– Electronics Engineering Technology –
2017-18 Assessment Report

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1 Introduction

1.1 Program Location

The Bachelor of Science in Electronics Engineering Technology (BSEET) is offered at the Oregon Tech Wilsonville Campus on the south side of the Portland metropolitan area. The campus is situated in a wooded business park setting among several technology companies including Mentor Graphics, Rockwell Collins, and Xerox. The campus is conveniently located off Interstate 5 and a short walk away from the Wilsonville Station on the Westside Express Service (WES) commuter rail line that connects to Beaverton and the MAX Light Rail. In addition, several of the core courses for the degree and technical electives are available at the Willow Creek Center (WCC) in the Portland Westside to better accommodate degree-seeking professionals working for high-tech companies in the Hillsboro and Beaverton area. The WCC is located in the heart of the high-tech industry cluster (Silicon Forest), minutes away from companies such as Intel, Tektronix, MAXIM, Credence, Lattice, Synopsis, TriQuint, and ESI. Some of the core courses and technical electives are also available online.

1.2 Program Goals and Design

The program is designed to prepare graduates to assume engineering and technology positions in the electronics industry. Graduates of the Electronics Engineering Technology program fulfill a wide range of functions within industry. Bachelor's degree graduates are currently placed in positions such as component and system design, test engineering, product engineering, field engineering, manufacturing engineering, sales or market engineering, and quality control engineering. The program also provides a solid preparation for students intending to continue to graduate school to pursue master's degrees in engineering, engineering management, and M.B.A.s. Employers of Electronics Engineering Technology graduates include research and development laboratories, electronic equipment manufacturers, public utilities, colleges and universities, government agencies, medical laboratories and hospitals, electronic equipment distributors, semiconductor companies, and automated electronic controlled processing companies. Recent graduates have been employed at companies such as MAXIM, TriQuint, Tektronix, Biotronik, and Intel.

The BSEET degree at Oregon Tech Wilsonville is especially suited for working professionals with an associate's degree in Electronics Engineering Technology, Microelectronics Technology, or equivalent coursework. Students entering the B.S. degree in Electronics Engineering Technology program by transfer are requested to contact the EET Program Director concerning transfer of technical coursework. An accredited Associate of Applied Science (A.A.S.) degree in Electronics or Microelectronics and Calculus-level math is a perfect preparation to start our upper-division coursework. Alternatively, coursework on DC Circuit Analysis, AC Circuit Analysis, Combinational Logic (Digital Circuits), Sequential Logic (Digital Circuits), Semiconductor Devices, and other technical and general education courses provides adequate preparation. Our BSEET program has articulation agreements with the Electronics and Microelectronics programs at Portland Community College, Clackamas Community College, Chemeketa Community College, and Columbia Gorge Community College. It is recommended that students start the advising process with Oregon Tech right after they complete the first year of their A.A.S. degree.

1.3 Program Brief History

The BSEET program at Oregon Tech was first accredited by ABET in 1970. The last ABET accreditation visit took place in Fall 2014.

Oregon Institute of Technology has offered a Bachelor of Science in Electronics Engineering Technology (BSEET) degree since 1970. The EET program served a need in the state for many years and was successful and highly regarded. Since the 1990's industries' needs began to shift more towards hiring graduates of full electrical engineering programs and the BSEET program started to experience significant enrollment declines. A department committee, in consultation with the industry advisory board, recommended that the program change from EET to EE in Klamath Falls, but continue as the BSEET program at OIT-Portland to continue serving degree completion students and working professionals with A.A.S. EET degrees. Once the decision to discontinue the BSEET program from Klamath Falls was made, the BSEET program underwent a major revision in order to optimize it to address the needs of working professionals and transfer students at OIT-Portland. These revisions were approved by the Curriculum Planning Commission (CPC) in 2008. In 2011, a decision was made by the department, in consultation with the industry advisory board, to enhance the upper division EET curriculum by converting some of the EET courses to traditional EE courses with a strong lab component. This change was implemented to better achieve the program educational objectives of preparing graduates to assume diverse roles in the engineering and engineering technology fields, as well as improve their access to graduate education. These changes were approved by the Curriculum Planning Commission (CPC) in 2011 and implemented in the 2011-12 academic year.

