figure 3. Percentage of students correctly apply calculus to the solution of integrator and differentiator problems on Test 2.**

### Measure 2.2. (Direct – Knowledge/Skill)

Every fall semester, students' grades on the EET 4310 Final Test are used to assess the attainment of SLO 2. The acceptable target is 80% of students' scores demonstrate the ability to do Fourier series and Bessel functions on the final exam.

**Finding:** Target met. 6 out of 6 (100%) students demonstrated the ability to do Fourier series and Bessel functions on the final exam.

**Analysis:** Student performance has only missed the target once in the last seven years (in 2014-2015). Then, the target was only missed by a narrow margin, which can be attributed to a random event. Otherwise, student performance has been satisfactory and will be monitored regularly.

**Action - Decision or Recommendation:** No program changes were recommended.

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## Academic Year 2016 – 2017

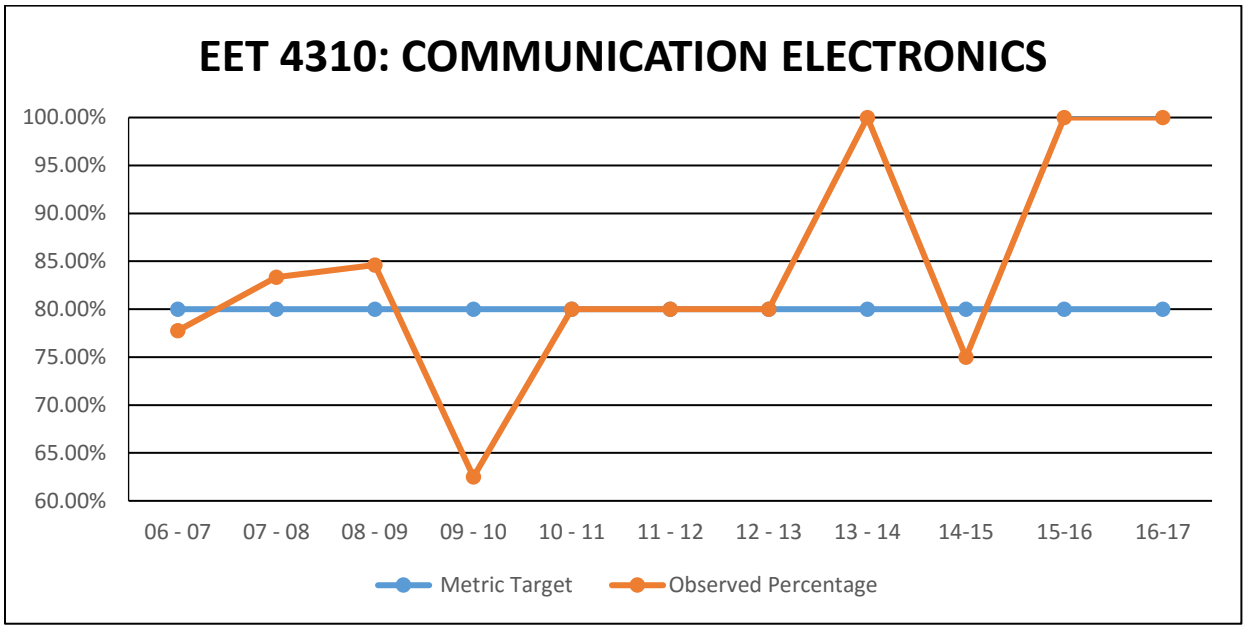


**Figure 4. Percentage of students' score that demonstrate the ability to do Fourier series and Bessel functions on the final exam.**

### Measure 2.3. (Direct – Ability/Skill)

Every fall semester, students' grades on the EET 4311 Laboratory Reports are used to assess the attainment of SLO 2. The acceptable target is 80% of students receive a C or better on technical component of formal laboratory report.

**Finding:** Target met. 5 out of 6 (83.4%) students received a C or better on laboratory tests.

**Analysis:** Over the last several years, the performance targets were met satisfactorily and the slight fluctuation in performance in recent years may be contributed to random phenomena.

**Action - Decision or Recommendation:** No program changes were recommended.

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## Academic Year 2016 – 2017

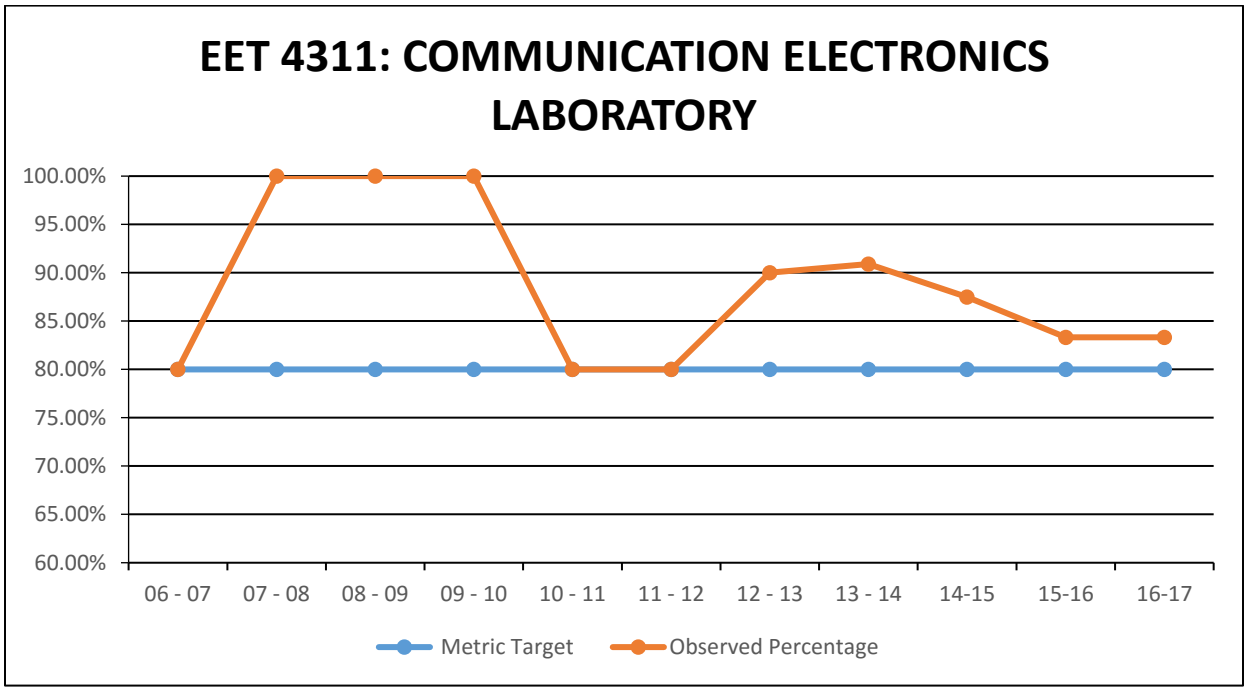


**Figure 5. Percentage of students receiving on technical component of formal laboratory report.**

**SLO 3. Ability to design electronic components and systems (ETAC of ABET Outcome c).**

Course Map: Tied to course syllabus objectives.

