2017-18 Program Assessment Report

Embedded Systems Engineering Technology B.S.

Mission, Objectives & Learning Outcomes

Oregon Tech Mission

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.

Core Theme 1: Applied Degree Programs

Oregon Tech offers innovative and rigorous applied degree programs. The teaching and learning model at Oregon Tech prepares students to apply the knowledge gained in the classroom to the workplace.

Core Theme 2: Student and Graduate Success

Oregon Tech fosters student and graduate success by providing an intimate, hands-on learning environment, which focuses on application of theory to practice. The teaching and support services facilitate students' personal and academic development.

Core Theme 3: Statewide Educational Opportunities

Oregon Tech offers statewide educational opportunities for the emerging needs of Oregon's citizens. To accomplish this, Oregon Tech provides innovative and rigorous applied degree programs to students across the state of Oregon, including high-school programs, online degree programs, and partnership agreements with community colleges and universities.

Core Theme 4: Public Service

Oregon Tech will share information and technical expertise to state, national, and international constituents.

Program Alignment to Oregon Tech Mission and Core Themes

Our program is very hands-on and thus aligns with Core Theme 1. Our graduates are in high demand by the industries we support. This is evidence that we are aligned with Core Theme 2.

Program Mission

The mission of the Embedded Systems Engineering Technology (ESET) Degree program within the Computer Systems Engineering Technology (CSET) Department at Oregon Institute of Technology is to prepare our students for productive careers in industry and government by providing an excellent education incorporating industry-relevant, applied laboratory based instruction in both the theory and application of embedded systems engineering. Our focus is educating students to meet the growing workforce demand in Oregon and elsewhere for graduates prepared in both hardware and software aspects of embedded systems. Major components of the ESET program's mission in the CSET Department are:

1. To educate a new generation of Embedded Systems Engineering Technology students to meet current and future industrial challenges and emerging embedded systems engineering trends.
2. To promote a sense of scholarship, leadership, and professional service among our graduates.
3. To enable our students to create, develop, apply, and disseminate knowledge within the embedded systems development environment.
4. To expose our students to cross-disciplinary educational programs.
5. To provide government and high tech industry employers with graduates in embedded systems engineering and related professions.

Program Educational Objectives

The Program Educational Objectives reflect those attributes a student of the ESET program will practice in professional endeavors.

A) Graduates of the embedded program are expected to understand societal impact of embedded systems and technological solutions.

B) Graduates of embedded degree program are expected to do hardware/software co-design for embedded systems. Graduates will continue to develop skills in analysis, approach, optimization, and implementation of embedded systems.

C) Graduates of the embedded program are expected to obtain the knowledge, skills and capabilities necessary for immediate employment in embedded systems. Embedded Systems is a profession increasingly driven by advances in technology, therefore graduates are expected to obtain the necessary life-long learning skills to enable them to be able to adapt to a changing environment.

D) Graduates of the embedded program are expected to develop a broad base of skills. These skills will prepare them for professional practice: 1) as embedded engineers, 2) participants in embedded development teams, and 3) effective communicators within a multidisciplinary team.

Program Faculty Review

Program Student Learning Outcomes and Objectives were reviewed by program faculty during Fall Convocation program Assessment Meeting. No changes were made.

At the end of the 2017-2018 school year, Claude Kansaku retired and Harika Manem left Oregon Tech. During the same school year, George Drouant was hired as a replacement for Claude Kansaku and Pramod Govindan was hired as a replacement for Harika Manem.

Showcase Learning Opportunities

In 2017-2018 school year, the ESET program continued participating in the MECOP program. In the MECOP program, students participate in two 6-month internships. Many other students who do not participate in MECOP find internships on their own.

Program History & Vision

Program History

The Embedded Systems Engineering Technology (ESET) program was proposed to OUS in spring of 2006 and approved in August, 2006. The curriculum for the ESET program is common with the hardware and software programs for the freshman year. The sophomore year of the ESET program has been constructed to mirror the track through both the Computer Engineering Technology (CET) and Software Engineering Technology (SET) programs, called the Concurrent Degree program. The ESET program junior year is when ESET students get instruction specific to topics of embedded systems engineering. These courses were taught for the first time in fall, 2008 on the Klamath Falls campus and soon after at the Wilsonville location. The full program is now offered to students at both locations.