In Fall 2012 the Oregon Tech Wilsonville campus opened as a result of the consolidation of the university's four Portland metro area sites. The BSEET courses are offered at the Wilsonville campus, and they also continue to be offered at the Willow Creek Center (on the Westside), in order to accommodate professionals working in the high-tech industry cluster in the Beaverton/Hillsboro area.

The BSEET program also has strong relationships with industry, particularly through its program-level Industry Advisory Board and alumni from the EET program. These relationships allow the BSEET program to meet a third institutional mission objective, "Develop and maintain partnerships with public and private institutions, business and industry, and government agencies to ensure quality programs that meet the needs of students and the organizations that employ them."

2 Program Mission, Educational Objectives, and Outcomes

2.1 Program Mission

The mission of the EET Program is to provide a comprehensive program of instruction that will enable graduates to obtain the knowledge and skills necessary for immediate employment and continued advancement in the field of electronics. The department will be a leader in providing career ready candidates for various electronics technology fields. Faculty and students will engage in applied research in emerging technologies and provide professional services to their communities.

2.2 Program Educational Objectives

Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve. The Program Educational Objectives of Oregon Tech's Bachelor of Science in Electronics Engineering Technology are:

- The graduates of the program will possess a strong technical background as well as analytical and problem solving skills, and will contribute in a variety of technical roles within the electronics and high-tech industry. Within three years of graduation, BSEET graduates are expected to be employed as test engineers, characterization engineers, applications engineers, field engineers, hardware engineers, process engineers, and similar engineering technology positions within this industry.
- The graduates of the program will be working as effective team members with excellent oral and written communication skills, assuming technical and managerial leadership roles throughout their career.
- The graduates of the program will be committed to professional development and lifelong learning by engaging in professional and/or graduate education in order to stay current in their field and achieve continued professional growth.

2.3 Relationship Between Program Educational Objectives and Institutional Mission Statement

These program objectives support Oregon Tech's institutional mission statement, which states:

> Oregon Institute of Technology, an Oregon public university, offers innovative and rigorous applied degree programs in the areas of engineering, engineering technologies, health technologies, management, and the arts and sciences. To foster student and graduate success, the university provides an intimate, hands-on learning environment, focusing on application of theory to practice. Oregon Tech offers statewide educational opportunities for the emerging needs of Oregonians and provides information and technical expertise to state, national and international constituents.

2.4 Program Outcomes

The BSEET Program Outcomes include ABET's ETAC $a - k$ outcomes as well as the electronics specific $l - m$ outcomes.

These are listed below:

a an ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities.

b an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies.

c an ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.

d an ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives.

e an ability to function effectively as a member or leader on a technical team.

f an ability to identify, analyze, and solve broadly-defined engineering technology problems.

g an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature.

h an understanding of the need for and an ability to engage in self-directed continuing professional development.

i an understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity.

j a knowledge of the impact of engineering technology solutions in a societal and global context.

k a commitment to quality, timeliness, and continuous improvement.

l the ability to analyze, design, and implement control systems, instrumentation systems, communications systems, computer systems, or power systems.

m the ability to apply project management techniques to electrical/electronic(s) systems.

n the ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of electrical/electronic(s) systems.

3 Cycle of Assessment for Program Outcomes

3.1 Introduction and Methodology

Assessment of the program outcomes is conducted over a three year-cycle. Table 1 shows the minimum outcomes assessed each year. The assessment cycle was changed during the 2014/15 assessment year from previous years (see Table 2 for the old assessment cycle). This change was implemented at an assessment coordination meeting on February 2, 2014. At this meeting, assessment coordinators representing each program within the Electrical Engineering and Renewable Energy (EERE) Department aligned their assessment cycles so that each program assesses similar outcomes on the same years. The intention for this change is to better organize the assessment process and produce more meaningful data for comparison between different programs in the EERE Department.