EET 4311: COMMUNICATION ELECTRONICS LABORATORY
EET 4351: AUTOMATION AND CONTROL LABORATORY
EET 4950 or IET 4960: PROJECT DESIGN II

**Measure 3.1. (Direct – Ability/Skill)**

Every fall semester, students' grades on the EET 4311 Laboratory Reports are used to assess the attainment of SLO 3. The acceptable target is 80% of students receive a C or better on technical component of formal laboratory report.

**Finding:** Target met. 5 out of 6 (83.4%) students received a C or better on technical component of formal laboratory reports.

**Analysis:** Over the last several years, the performance targets were met satisfactorily and the slight fluctuation in performance may be contributed to random phenomena.

**Action - Decision or Recommendation:** No program changes were recommended.

## Assessment Cycle

## Academic Year 2016 – 2017

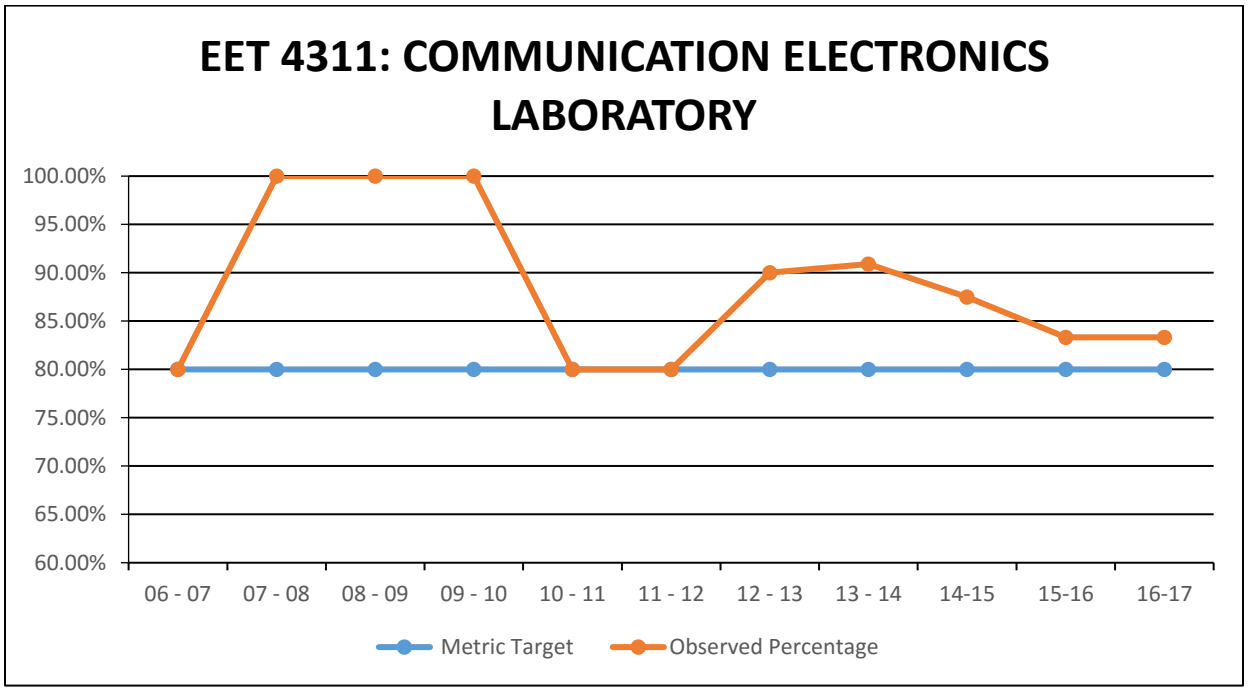


**Figure 6.Percentage of students receiving C or better on technical component of formal laboratory report.**

### Measure 3.2. (Direct – Ability/Skill)

Every fall semester, students' grades on the EET 4351 Laboratory Reports are used to assess the attainment of SLO 3. The acceptable target is 80% of students receive C or better on technical component of formal laboratory report.

**Finding:** Target met. 4 out of 4 (100%) students scored C or better on technical component of formal laboratory reports.

**Analysis:** For the past four years, the performance targets were met satisfactorily. If the steady performance of 100% is maintained in the next academic year, a possible change in target performance will be discussed by the Industrial Advisory Committee in the following year and the decision will be made based on the committee's recommendation.

**Action - Decision or Recommendation:** No program changes were recommended. A possible change in target performance will be discussed by the Industrial Advisory Committee in the fall of 2017.

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## Academic Year 2016 – 2017