Meeting with Advisory Board

Program faculty held a meeting with their Advisory Board during the academic year.

Advisory Board Review

The IAB Meeting was held on The meeting was held on Meeting was held on May 18th at 8 AM -10 AM in PV 147.

Program Enrollment

Enrollment at the beginning of the year was 57 students. 21 students were enrolled at the Wilsonville campus and 36 students were enrolled at the Klamath Falls campus. This represents an increase of 128% growth in the last 5 years.

Attachment_1_Enrollment_5_Year_History_by_Major

Program Graduates

We had four graduates this year. Graduates have increased for the last five years.

Attachment_2_Graduates_10_Year_History_by_Major

Employment Rates and Salaries

100% of our graduates have found employment with a median salary of $60,000.

Attachment_3_Grad_Data_First_Destination_3_Year_History_by_Major

Pass Rates on Board and Licensure Exam

N/A

Results of Board or Licensure Exam

N/A

Other Program Assessment Data

N/A

Desired Data

N/A

Closing the Loop

Describe any actions taken and re-assessment done during this academic year in response to assessment findings from prior academic years.

Since the last school year, we have made changes to the assessment process. All courses to be assessed are now pre-defined in the assessment cycle. Instead of choosing a course to assess each cycle, the same courses will always be used. This will also mean that each cycle will utilize the same assignment and instructor for consistency between assessments. Please reference the PSLO Assessment cycle below.

The previous assessment data did not separate Computer Engineering Technology (CET) and Embedded Systems Engineering Technology (ESET) students. The report this year is now separated by major.

For the previous cycle (2016-2017), data for **OIT-BEMB 2016-17.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), indicated that students struggled with 'writing reports in such a way that hardware and software explanations were sufficient for the reader to recreate'. An additional item was assessed in CST 374 for Spring 2018. Please see *Attachment 13*.

Changes Implemented

We have created pre-defined assessment cycles as noted in the PSLO Assessment Cycle chart below, and data from CET and ESET are now separated by major. Assessment items are now permanently attached to the classes and instructors listed in the PSLO Assessment Cycle chart below.

Assessment Findings

For the previous cycle (2016-2017) reassessment mentioned above, the illustrates that by junior year, students are able to meet the OIT-BEMB 2016-17g. learning outcome.

Program Student Learning Outcomes Assessment Cycle

Program Student Learning Outcomes 3-year cycle Computer Engineering Technology B.S.	**2017-18**	**2018-19**	**2019-20**
OIT-BEMB 2016-17.a An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities;		**371 471**	
OIT-BEMB 2016-17.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;	**231 KF 231 WL 466 KF/WL**		
OIT-BEMB 2016-17.c An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;	**372 - KF 337 - KF 471 - WL**		
OIT-BEMB 2016-17.d An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives;		**471 371**	
OIT-BEMB 2016-17.e An ability to function effectively as a member or leader on a technical team;		**372 373**	
OIT-BEMB 2016-17.f An ability to identify, analyze, and solve broadly-defined engineering technology problems;	**373 - KF 471 - KF 133 - WL**		
OIT-BEMB 2016-17.g An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to to identify and use appropriate technical literature.			**471 371**
OIT-BEMB 2016-17.h An understanding of the need for and an ability to engage in self-directed continuing professional development;			**372 473**
OIT-BEMB 2016-17.i An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity;			**372 472**

OIT-BEMB 2016-17.j A knowledge of the impact of engineering technology solutions in a societal and global context;			**372** **473**
OIT-BEMB 2016-17.k A commitment to quality, timeliness, and continuous improvement.		**372** **473**	

Assessment Map and Measure

F – Foundation – introduction of the learning outcome, typically at the lower-division level,

P – Practicing – reinforcement and elaboration of the learning outcome, or

C – Capstone – demonstration of the learning outcome at the target level for the degree

For each outcome, programs should identify at least 2 direct measures (student work that provides evidence of their knowledge and skills), and 1 indirect measure (student self-assessment of their knowledge and skills) for each outcome.

For every program, data from the Student Exit Survey will be an indirect measure at the capstone level.