The assessment cycle was changed during the 2014/15 assessment year to begin in the spring. In previous years, the assessment cycle started in the fall. This change reflected a shift on an institutional level to begin data collection in the spring term. In 2012-13 the Assessment Commission Executive Committee began recommending that programs begin data collection for the upcoming year during spring term. This recommendation was based on the fact that many programs found the best courses to embed assessment often fell in spring term. Yet this made it difficult to gather the data for a spring term faculty meeting to review the results and make recommendations for actions.

In 2016/17, the institution shifted back to an assessment cycle starting in the fall, as advised by the Assessment Commission Executive Committee. In accordance with this recommendation, effective 2016/17, the cycle of assessment for the BSEET program outcomes begins in the fall.

3.2 Assessment Cycle

Table 1: BSEET Outcome Assessment Cycle. Check marks ($\surd$) indicate standard assessment cycle, daggers (†) indicate additional assessments performed, check marks with asterisks ($\surd^*$) indicate assessments that were not performed in AY 2017/18 due to lack of BSEET enrollment in assigned courses.

Outcome	2014/15	2015/16	2016/17	2017/18
a. Fundamentals	–	–	$\surd$	–
b. Application	$\surd$	–	–	$\surd$
c. Experimentation	–	$\surd$	–	–
d. Design	$\surd$	–	–	$\surd^*$
e. Teamwork	$\surd$	–	–	$\surd$
f. Problem Solving	–	–	$\surd$	–
g. Communication	–	–	$\surd$	†
h. Lifelong Learning	–	–	$\surd$	–
i. Ethics	–	$\surd$	†	–
j. Impact	–	$\surd$	–	†
k. Continuous Improvement	$\surd$	–	–	$\surd^*$
l. Electronic Systems	–	$\surd$	†	–
m. Project Management	–	–	$\surd$	–
n. Advanced Mathematics	$\surd$	–	†	$\surd$

Table 2: Old BSEET Outcome Assessment Cycle

Outcome	2008/9	2009/10	2010/11	2011/12	2012/13	2013/14
a. Fundamentals	–	$\surd$	–	–	$\surd$	–
b. Application	$\surd$	–	–	$\surd$	–	–
c. Experimentation	–	–	$\surd$	–	–	$\surd$
d. Design	$\surd$	–	–	$\surd$	–	–
e. Teamwork	$\surd$	–	–	$\surd$	–	–
f. Problem Solving	–	–	$\surd$	–	–	$\surd$
g. Communication	–	–	$\surd$	–	–	$\surd$
h. Lifelong Learning	–	–	$\surd$	–	–	$\surd$
i. Ethics	–	$\surd$	–	–	$\surd$	–
j. Impact	–	$\surd$	–	–	$\surd$	–
k. Continuous Improvement	–	–	$\surd$	–	–	$\surd$
l. Electronic Systems	–	$\surd$	–	–	$\surd$	–
m. Project Management	–	–	$\surd$	–	–	$\surd$
n. Advanced Mathematics	$\surd$	–	–	$\surd$	–	–

3.3 Summary of Assessment Activities & Evidence of Student Learning

3.3.1 Introduction

The Electronics Engineering Technology faculty members conducted formal assessment of nine Program Outcomes during the 2017-2018 assessment year using direct measures such as comprehensive ABET Projects and ABET Assignments[1] and targeted ABET Program

[1]ABET Projects and ABET Assignments refer to projects and assignments especially designed by Oregon Tech BSEET faculty to go beyond the assessment of course outcomes in order to assess more general program-

Outcome Exam Questions. Additionally, the Program Educational Objectives were assessed using indirect measures, namely, surveys of employers and alumni.