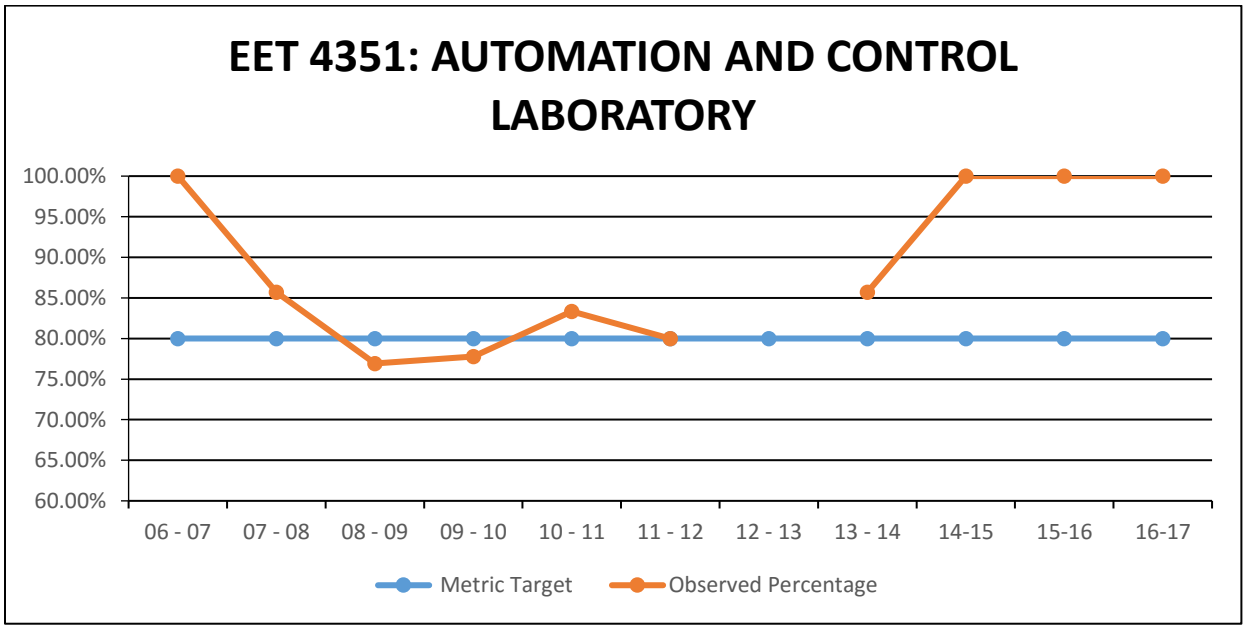


**Figure 7.Percentage of students receiving C or better on technical component of formal laboratory report.**

### Measure 3.3. (Indirect – Knowledge/Ability/Skill)

Every semester, upon presentation of capstone projects, ET faculty evaluate student performance with respect to ability to design electronic components and systems. The acceptable target is 80% of EET students rate at least 4 of 7.

**Finding:** Target met. 3/3 (100%) of students rated 4 or better with respect to design electronic components and systems in IET 4960 in the fall of 2016 and 4/4 (100%) of students rated 4 or better with respect to ability to design electronic components and systems in IET 4960 in the spring of 2017.

**Analysis:** For EET 4940 the student performance is fluctuating which can be attributed to random event; however, in recent years, there is a discernible positive trend in performance, often even surpassing the target. The performance in EET 4940 will be continually monitored in the future years before any decision is made.

For the past six years, the performance targets were met consistently at 100% level for IET 4960. A possible change in target performance will be discussed by the Industrial Advisory Committee in fall of 2017 and the decision will be made based on the committee's recommendation.

**Action - Decision or Recommendation:** No program changes were recommended. A possible change in target performance will be discussed in Industrial Advisory Committee in the fall of 2017.

## Assessment Cycle

## Academic Year 2016 – 2017

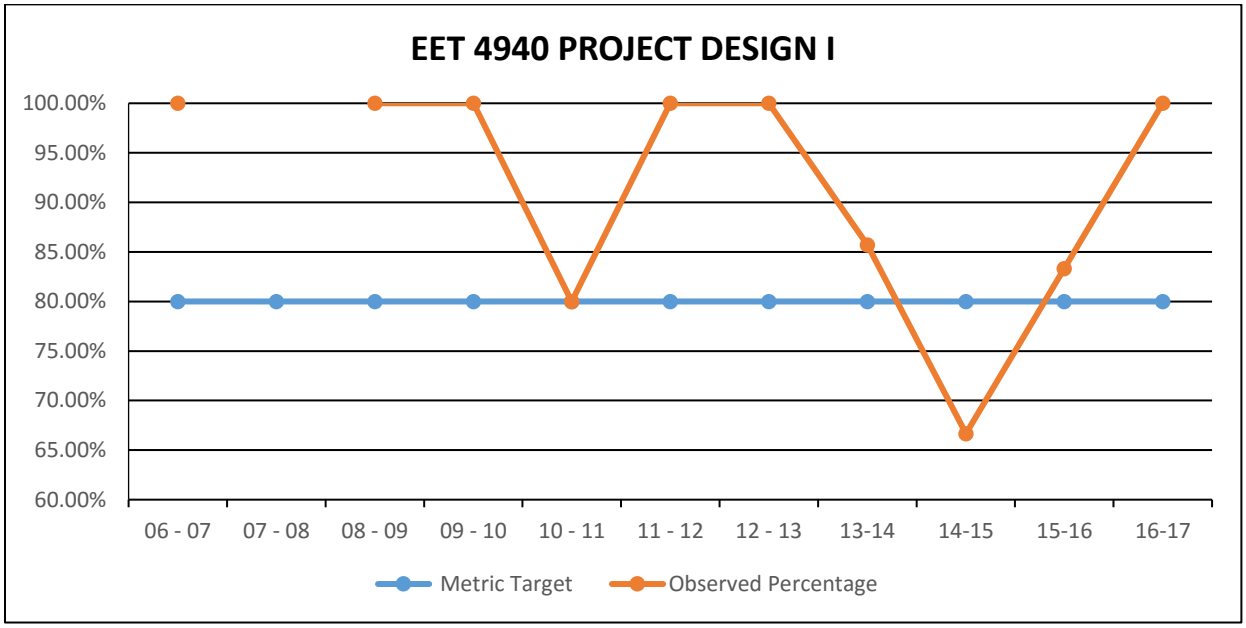


**Figure 8a Percentage of students rated 4 or better with respect to ability to design electronic components and systems in EET 4950 or IET 4960**