OIT-BEMB 2017-18.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;	
Course/Event	CST 231 – KF, WL
Legend	F- Foundation
Assessment Measure	Direct – Assignment
Criterion	70% or more are proficient or better
Course/Event	CST 466 – KF, WL
Legend	P - Practicing
Assessment Measure	Direct – Assignment
Criterion	70% or more are proficient or better
Course/Event	Student Exit Survey
Legend	C - Capstone
Assessment Measure	Indirect – Student Exit Survey
Criterion	70% of students rate themselves as “proficient” or better

OIT-BEMB 2017-18.c An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;	
Course/Event	CST 372 - KF
Legend	P- Practice
Assessment Measure	Direct – Assignment
Criterion	70% or more are proficient or better
Course/Event	CST 473 – KF, WL
Legend	C- Capstone
Assessment Measure	Direct – Assignment
Criterion	70% or more are proficient or better
Course/Event	Student Exit Survey
Legend	C - Capstone
Assessment Measure	Indirect – Student Exit Survey
Criterion	70% of students rate themselves as “proficient” or better

OIT-BEMB 2016-17.f An ability to identify, analyze, and solve broadly-defined engineering technology problems;	
Course/Event	CST 373 KF
Legend	P- Practice
Assessment Measure	Direct – Assignment
Criterion	70% or more are proficient or better
Course/Event	CST 471 KF
Legend	C- Capstone
Assessment Measure	Direct – Assignment
Criterion	70% or more are proficient or better
Course/Event	CST 133 WL
Legend	P- Practice
Assessment Measure	Direct – Assignment
Criterion	70% or more are proficient or better
Course/Event	Student Exit Survey
Legend	C - Capstone
Assessment Measure	Indirect – Student Exit Survey
Criterion	70% of students rate themselves as “proficient” or better

Analysis of Results

Data provided in this report indicates that the Program Student Learning Objectives are being met at both campuses.

One improvement for next year is data collection for Wilsonville. Only the assessment for CST 466 (Attachment 5) had data for both campuses. In the future, we will work on standardising data collected from both campuses.

OIT-BEMB 2017-18.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;	
Criterion	Met.
Summary	N/A
Improvement Narrative	Reassess during next cycle.
Attachments	*Attachment_4_CST231_Winter2018_Assessment_KF* *Attachment_5_CST231_Winter2018_Assessment_WL* *Attachment_6_CST466_Spring2018_Assessment_WL* *Attachment_12_Student_Exit_Survey*

OIT-BEMB 2017-18.c An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;	
Criterion	Met
Summary	N/A
Improvement Narrative	Reassess during next cycle.
Attachments	*Attachment_7_CST372_Winter2018_Assessment* *Attachment_8_CST473_Spring2018_Assessment_KF* *Attachment_9_CST473_Spring2018_Assessment_WL* *Attachment_12_Student_Exit_Survey*

OIT-BEMB 2016-17.f An ability to identify, analyze, and solve broadly-defined engineering technology problems;	
Criterion	Met
Summary	N/A
Improvement Narrative	Reassess during next cycle.
Attachments	*Attachment_10_CST373_Winter2018_Assessment* *Attachment_11_CST471_Fall2017_Assessment* *Attachment_12_CST133_Fall2017_Assessment* *Attachment_12_Student_Exit_Survey*

References

Program Assessment Coordinator: Kevin Pintong, Assistant Professor, Computer Engineering Technology

Phong Ngyuen, Assistant Professor, Embedded Systems Engineering Technology

Michael Healy, Assistant Professor, Computer Engineering Technology

Office of Academic Excellence provided enrollment and graduate information

Attachment_1_Enrollment_5_Year_History_by_Major

Oregon TECH

Computer Systems Eng Tech Headcount, Fall 4th Week
November 4, 2017
Student campus is based on location assigned to student; however students may enroll at other/multiple locations
Majors with asterisk (*) have been phased out
Dual Majors are reported under each separate major

	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017
Computer Engineering Tech	**82**	**81**	**86**	**63**	**62**
Klamath Falls					
Full-Time	72	68	70	51	50
Part-Time	9	9	8	6	10
Wilsonville					
Full-Time		1	8	4	
Part-Time	1	3		2	2
Embedded Systems Eng Tech	**25**	**32**	**35**	**57**	**57**
Klamath Falls					
Full-Time	15	21	24	31	29
Part-Time	3	2		4	7
Wilsonville					
Full-Time	1	2	4	11	10
Part-Time	6	7	7	11	11
Software Engineering Tech	**268**	**289**	**309**	**285**	**274**
Klamath Falls					
Full-Time	152	145	154	124	126
Part-Time	17	28	24	23	31
Wilsonville					
Full-Time	37	53	47	63	51
Part-Time	62	63	84	75	66
Grand Total	**375**	**402**	**430**	**405**	**393**