3.3.2 Methodology for Assessment of Program Outcomes

The BSEET mapping process links specific tasks within engineering assignments to ABET program outcomes and on to program educational objectives in a systematic way based on ABET rubrics[2]. The program outcomes are evaluated as part of the course curriculum primarily by means of comprehensive ABET assignments specifically designed to measure program-level outcomes in addition to course-level outcomes. These assignments typically involve a short project or lab requiring the student to apply math, science, and engineering principles learned in the course to solve a particular problem requiring the use of modern CAD tools and engineering equipment, working in teams, writing a project report, and giving an oral presentation. ABET assignments are designed to assess several fundamental program outcomes at once. An ABET multi-outcome rubric is used to perform direct assessment of these assignments. A systematic, rubric-based process is then used to quickly assess tasks within assignments and link them directly to a group of program outcomes. Evaluations of these outcomes are then gathered and accounted in outcome-specific tables, analyzed and then individually summarized. Summaries for all outcomes are then compiled into a comprehensive program outcome summary for each course. The outcome summary is then evaluated for relevance with respect to the program objectives. The summary of outcomes is formatted and organized such that it is suitable for inclusion in an ABET review document.

The mapping process aims to systemize the assessment of engineering coursework, and to provide a mechanism that facilitates the design of engineering assignments that meet the ABET-relevant ("a" through "n") outcomes, particularly those that are more distant from traditional engineering coursework. Rather than considering how the outcomes match the assignment, the assignment is designed to map to the program outcomes.

By assessing multiple outcomes per assignment, the number of assessed assignments may be reduced and assignments become more relevant to the program outcomes, since the assignments are designed with the general program outcomes in mind. Additionally, incorporating multiple outcomes in a single assignment provides for a richer assignment, one that takes into account a wider range of engineering issues.

3.3.3 2017-2018 Targeted Assessment Activities

The sections below describe the 2017-2018 targeted assessment activities and detail the performance of students for each of the assessed outcomes. The tables report the number of students performing at a developing level, accomplished level, and exemplary level for each performance criteria, as well as the percentage of students performing at an accomplished level or above.

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level outcomes including the ABET $a - n$ outcomes.

[2]ABET rubrics refer to rubrics especially designed by Oregon Tech BSEET faculty to assess ABET Projects based on program-level outcomes.

3.3.4 Targeted Assessment for Outcome b: an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies.

This outcome was assessed in EE 320 - Advanced Circuits and Systems in Fall 2017.

Outcome (b) : EE 320, Fall 2017, Dr. Aaron Scher

This outcome was assessed in EE 320 - Advanced Circuits and Systems in Fall 2017 by means of a laboratory assignment. The objective of this lab is to find the transfer function of RLC circuits and use it to find the impulse response, step response, ramp response, and frequency response, as well as to understand the relationship between the impulse response and the frequency response.

Three BSEET students were enrolled in the course and assessed in Fall 2017 using the performance criteria listed in Table 3. The minimum acceptable performance level was to have above 80% of the students performing at the accomplished or exemplary level in all performance criteria.

Table 3 summarizes the results of this targeted assessment. The results indicate that the minimum acceptable performance level of 80% was not met on all performance criteria for this program outcome. We note that the low sample size (n = 3), reduces the ability to make general inferences or conclusions from this data set.

Table 3: Targeted Assessment for Outcome a: 1) Criterion 1 - 1-an ability to select and apply a knowledge of mathematics, 2) Criterion 2- 2-an ability to select and apply a knowledge of science, engineering and technology.

Outcome (b) : EE 320, Fall 2017, Dr. Aaron Scher

Performance Criteria	1-Developing	2-Accomplished	3-Exemplary	% Students ≥ 2
1 - Mathematics	1	2	0	66.67%
2 - Science/Engr.	0	3	0	100%

3.3.5 Targeted Assessment for Outcome e: an ability to function effectively as a member or leader on a technical team.

This outcome was assessed in EE 320 - Advanced Circuits and Systems in Fall 2017.

Outcome (e) : EE 320, Fall 2014, Dr. Aaron Scher

This outcome was assessed in EE 320 -Advanced Circuits and Systems in Fall 2017 by means a project where students worked in teams to design and construct a capacitive proximity detector circuit. Students were required to build their circuits on PCBs and demonstrate their final project the class. Students completed a peer assessment evaluation at the end of the project. A total of three students were enrolled in the course and assessed in Fall 2017 using the performance criteria listed in Table 4. The minimum acceptable performance level was to have above 80% percent of the students performing at the accomplished or exemplary level in all performance criteria. The results indicate that the minimum acceptable performance level of 80% was met on all performance criteria.