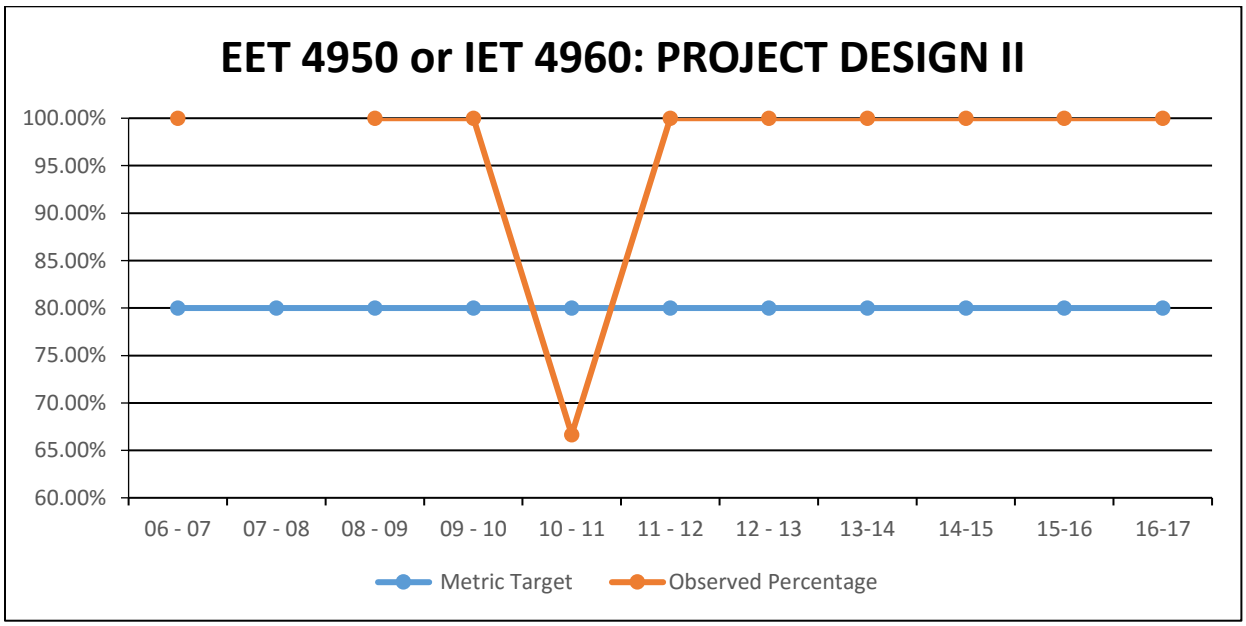


**Figure 8b. Percentage of students rated 4 or better with respect to ability to design electronic components and systems in EET 4950 or IET 4960**

### SLO 4. Ability to function effectively on a team (ETAC of ABET Outcome d).

Course Map: Tied to course syllabus objectives.
EET 4950 or IET 4960: PROJECT DESIGN II

# Assessment Cycle

# Academic Year 2016 – 2017

**Measure 4.1. (Indirect – Knowledge/Ability/Skill)**

Every semester, upon presentation of capstone projects, ET faculty evaluate student performance with respect to ability to function effectively on a team. The acceptable target is 80% of EET students rated at least 4 of 7.

**Finding:** Target met. 3/3 (100%) of students rated 4 or better with respect to ability to function effectively on a team in IET 4960 in the fall of 2016 and 4/4 (100%) of students rated 4 or better with respect to ability to function effectively on a team in IET 4960 in the spring of 2017.

**Analysis:** For capstone projects, final presentation by a team before ET faculty followed by questions and answers at the end of the presentation is considered a team effort. Well-structured and thought-out preparation and presentation can be attributed to group's ability to function in a team. It is evident that graduating seniors' performance in Project Design II is better than the students in Project Design I; however, performance targets were met for several years in a row for both courses.

**Action - Decision or Recommendation:** No program changes were recommended.

**Measure 4.2. (Direct –Skill/Ability)**

Every semester, upon presentation of capstone projects, students evaluate each other (i.e., peer evaluation) with respect to ability to function effectively on a team. The acceptable target is 80% of EET students rated at least 4 of 7.

**Finding:** Target met. 3/3 (100%) of students rated 4 or better for ability to function effectively on teams by their peers on capstone projects in the fall of 2016.
4/4 (100%) of students rated 4 or better for ability to function effectively on teams by their peers on capstone projects in the spring of 2017.

**Analysis:** For EET 4940 the student performance is fluctuating which can be attributed to random events. For many of the students in this class, this is their first experience in a group environment, and there is a learning curve associated with it. Therefore, since student performance was satisfactory in this year's assessment, performance in EET 4940 will be continually monitored for the future years before any decision is made.

For the past six years, the performance targets were met consistently at 100% level for IET 4960. A possible change in target performance will be discussed in Industrial Advisory Committee in the fall of 2017 and the decision will be made based on the committee's recommendation.

**Action - Decision or Recommendation:** No program changes were recommended.

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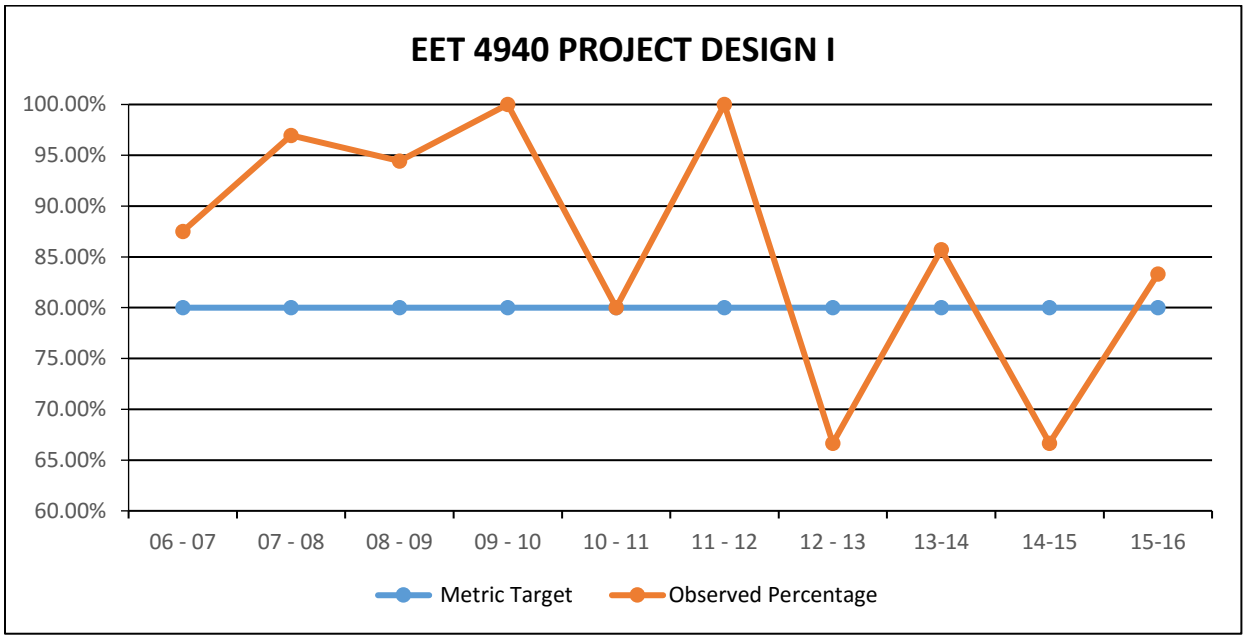


**Figure 9. Percentage of students rated 4 or better with respect to ability to function effectively on a team in EET 4940.**