Klamath Falls	268	273	280	239	253
Online	0	0	0	0	0
Wilsonville	107	129	150	166	140
Total	**375**	**402**	**430**	**405**	**393**

Attachment_2_Graduates_10_Year_History_by_Major

Bachelors

	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Allied Health Management	-	1	2	4	3	2	1	-	-	-
Applied Mathematics	7	1	5	3	7	4	4	5	7	8
Applied Psychology	37	30	36	38	30	40	37	31	31	26
Biology	16	14	11	11	3	4	1	2	-	-
Biology-Health Sciences	-	-	-	-	10	14	20	18	28	18
Business Accounting Option	3	8	4	9	9	12	5	8	7	5
Business Management Option	11	18	8	6	8	12	4	7	6	5
Business Marketing Option	5	5	7	8	7	4	7	7	10	11
Civil Engineering	29	28	20	14	23	17	15	25	25	23
Clinical Laboratory Science	24	22	22	35	27	34	49	46	-	-
Communication Studies	9	10	13	8	19	13	4	8	4	9
Computer Engineering Tech	14	8	13	3	4	3	3	3	6	3
Dental Hygiene	45	55	49	54	51	76	62	65	60	57
Diagnostic Medical Sonography	21	27	29	24	19	31	25	24	31	31
Echocardiography	16	9	21	32	31	32	29	35	30	29
Electrical Engineering	-	6	11	9	11	17	17	26	37	39
Electronics Engineering Tech	13	10	18	16	11	10	10	13	4	6
Embedded Systems Eng Tech	-	1	2	2	4	1	5	3	6	4

Attachment_3_Grad_Data_First_Destination_3_Year_History_by_Major

Oregon Tech Graduate Outcome Data

a=2014 / 2015 / 2016 combined b=2015 / 2016 / 2017 combined	% Employed		% Continuing Ed		% Seeking		% Not Seeking		Success Rate		Median Salary	
	a	b	a	b	a	b	a	b	a	b	a	b
% among those reporting outcomes	**87.6**	**90.0**	**6.7**	**6.7**	**4.9**	**2.8**	**0.8**	**0.5**	**95.1**	**97.2**	$ 56,000	$ 58,000
Embedded Systems Engineering Technol	83	88	17	13	0	0	0	0	100	100	$ 60,000	$ 60,000

Additional Notes:

Numbers may not add to 100 due to rounding

na=not reported, or not available due to small sample size

METHODOLOGY

Sample Frame 2017: 797 degrees awarded per FAST

Survey Response Rate: 60% Total Knowledge Rate 2016: 73%

Sources: Data collected from a variety of sources. Below, for 2017, in chronological order:

- Grad Fair paper survey
- Faculty senior exit survey
- Career Services survey
- Career Services followup with non-respondents
- Faculty information from their contact with students
- LinkedIn Profiles

Known Outcomes 2017: 582

Western Region NACE data: from National Association of College and Employers, 2017

Attachment_4_CST231_Winter2018_Assessment_KF

Term Name: Winter 2018

Course Code CST 231

PSLO: **OIT-BEMB 2017-18.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;

Assignment Name: Quiz 5

Type: Direct Assessment

Created By Kevin Pintong

Assessment Method: On quiz 5, students were asked to:

1. Generate a state machine diagram for UART transmitter with three stop bits, one parity bit, and 9 data bits using Mealy style outputs.
2. For the UART receiver, why is oversampling required, and how much should you oversample by?

Item	Quiz 5	ESET	CET
1	Identified one reason oversampling is required for UART receivers **such as clock jitter, skew, or asynchronous clocks between RX and TX.**	100%	89%
2	Identified that an oversampling **of 2x, 4x,8x, or 16x would work.**	100%	89%
3	Drew a state machine that implemented a UART transmitter. **Errors may include be wrong state machine type, wrong output on arc, or too many bits outputted, but may not exceed three errors.**	80%	78%

Successful performance criteria: 75% of students are able to answer or higher.