Table 4 summarizes the results of this targeted assessment. The results indicate that the minimum acceptable performance level of 80% was not met on all performance criteria for this program outcome. We note that the low sample size (n = 3), reduces the ability to make general inferences or conclusions from this data set.

Table 4: Targeted Assessment for Outcome e: 1) Criterion 1- team participation, 2) Criterion 2- team communication, 3) Criterion 3- team decision making, 4) Criterion 4- team management

Outcome (e) : EE 320, Fall 2017, Dr. Aaron Scher

Performance Criteria	1-Developing	2-Accomplished	3-Exemplary	% Students ≥ 2
1 - Participation	1	0	2	66.67%
2 - Communication	0	2	1	100%
3 - Decision	1	2	0	66.67%
4 - Management	1	2	0	66.67%

3.3.6 Targeted Assessment for Outcome g: an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature.

This outcome was assessed in EE 430 - Digital Signal Processing in Winter 2018.

Outcome (g) : EE 430, Winter 2018, Dr. Mateo Aboy

This outcome was assessed in EE430-DSP in Winter 2018 by means of two lab assignments. In the first lab assignment students needed to use the reporting feature in MATLAB in order to generate an automatic technical logbook of their lab work. They needed to include sufficient graphs and plots in order for a technical person to be able to evaluate their ability to design and analyze FIR filters. In the second lab assignment, students needed to create a brief presentation to explain their design of an automatic beat detection algorithm to a non-technical audience (5 min maximum).

Table 5 summarizes the results of this targeted assessment. The results indicate that the minimum acceptable performance level of 80% was met on all performance criteria for this program outcome, that is, over 80% of students were able to demonstrate an ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature. We note that the low sample size (n = 3), reduces the ability to make general inferences or conclusions from this data set.

Table 5: Targeted Assessment for Outcome g: 1) Criterion 1 - an ability to apply written communication, 2) Criterion 2- an ability to apply oral communication, 3) Criterion 3 - an ability to apply graphical communication, 4) Criterion 4 - an ability to apply and identify appropriate technical literature, 5) Criterion 5 - an ability to communicate with technical and nontechnical audiences

Outcome (g) : EE 430, Winter 2018, Dr. Mateo Aboy

Performance Criteria	1-Developing	2-Accomplished	3-Exemplary	% Students ≥ 2
1 - Written	0	3	0	100%
2 - Oral	0	3	0	100%
3 - Graphical	0	3	0	100%
4 - Literature	0	3	0	100%
5 - Audience	0	3	0	100%

3.3.7 Targeted Assessment for Outcome j: a knowledge of the impact of engineering technology solutions in a societal and global context

This outcome was assessed in EE 323 - Electronics II in Winter 2018.

Outcome (j) : EE323, Winter 2017, Cristina Crespo

This outcome was assessed in EE323 - Electronics II in Winter 2018 by means of a special assignment. The assignment consisted of research current trends and contemporary topics in the field of electronics, select a particular contemporary issue in the field of electronics, generate and deliver a slide presentation about the particular topic selected, including current proposed solutions and their societal and global impact.

Three BSEET students were enrolled in the course in Winter 2018. Of those, two failed to submit their assignment. Therefore, only one student was assessed, using the performance criteria listed in the table below. The minimum acceptable performance level is to have above 80% of the students performing at the accomplished or exemplary level in all performance criteria. We note that the low sample size (n = 1), reduces the ability to make general inferences or conclusions from this data set.

Table 6: Targeted Assessment for Outcome j: 1) Criterion 1 - an ability to examine the impact of engineering technology solutions is a societal context, 2) Criterion 2 - an ability to examine the impact of engineering technology solutions is a global context.