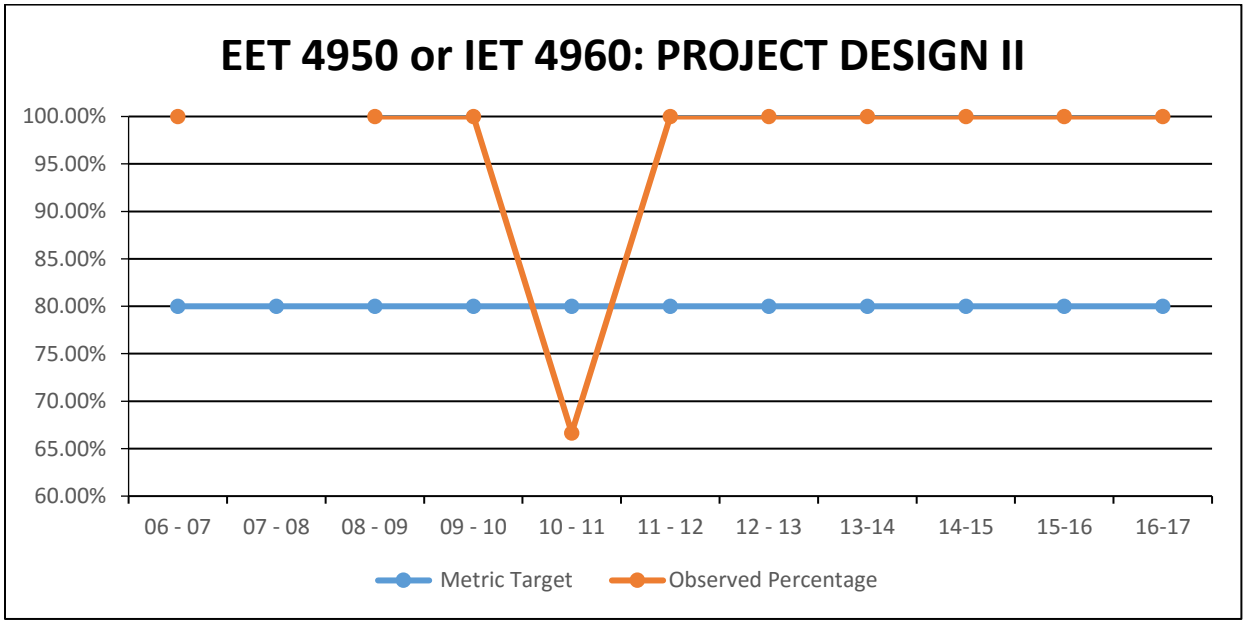


**Figure 10. Percentage of students rated 4 or better for ability to function effectively on teams by their peers on capstone projects**

### Measure 4.3. (Direct – knowledge)

Every semester, students are evaluated on the technical portion of the written proposal (report). The acceptable target is 80% of students score a C or better on the technical portion of the written proposal.

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**Finding:** Target met. 3 out of 3 (100%) students scored C or better on technical portion of the written proposal in IET 4960 in the fall of 2016. 4 out of 4 (100%) students scored C or better on oral presentation and written proposal in IET 4960 in the spring of 2017.

**Analysis:** For the past six years, the performance targets were met consistently at 100% level for IET 4960. A possible change in target performance will be discussed in Industrial Advisory Committee in fall of 2017 and the decision will be made based on the committee's recommendation

**Action - Decision or Recommendation:** No program changes were recommended. A possible change in target performance will be discussed by the Industrial Advisory Committee in the fall of 2017.

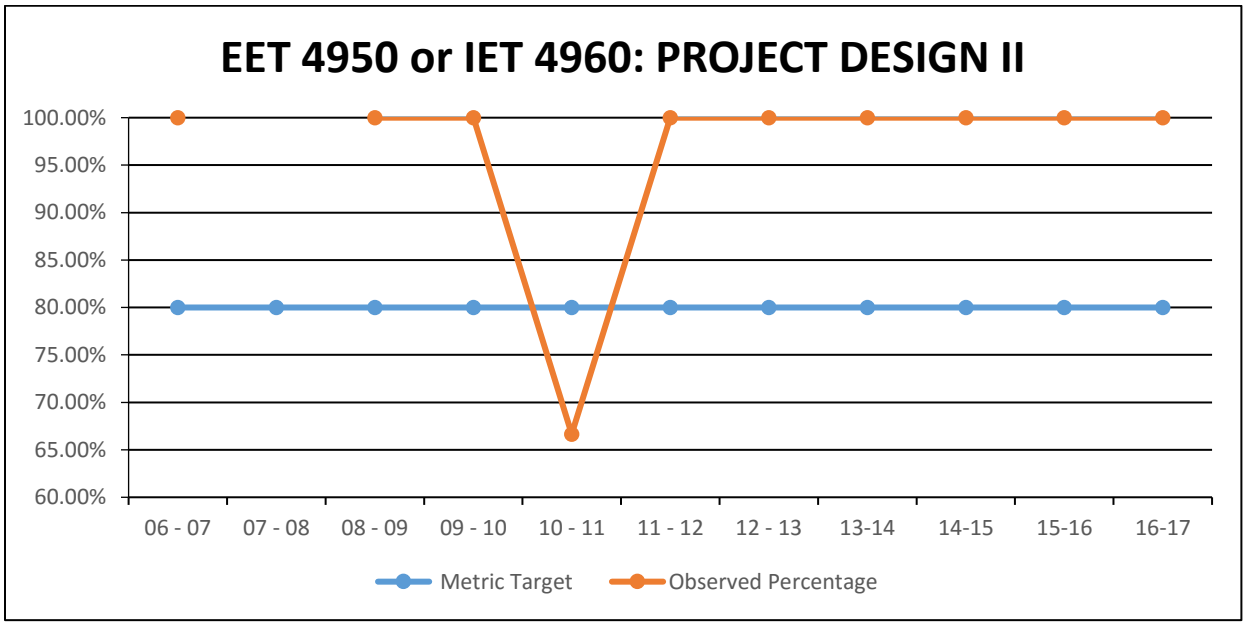


**Figure 11. Percentage of students rated 4 or better on the technical portion of the written proposal in EET 4950 or IET 4960.**

### SLO 5. Ability to communicate effectively (ETAC of ABET Outcome e).

Course Map: Tied to course syllabus objectives.

EET 4950 or IET 4960: PROJECT DESIGN II
COMM 1010: FUNDAMENTALS OF SPEECH

### Measure 5.1. (Direct –Skill/Ability)

## Assessment Cycle

## Academic Year 2016 – 2017

Every semester, upon presentation of capstone projects, students evaluate each other (i.e., peer evaluation) with respect to ability to communicate effectively. The acceptable target is 80% of EET students rate at least 4 of 7.