Students were rated on a binary scale.

0 = No answer provided, or unacceptable answer.

1 = Acceptable answer.

Attachment_5_CST231_Winter2018_Assessment_WL

Term Name: Winter 2018

Course Code CST 231

PSLO: **OIT-BEMB 2017-18.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;

Assignment Name: Quiz 3

Type: Direct Assessment

Created By Harika Manem

Assessment Method: On quiz 3, students were asked to:

Design a 4-bit **asynchronous** counter using JK flip-flops and an asynchronous negative edge triggered reset signal.

Provide the logic diagram, Verilog code and a screenshot of the simulation results. Note: label the timing diagram appropriately.

Item	Quiz 5	ESET	CET
1	Digital logic development of logic diagram**.**	85%	NA
2	Verilog code **.**	100%	NA
3	Simulation timing diagram	85%	78%
		6 of 7	NA

Successful performance criteria: 85% of students are able to answer or higher.

Students were rated on a point scale. About 33% on each of above criteria (items)

Attachment_6_CST466_Spring2018_Assessment

Term Name: Spring 2018

Course Code CST 466

PSLO: **OIT-BEMB 2017-18.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;

Assignment Name: Quiz 8

Type: Direct Assessment

Created By Kevin Pintong

Assessment Method: Students were asked the following on a quiz:

1) Apply a classical cipher such as Hill, Caesar, Playfair, or Vigenere cipher to the word TACO.

2) Determine the differences between symmetric and asymmetric key encryption.

Item	Quiz 8	ESET KF	ESET WL	ESET Overall
1	Student successfully applied classical cipher	6/7	2/2	8/9
2	Student could identify the type of cipher used.	6/7	2/2	8/9
3	Student identified the key differences between symmetric and asymmetric key encryption	7/7	1/2	8/9
4	Student identified that RSA was asymmetric and AES was symmetric	7/7	1/2	8/9

Successful performance criteria: 75% of students are able to answer or higher.

0 = No answer provided, or unacceptable answer.

1 = Acceptable answer.

Attachment_7_CST372_Winter2018_Assessment_KF

Term Name: Winter 2018

Course Code CST 372

PSLO: **OIT-BEMB 2017-18.c** An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;

Assignment Name: Refined Plan Document

Type: Direct Assessment

Created by: Michael Healy

Assessment Method:

Provide step-by-step test plans scoped by module or sub-module. Include module integration testing, and final product/project testing. Be detailed in your descriptions: Describe which characteristics and parameters are you testing. Describe the voltage and amperage boundaries of your tests. Describe the logical environmental extremes in terms of temperature, humidity, etc.

Assessment	Metric	ESET	CET
Assignment score	Average score on assignment	92.83	89.63
Performance Criteria	70% students proficient or higher	100%	100%
		6 of 6	8 of 8

Attachment_8_CST473_Spring2018_Assessment_KF

Term Name: Spring 2018

Course Code CST 473

PSLO: **OIT-BEMB 2017-18.c** An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;

Assignment Name: Assurance Plan

Type: Direct Assessment

Created by: Kevin Pintong

Assessment Method:

Students were asked to write an assurance plan document, explaining how their software, hardware requirements were met. Two key items that are evaluated as part of this assessment are:

1) Explain what test was performed to verify that the system meets original stated requirements.

2) Provide traceability through identification of tools, serial numbers, and version numbers. Example : Quartus Prime version 123 or Tektronix MSO4034 S/N 12345ABC.

3) Identify areas of concerns and problems such as glitches in the system or unfinished portions of the project.

Successful performance criteria: 75% of students are able to answer or higher.

0 = No answer provided, or unacceptable answer.

1 = Acceptable answer.

Item	Assurance Plan	ESET	CET
1	Explain what test was performed to verify that the system meets original stated requirements.	3/3	3/3
2	Provide traceability through identification of tools, serial numbers, and version numbers.	3/3	3/3
3	Identify areas of concerns and problems such as glitches in the system or unfinished portions of the project.	3/3	3/3
	Total %	100%	100%

Attachment_9_CST473_Spring2018_Assessment_WL

Term Name: Spring 2018

Course Code CST 473

PSLO: **OIT-BEMB 2017-18.c** An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes;

Assignment Name: Lessons Learned Paper

Type: Direct Assessment

Created by: Phong Nguyen

Assessment Method:

Provide examples of failure in senior projects. Write about experiments, tests, analysis of failures. Wrote about how to improve processes so as to minimize same failure

Assessment	Metric	ESET	CET
Assignment score	Average score on assignment	85%	NA
Performance Criteria	70% students proficient or higher	75%	NA
		3 of 4	NA

Successful performance criteria: 75% of students are able to get a grade of 80 out of 100 or higher. One of four students was late without sufficient excuse on paper.