Outcome (j) : EE 323, Winter 2018, Cristina Crespo

Performance Criteria	1-Developing	2-Accomplished	3-Exemplary	% Students ≥ 2
1 -Social Impact	0	1	0	100%
2 - Global Impact	0	1	0	100%

3.3.8 Targeted Assessment for Outcome n: the ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of electrical/electronic(s) systems.

This outcome was assessed in EE 320 - Advanced Circuits and Systems in Fall 2017.

Outcome (n) : EE 320, Fall 2017, Dr. Aaron Scher

This outcome was assessed using questions from the final exam. Students were required to represent an snubber circuit in the s-domain, as well as find the transfer function (using the Laplace Transform), frequency response, impulse response, and steady-state sinusoidal response of an RC filter.

Three BSEET students were enrolled in the course and assessed in Fall 2017 in the course EE 320 - Advanced Circuits and Systems using the performance criteria listed in Table 7. The minimum acceptable performance level was to have above 80% of the students performing at the accomplished or exemplary level in all performance criteria.

Table 7 summarizes the results of this targeted assessment. The results indicate that the minimum acceptable performance level of 80% was not met on all performance criteria for this program outcome. We note that the low sample size (n = 3), reduces the ability to make general inferences or conclusions from this data set.

Table 7: Targeted Assessment for Outcome n: 1) Criterion 1- ability to identify appropriate and relevant concepts of mathematics to solve problems related to electrical/electronic(s) systems, 2) Criterion 2- an ability to apply mathematics to solve problems related to electrical/electronics systems

Outcome (n) : EE 320, Fall 2017, Dr. Aaron Scher

Performance Criteria	1-Developing	2-Accomplished	3-Exemplary	% Students ≥ 2
1 - Identify	2	1	0	33.33%
2 - Apply	2	1	0	33.33%

3.3.9 2017-2018 Indirect Assessment

In addition to direct assessment measures, the student outcomes a – n were indirectly assessed through a senior exit survey.

The survey presents the program student learning outcomes and asks "Please rate your proficiency in the following areas". Figure 1 shows the results of this indirect assessment of the BSEET student outcomes for the 2017-2018 graduating class. Four BSEET graduating seniors completed the survey. For all outcomes, 100% of respondents indicated that after completing the BSEET program they have have proficiency in all BSEET student outcomes.

The survey also asks "How much has your experience at Oregon Tech contributed to your knowledge, skills, and personal How much has your experience at Oregon Tech contributed to your knowledge, skills, and personal development in these areas?". Figure 2 shows the results of this indirect assessment. For all outcomes, 100% of respondents indicated that their experience at Oregon Tech contributed to their knowledge, skills, and personal development in all BSEET student outcomes.

We recognize that the sample size is very low (four survey responses), which may not accurately reflect the proficiency of our recent graduates. The BSEET Program Director has brought this issue to the attention of the Office of Academic Excellence and Assessment.

4 Changes Resulting From Assessment

This section describes the changes resulting from the assessment activities carried out during the year 2017-2018. It includes any changes that have been implemented based on assessment in previous assessment cycles, from this or last year, as well as considerations for the next assessment cycle.

The BSEET faculty met in November 2018 to review the assessment results and determine whether any changes are needed to the BSEET curriculum or assessment methodology based on the results presented in this document. The objective set by the BSEET faculty was to have at least 80% of the students perform at the level of accomplished or exemplary in all performance criteria of the assessed outcomes. Table 8 provides a summary of the 2017-18 assessment results for the outcomes which were directly assessed. This data is separated into outcomes and courses assessed.

BSEET survey question: Please rate your proficiency in the following areas.