**Finding:** Target met. 3/3 (100%) of students rated 4 or better for ability to function effectively on teams by their peers on capstone projects in the fall of 2016. 4/4 (100%) of students rated 4 or better for ability to function effectively on teams by their peers on capstone projects in the spring of 2017.

**Analysis:** For the past six years, the performance targets were met consistently at 100% level for IET 4960. A possible change in target performance will be discussed by the Industrial Advisory Committee in fall of 2017 and the decision will be made based on the committee's recommendation.

**Action - Decision or Recommendation:** No program changes were recommended. A possible change in target performance will be discussed in Industrial Advisory Committee in the fall of 2017.

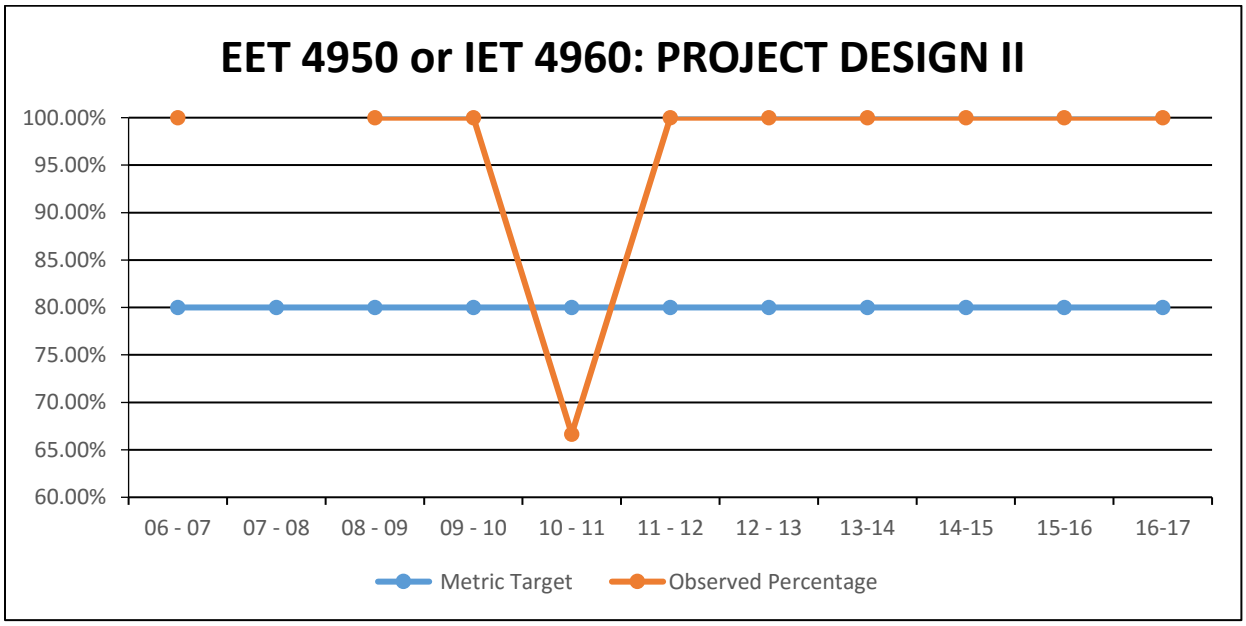


**Figure 12. Percentage of students rated 4 or better for ability to function effectively on teams by their peers on capstone projects.**

### Measure 5.2. (Direct –Skill)

Every semester, student's final grades on COMM 1010 are obtained through institutional research. The acceptable target is 80% of graduating EET students graded at a C or better in COMM 1010.

**Finding:** Target met. 5 out of 6 (83 %) scored a C or better in the fall of 2016. 9 out of 11 (82 %) scored C or better in spring 2017

**Analysis:** Targets were missed by a narrow margin in 2015-16. Targets were met in fall 2016 and spring 2017. The recent trend shows that the student performance is gradually increasing. COMM 1010 classes are offered outside of the department and in future, if the performance is not satisfactory appropriate measures (e.g., notifying respective department, ways to enhance students learning, etc.) will be initiated and decision will be made. For the time being performance is satisfactory.

**Action - Decision or Recommendation:** No program changes were recommended.

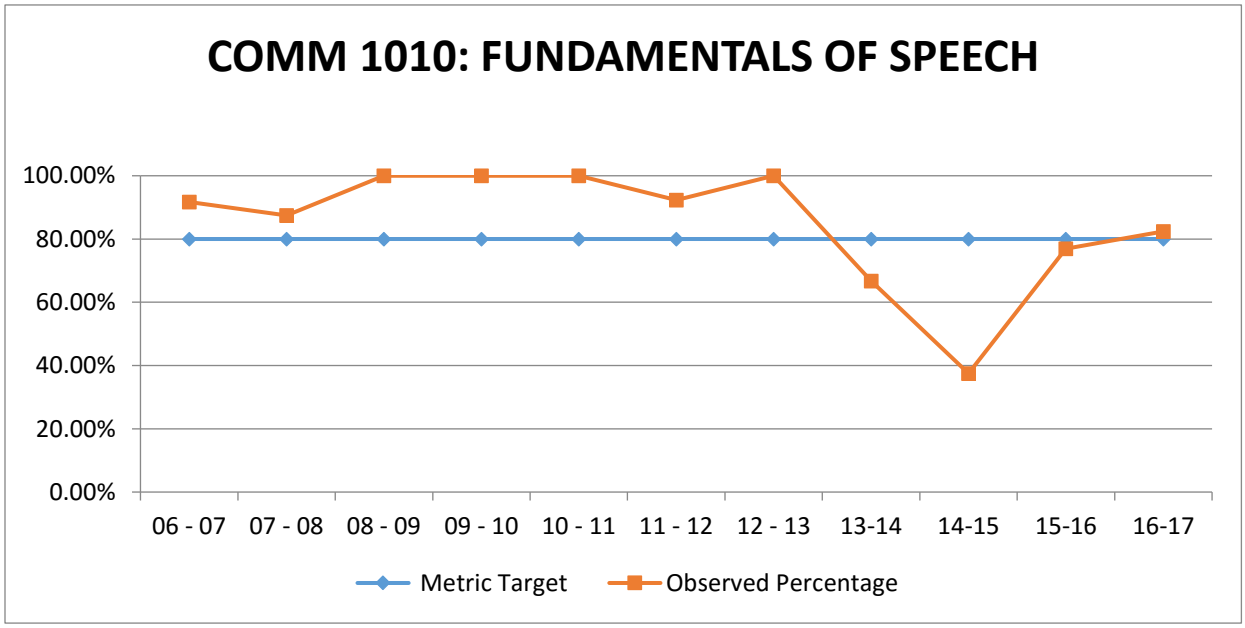


**Figure 13. Percentage of graduating EET students graded C or better in course COMM 1010.**

**SLO 6. Ability to perform self-directed professional development (ETAC of ABET Outcome f).**

Course Map: Tied to course syllabus objectives.