Attachment_10_CST373_Winter2018_Assessment

Term Name: Fall 2018

Course Code CST 373

PSLO: **OIT-BEMB 2016-17.f** An ability to identify, analyze, and solve broadly-defined engineering technology problems

Assignment Name: Design Improvement Paper

Type: Direct Assessment

Created by: Michael Healy

Assessment Method:

(Preamble) Choose a module of your project that includes both hardware and software aspects of design. Describe an improvement that includes schematics, data management, software changes, testing, analysis, purchasing and final implementation. Consider the impact on fabrication and practical usage of the improvement.

Assessment	Metric	ESET	CET
Assignment score	Average score on assignment	95.8	88.75
Performance Criteria	70% students proficient or higher	100%	100%
		6 of 6	8 of 8

Attachment_11_CST471_Fall_2017_Assessment

Term Name: Fall 2017

Course Code CST 471

PSLO: **OIT-BEMB 2016-17.f** An ability to identify, analyze, and solve broadly-defined engineering technology problems;

Assignment Name: Requirements resubmission

Type: Direct Assessment

Created By Kevin Pintong

Assessment Method: Student was asked to submit requirements document. The requirements document needed to include ten or more SMART-based requirements. (Specific, Measureable, Acceptable, Realistic, and Time-bound.)

Students were assessed on whether:

- There were a sufficient number of requirements included (>10).
- Whether or not their requirements met SMART guidelines.
- How much more revision was needed to get submission to meet SMART guidelines.

Assessment Score:	Requirements Document	ESET	CET
Range 0 - 9	No submission or insufficient number of requirements (<10)	0	0
Range 10-19	Requirements need major work in quantity and quality. Requirements do not meet the S.M.A.R.T. guidelines.	0	0
Range 20-29	With major revisions, requirements could be used to build a product.	0	1
Range 30-39	With minor revisions, requirements could be used to build a product.	5	6
Range 40-50	Requirements are ready to build the design. All requirements are S.M.A.R.T.	0	0
Performance Criteria	75% students score 30 or higher.	100%	86%
		5 of 5	6 of 7

Attachment_12_CST133_Fall2017_Assessmemt_KF
Term Name: Fall 2017

Course Code CST 133

PSLO: **OIT-BEMB 2016-17.f** An ability to identify, analyze, and solve broadly-defined engineering technology problems

Assignment Name: Design Traffic Light on DE10 LITE Board

Type: Direct Assessment

Created by: Phong Nguyen

Assessment Method:

Students were asked to design a traffic light controller by using Logisim as a simulation tool. Next, the design was written in Verilog and simulated in Quartus or ModelSim. Finally, design was synthesized on DE10 LITE board.

Item	Quiz 5	ESET	CET
1	Digital logic design of traffic light**.**	85%	NA
2	Logisim simulation **.**	100%	NA
3	Quartus or ModelSim simulation	85%	NA
4	Verilog Code	100%	NA
5	DE10 LITE Board	100%	NA
		6 of 7	NA

Successful performance criteria: 85% of students are able to answer or higher on all criteria

Students were rated on a point scale. About 20% on each of above criteria (items)

Attachment_13_CST374_Spring_2018_Assessment

Note: This is a replacement assessment for the missing assessment from previous year.

Term Name: Fall 2017

Course Code CST 471

PSLO: ***OIT-BEMB 2016-17.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

Assignment Name: Final Proposal

Type: Direct Assessment

Created By Kevin Pintong

Assessment Method: Student was asked to submit final report.