Field	High proficiency	Proficiency	Some proficiency	Limited proficency
a. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities.	3	1	0	0
b. An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies.	4	0	0	0
c. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.	2	2	0	0
d. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives.	2	2	0	0
e. An ability to function effectively as a member or leader on a technical team.	4	0	0	0
f. An ability to identify, analyze, and solve broadly-defined engineering technology problems.	3	1	0	0
g. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature.	3	1	0	0
h. An understanding of the need for and an ability to engage in self-directed continuing professional development.	4	0	0	0
i. An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity.	4	0	0	0
j. A knowledge of the impact of engineering technology solutions in a societal and global context.	4	0	0	0
k. A commitment to quality, timeliness, and continuous improvement.	4	0	0	0
l. The ability to analyze, design, and implement control systems, instrumentation systems, communications systems, computer systems, or power systems.	3	1	0	0
m. The ability to apply project management techniques to electrical/electronic(s) systems.	3	1	0	0
n. The ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of electrical/electronic(s) systems.	3	1	0	0

Figure 1: Table of results of the indirect assessment for the BSEET Student Outcomes as reported in the Senior Exit Survey (AY 2017-18).

BSEET survey question: How much has your experience at Oregon Tech contributed to your knowledge, skills, and personal How much has your experience at Oregon Tech contributed to your knowledge, skills, and personal development in these areas?

Field	Very much	Quite a bit	Some	Very little
a. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities.	3	1	0	0
b. An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies.	2	2	0	0
c. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.	3	1	0	0
d. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives.	4	0	0	0
e. An ability to function effectively as a member or leader on a technical team.	2	1	1	0
f. An ability to identify, analyze, and solve broadly-defined engineering technology problems.	2	2	0	0
g. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature.	3	1	0	0
h. An understanding of the need for and an ability to engage in self-directed continuing professional development.	3	0	1	0
i. An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity.	2	2	0	0
j. A knowledge of the impact of engineering technology solutions in a societal and global context.	3	1	0	0
k. A commitment to quality, timeliness, and continuous improvement.	4	0	0	0
l. The ability to analyze, design, and implement control systems, instrumentation systems, communications systems, computer systems, or power systems.	3	1	0	0
m. The ability to apply project management techniques to electrical/electronic(s) systems.	3	1	0	0
n. The ability to utilize statistics/probability, transform methods, discrete mathematics, or applied differential equations in support of electrical/electronic(s) systems.	3	1	0	0

Figure 2: Table of results of the indirect assessment for the BSEET Student Outcomes as reported in the Senior Exit Survey (AY 2017-18).

Table 8: Summary of BSEET direct assessment for AY2017-18.

	Total Students	Students ≥ 2	% Students ≥ 2
b - Application - EE 320 (Scher)			
1 - Mathematics	3	2	66.67%
2 - Science/Engineering	3	3	100%
e - Teamwork - EE 320 (Scher)			
1 - Participation	3	2	66.67%
2 - Communication	3	3	100%
3 - Decision	3	2	66.67%
4 - Management	3	2	66.67%
g - Communication - EE 430 (Aboy)			
1 - Written	3	3	100%
2 - Oral	3	3	100%
3 - Graphical	3	3	100%
4 - Literature	3	3	100%
5 - Audience	3	3	100%
j - Impact - ENGR 323 (Crespo)			
1 - Social Impact	1	1	100%
2 - Global Impact	1	1	100%
n - Advanced mathematics - EE 320 (Scher)			
1 - Identify	2	1	33.33%
2 - Apply	2	1	33.33%

Table 9: Comparison of results with previous assessment year. Shown are % students ≥ 2 for 2017-18 and the previous year the outcome was assessed. Sample size and results includes combined total of students for each outcome evaluated within the academic year.

	Current	Previous
b - Application	2017-18	2014-15
	Sample size =3	Sample size size =11
1 - Mathematics	66.67%	90.9%
2 - Science/Engineering	100%	90.9%
e - Teamwork	2017-18	2014-15
	Sample size =3	Sample size = 11
1 - Participation	66.67%	90.91%
2 - Communication	100%	81.92%
3 - Decision	66.67%	90.91%
4 - Management	66.67%	90.91%
g - Communication	2017-18	2016-17
	Sample size =3	Sample size =8
1 - Written	100%	100%
2 - Oral	100%	100%
3 - Graphical	100%	100%
4 - Literature	100%	100%
5 - Audience	100%	100%
j - Impact	2017-18	2015-16
	Sample size =1	Sample size =4
1 - Ability	100%	100%
2 - Recognition	100%	100%
n - Advanced mathematics	2017-18	2016-17
	Sample size =3	Sample size =5
1 - Identify	33.33%	80%
2 - Apply	33.33%	80%