IET 1700: INTRODUCTION TO ENGINEERING TECHNOLOGY
EET 4950 or IET 4960: PROJECT DESIGN II

**Measure 6.1. (Direct –Skill/Ability)**

Every semester, students' grades on IET 1700 Test 1 are used to assess the attainment of SLO 6. The acceptable target is 80% of students score a C or better on Test 1.

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**Finding:** Target met. 19 out of 20 (95%) scored a C or better in Test 1 in the fall of 2016. 16 out of 19 (95%) scored a C or better in Test 1 in the spring of 2017.

**Analysis:** This is a freshmen level class and so far, the students' performance is satisfactory. A fluctuation in performance can be attributed to year-to-year variation.

**Action - Decision or Recommendation:** No program changes were recommended.

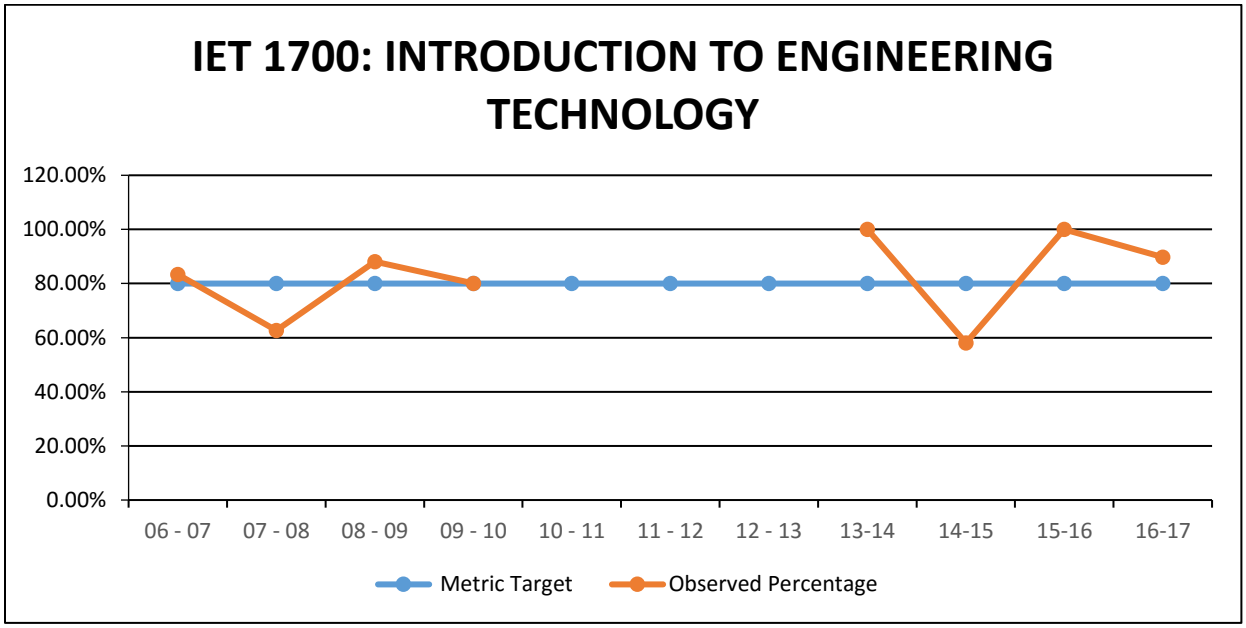


**Figure 14 Percentage of students scoring C or better in Test 1**

### Measure 6.2. (Indirect – Knowledge/Ability/Skill)

Every semester, upon presentation of capstone projects, ET faculty evaluate student performance with respect to the ability to perform self-directed professional development. The acceptable target is 80% of EET students rate at least 4 of 7.

**Finding:** Target met. 3/3 (100%) of students rated 4 or better on faculty evaluation of student performance with respect to ability to perform self-directed professional development in IET 4960 in the fall of 2016 and 4/4 (100%) of students rated 4 or on faculty evaluation of student performance with respect to ability to perform self-directed professional development in IET 4960 in the spring of 2017.

**Analysis:** For the past six years, the performance targets were met consistently at 100% level for IET 4960. A possible change in target performance will be discussed by the Industrial Advisory Committee in the fall of 2017 and the decision will be made based on the committee's recommendation.

**Action - Decision or Recommendation:** No program changes were recommended. A possible change in target performance will be discussed by the Industrial Advisory Committee in the fall of 2017.

**SLO 7. A commitment to address ethical considerations involved in solving electronic engineering technology problems (ETAC of ABET Outcome g).**

Course Map: Tied to course syllabus objectives.

IET 4750: ELEMENTS OF OCCUPATIONAL SUPERVISION
EET 4950 or IET 4960: PROJECT DESIGN II
ENGL 3320: TECHNICAL COMPOSITION

**Measure 7.1. (Direct – Knowledge)**

Every semester, students' grades on IET 4750 Test2 are used to assess the attainment of SLO 7. The acceptable target is 80% of students score a C or better on Test 2.

**Finding:** Target met. 2 out of 2 (100%) scored B or better on course evaluations in the fall of 2016. No EET student were enrolled in IET 4750 in the spring of 2017.

**Analysis:** Over the past several years, students' performance has been satisfactory. Steady performance at 100% will be monitored in future to initiate change in target or other decision related performance evaluation.