Students were assessed on whether the following items were included

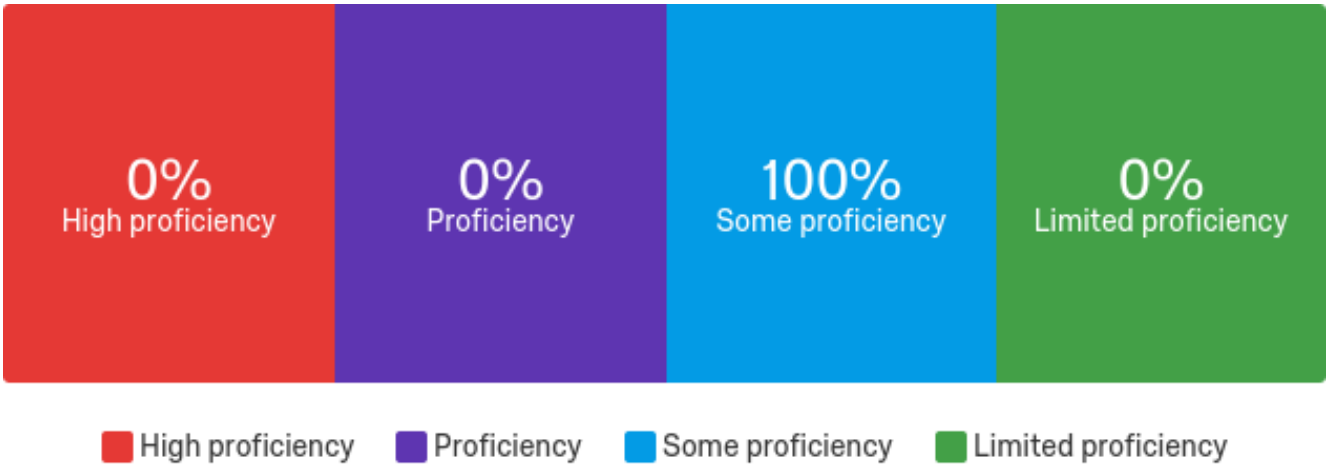
Section	Possible
Title page	5
Signatory page	5
Abstract	10
Table of contents	5
Project management	10
Conceptual overview	15
System description	15
Requirements	20
Glossary	5
Appendix	5
References	5
	100

Performance Criteria- 75% students score 75% or higher.

Assessment Score:	Requirements Document	ESET	CET
Total score	Score greater than 75%	4/5 (80%)	8/9 (88%)

Attachment_14_Student_Exit_Survey

Q BEMB 1 - Program Student Learning Outcomes for Embedded Systems Engineering Technology B.S. Please rate your proficiency in the following areas.