4.1 Changes Resulting from the 2017-2018 Assessment

The results of the 2016-17 Assessment indicate that the minimum acceptable performance level of 80% was not met on all performance criteria for all assessed outcomes. Areas of improvement to the curriculum were discussed during the Closing the Loop Meeting in November 2018 with respect to these results. The faculty noted that the sample size for out outcomes assessed was low, which reduces the ability to make general inferences or conclusions for the gathered data sets. This low sample size reflects recent enrollment trends in the BSEET program.

At the 2017 BSEET Closing the Loop meeting, the EET faculty also noticed that several assessments had low sample sizes, which prompted the faculty to propose and approve a change to the assessment methodology in which low sizes are handled differently. The faculty considers a low sample size to be a sample size of equal to or less than than 10 students (i.e. a sample size ≤ 10). Such a sample size is classified as "low", since a single measurement moving from one category to another would yield a change to the results greater than or equal to 10%. This could give one student a disproportionate amount of weight when considering programmatic changes based on assessment data. For low sample sizes, if the results are below 70% (which is a full 10% below the minimum threshold of 80%) for any performance criteria, triggers an automatic re-assessment of the respective learning outcome the next academic year. The two years of data will be combined to generate a larger sample size, and the net results will be examined at the next Closing the Loop meeting. If a low sample size yields results under the minimum threshold of 80%, but greater than 70%, then that learning outcome will not necessarily result an an automatic re-assessment. For such borderline cases, the EET faculty will be advised that the minimum performance criteria was not met and that some students may need additional support in the respective learning outcome. Areas of improvement will be discussed at the Closing the Loop meeting in the context of a low sample size, and results will be closely compared with those from previous assessment years.

Areas of improvement for the assessed outcomes are give below.

- **Outcome b (Application):**
  - **Results:** The results show that the threshold of attainment of this outcome was below 70% in Criteria 1. The sample size (n=3) is considered low.
  - **Recommendation:** Since the sample size is low and the results are below 70% for at least one performance criteria, this triggers an automatic re-assessment of the this learning outcome the next academic year.
- **Outcome e (Teamwork):**
  - **Results:** The results show that the threshold of attainment of this outcome was below 70% in Criteria 1, 3, and 4. The sample size (n=3) is considered low.
  - **Recommendation:** Since the sample size is low and the results are below 70% for at least one performance criteria, this triggers an automatic re-assessment of the this learning outcome the next academic year.
- **Outcome g (Communication):**

  - **Results:** The results show that the threshold of attainment of this outcome was exceeded in all performance criteria. These results show an improvement over those obtained the last time this outcome was assessed in the 2016-17 assessment cycle.
  - **Recommendation:** The faculty identified no problem with this outcome, and therefore recommended no changes at this time.

- **Outcome j (Impact):**

  - **Results:** The results show that the threshold of attainment of this outcome was exceeded in all performance criteria. These results are consistent with those obtained the last time this outcome was assessed in the 2013-14 assessment cycle.
  - **Recommendation:** The faculty identified no problem with this outcome, and therefore recommended no changes at this time.

- **Outcome n (Advanced mathematics):**

  - **Results:** The results show that the threshold of attainment of this outcome was below 70% in all criteria. The sample size (n=3) is considered low.
  - **Recommendation:** Since the sample size is low and the results are below 70% for at least one performance criteria, this triggers an automatic re-assessment of the this learning outcome the next academic year.

4.2 Changes to Assessment Methodology

The low sample size for all outcomes assessed reduces the ability to make general inferences or conclusions from the gathered data sets. Over the next academic year, the EET faculty will take the following steps:

- The EET faculty will look at how other low-enrollment programs are generating quality assessment data.
- The Office of Academic Excellence will be notified and consulted.
- The EET faculty will meet to discuss the current assessment methodology and how this methodology can be improved.