**Action - Decision or Recommendation:** No program changes were recommended.

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## Academic Year 2016 – 2017

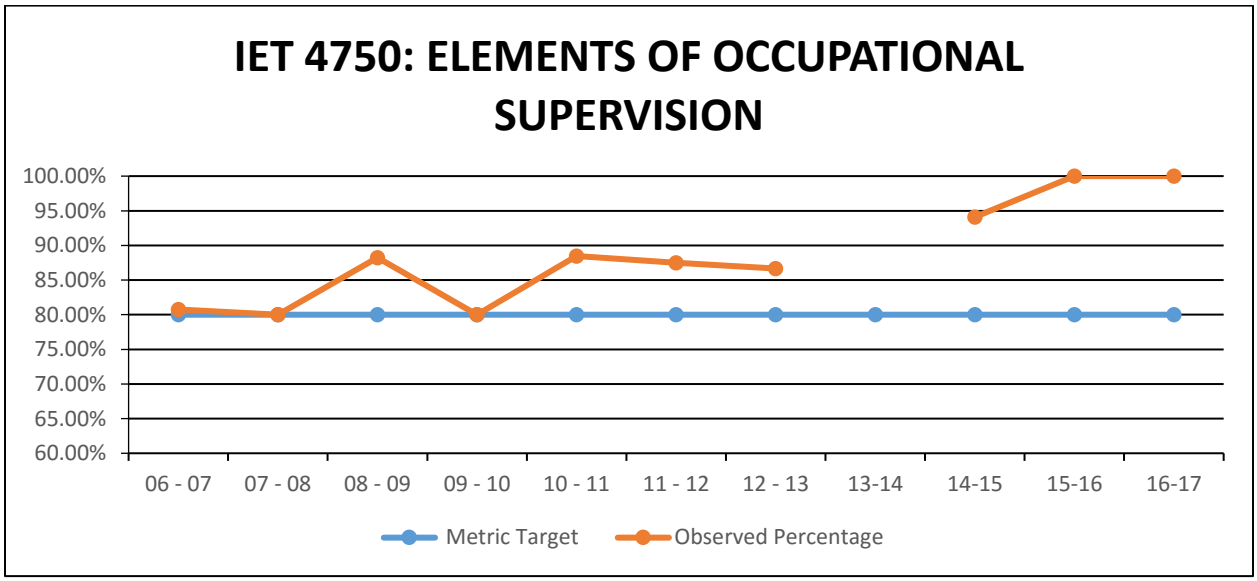


**Figure 15. Percentage of Students scoring B or better in Test 2.**

### Measure 7.2. (Direct – Knowledge/Ability/Skill)

Every semester, upon presentation of capstone projects, ET faculty evaluate student performance on oral presentation and written proposal (report). The acceptable target is 80% of students score C or better on oral presentation and written proposal.

**Finding:** 3/3 (100%) of students rated 4 or better by faculty on oral presentation and written proposal of capstone projects in IET 4960 in fall 2016.
4/4 (100%) of students rated 4 or better by faculty on oral presentation and written proposal of capstone projects in IET 4960 in spring 2017

**Analysis:** Target met. Fluctuating performance by the student may be attributed to their inexperience in oral presentation in front of the audience (faculty and students). Overall, the performance by students is satisfactory.

**Action - Decision or Recommendation:** No program changes were recommended.

### Measure 7.3. (Direct –Skill)

Every semester, student's final grades on ENGL 3230 are obtained through institutional research. The acceptable target is 80% of graduating EET students graded at a C or better in ENGL 3230.

**Finding:** Target met. 4 out of 5 (80 %) scored a C or better in the fall of 2016. 10 out of 10 (100 %) scored a C or better in the spring of 2017.

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**Analysis:** The performance data is collected at the university level. As per the existing trend, student performance has met the target most of the time with one exception in the past five years. Until consistent higher performance is observed, the overall performance is satisfactory with no need for any immediate changes.

**Action - Decision or Recommendation:** No program changes were recommended.

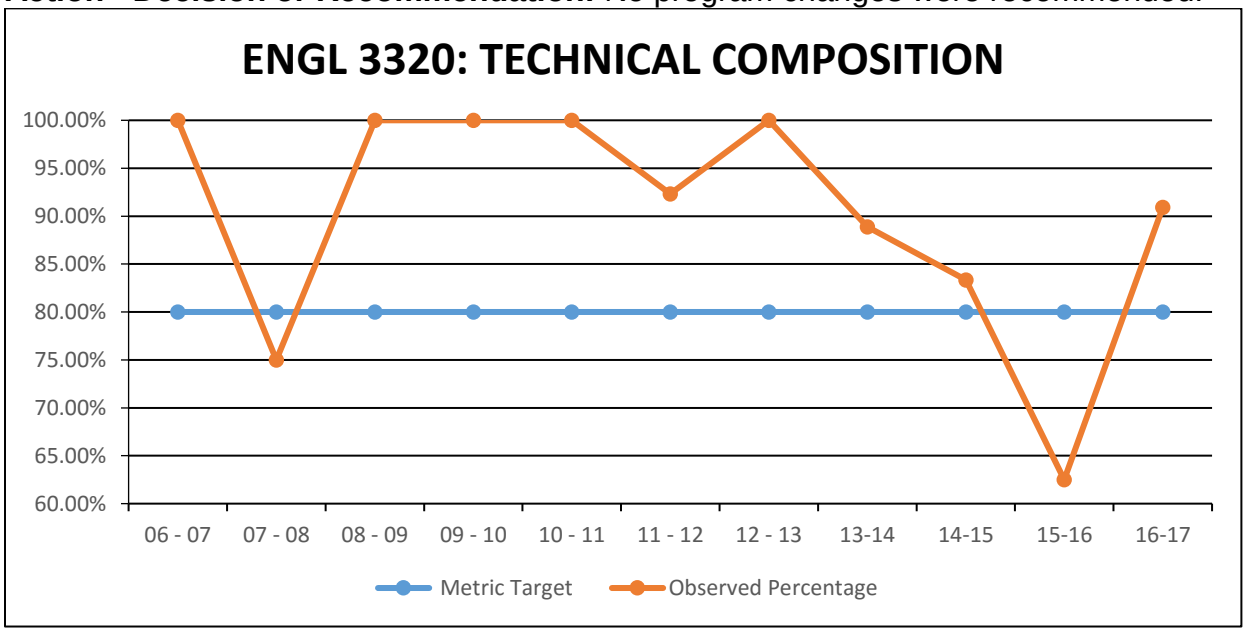


**Figure 16. Percentage of students scoring C or better.**

### Summary of key findings and or decisions.

Assessment data for academic year 2016-2017 show that targets were met or exceeded.

The students' performance charts show the results of assessment over time. The majority of the students' performance indices for all SLOs were found to be satisfactory. There is no need to adjust assessment targets at this time; however, some of the performance indices were at 100% level for several years in a row. A possible change in the performance targets will be discussed in the Industrial Advisory Committee in the fall of 2017 and decisions will be made based on the committee's recommendation for each of the performance targets.