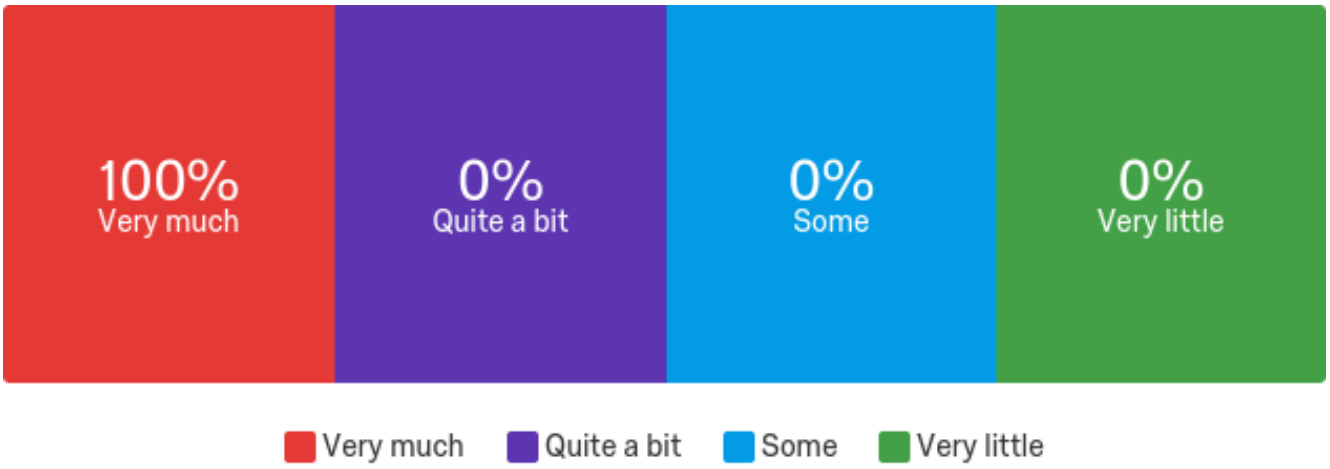


#	Question	High proficiency		Proficiency		Some proficiency		Limited proficiency		Total
43	a. Application of mathematics including differential and integral calculus, probability, and discrete mathematics to hardware and software problems.	0.00%	0	0.00%	0	100.00%	2	0.00%	0	2
44	b. Application of project management techniques to embedded systems projects.	50.00%	1	50.00%	1	0.00%	0	0.00%	0	2
45	c. Application of knowledge of embedded systems engineering technology, along with some specialization in at least one area of computer systems	50.00%	1	50.00%	1	0.00%	0	0.00%	0	2

	engineering technology.									
46	d. A broad education and knowledge of contemporary issues necessary to reason about the impact of embedded system based solutions to situations arising in society.	100.00%	2	0.00%	0	0.00%	0	0.00%	0	2
47	e. Identification and synthesis of solutions for embedded systems problems.	50.00%	1	50.00%	1	0.00%	0	0.00%	0	2
48	f. Design, execution and evaluation of experiments on embedded platforms.	50.00%	1	50.00%	1	0.00%	0	0.00%	0	2
49	g. Analysis, design and testing of systems that include both hardware and software.	100.00%	2	0.00%	0	0.00%	0	0.00%	0	2
50	h. Documenting the experimental processes and to writing of satisfactory technical reports/papers.	0.00%	0	50.00%	1	50.00%	1	0.00%	0	2
51	i. Delivery of technical oral presentations and interacting with a presentation audience.	50.00%	1	50.00%	1	0.00%	0	0.00%	0	2
52	j. Recognition for and the motivation to further develop their knowledge and skills as embedded engineering	50.00%	1	50.00%	1	0.00%	0	0.00%	0	2

	advances occur in industry.									
53	k. Working effectively, independently, and in multi-person teams.	50.00%	1	50.00%	1	0.00%	0	0.00%	0	2
54	m. Professional and ethical execution of responsibilities.	50.00%	1	50.00%	1	0.00%	0	0.00%	0	2

Q BEMB 2 - Program Student Learning Outcomes for Embedded Systems Engineering Technology B.S. How much has your experience at Oregon Tech contributed to your knowledge, skills, and personal development in these areas?



#	Question	Very much		Quite a bit		Some		Very little		Total
43	a. Application of mathematics including differential and integral calculus, probability, and discrete mathematics to hardware and software problems.	100.00%	2	0.00%	0	0.00%	0	0.00%	0	2
44	b. Application of project management techniques to embedded systems projects.	100.00%	2	0.00%	0	0.00%	0	0.00%	0	2
45	c. Application of knowledge of embedded systems engineering technology, along with some specialization in at least one area of computer systems engineering technology.	100.00%	2	0.00%	0	0.00%	0	0.00%	0	2
46	d. A broad education and knowledge of contemporary issues necessary to reason about the impact of embedded system based solutions to situations arising in society.	0.00%	0	50.00%	1	50.00%	1	0.00%	0	2
47	e. Identification and synthesis of solutions for embedded systems problems.	100.00%	2	0.00%	0	0.00%	0	0.00%	0	2

48	f. Design, execution and evaluation of experiments on embedded platforms.	100.00%	2	0.00%	0	0.00%	0	0.00%	0	2
49	g. Analysis, design and testing of systems that include both hardware and software.	100.00%	2	0.00%	0	0.00%	0	0.00%	0	2
50	h. Documenting the experimental processes and to writing of satisfactory technical reports/papers.	0.00%	0	50.00%	1	50.00%	1	0.00%	0	2
51	i. Delivery of technical oral presentations and interacting with a presentation audience.	0.00%	0	50.00%	1	50.00%	1	0.00%	0	2
52	j. Recognition for and the motivation to further develop their knowledge and skills as embedded engineering advances occur in industry.	100.00%	2	0.00%	0	0.00%	0	0.00%	0	2
53	k. Working effectively, independently, and in multi-person teams.	100.00%	2	0.00%	0	0.00%	0	0.00%	0	2
54	m. Professional and ethical execution of responsibilities.	50.00%	1	0.00%	0	50.00%	1	0.00%	0	2