Electrical Engineering Year 3

Outcome

1. Identify the PLO your program assessed this academic year.

- **(f)** An understanding of professional and ethical responsibility.
- **(h)** The broad education necessary to understand the impact of engineering solutions in a global and societal context.
- **(i)** A recognition of the need for, and an ability to engage in life-long learning.
- **(j)** A knowledge of contemporary issues.

Process

2. Identify the artifact(s) (i.e. student work) that you used to assess the PLO. [Papers, presentations, portfolios, test items, specific assignments, capstone work]

EE 241/EE 241L SO(f)
Assignments: Report (scoring rubric), in-class quiz, course exit survey
1. Direct assessment: report scoring rubric: Content & Knowledge: Professional Responsibility & Engineering Ethics.
2. Direct assessment: in-class quiz Q4 "Roger Boisjoly was a mechanical engineer who worked for NASA contractor, Morton Thiokol. What did he discover prior to the launch of the Challenger Space Shuttle? What did he do to attempt to correct the situation? What did he fail to accomplish?" "Mastered" on this rubric = (18-20)/20 points on answer. "Satisfactory" on this rubric = (16-17)/20 points on answer. "Limited" on this rubric = (0-15)/20 points on the answer.
3. Indirect assessment: course exit survey Q2: "I can explain how the principles contained within the IEEE Code of Ethics can be used to outline ethical and professional responsibilities".

EE 346 SO(H), SO(I), and SO(J)
Assignments: Written report, oral presentation, and exit survey.

A. Direct assessment: Students were required to write a term paper (3-5 pages) and to give an oral presentation (12 min) on aspects, history and development, and mathematical concepts behind contemporary applications of DSP. The topics selected needed approval by the instructor. The paper was required to be written in the form of a Technical Note and it should include the following parts: Abstract, introduction, methods and results (separate of combined), discussion (conclusion), and references. Different sections of the report were graded according to each SO assessed. For instance, for the abstract and the introduction, SO(H,J) were evaluated, for the methods and results, and references, SO(I,J) were evaluated, etc.

B. Indirect assessment: There was a course exit survey designed to determine the level of student attainment for several of the assessed learning outcomes. These are the questions relevant to SO(H, I, and J):

Q4: "I was taught and required to write technical project reports in a specified format."
Q6: "I can find and better understand relevant articles in the professional literature."
Q12: "Through my background, education, and professional activities (like participation in student branch IEEE, external professional speakers and research/technology literature handouts), I can understand better and relate to contemporary issues and the impact of engineering solutions in a global, economic, environmental, and societal context."
Q16: "I recognize better the need for and an ability to engage in life-long learning."

EE 449, EE449L SO(f)
Assignments: Oral and Written Reports
1. Direct assessment: Oral Report Grading Rubric, Written Report Grading Rubric

2. Direct assessment: Oral/Written Report Grading Rubric (f1) Did the Student address a significant professional responsibility issue in a meaningful way? Example(s): "Mastered" on this rubric = 3 "Satisfactory" on this rubric = 2. "Limited" on this rubric = 0,1. Oral/Written Report Grading Rubric (f2) Did the Student address a significant ethical issue in a meaningful way? Example(s): "Mastered" on this rubric = 3 "Satisfactory" on this rubric = 2. "Limited" on this rubric = 0,1.

EE 449, EE449L SO(j)
Assignments: Preliminary and Final Reports
1. Direct assessment: Preliminary Report Grading Rubric (j). Were contemporary issues mentioned and were they discussed in detail? Examples: Mastered" on this rubric = Many examples "Satisfactory" on this rubric = Several Issues. "Limited" on this rubric = No issues
2. Direct assessment: Final Report Grading Rubric (j) Were the impact of contemporary issues on their projects discussed in detail? Examples: Mastered" on this rubric = Yes/Several "Satisfactory" on this rubric = Yes/A few. "Limited" on this rubric = No or Yes/Only one.

EE 450 SO(h)
   Scoring rubric: Content and Knowledge: An excellent rating on this rubric item should demonstrate:
      An ability to demonstrate full knowledge of the content of periodicals that are relevant to understanding the societal impact of engineering
   Scoring rubric: Overall Performance: An excellent rating on this rubric item should demonstrate:
      An ability to use a consistent format throughout a paper.
      An ability to present figures and tables in a logical way to reinforce text
   Informal Oral Presentation: An excellent rating on this presentation should demonstrate:
      An ability to describe to others the impact of an engineering solution in a global and societal context.

EE 454 SO(i)
Assignments: Electronic Portfolio Grading Rubric
1. Direct assessment: Electronic Portfolio Grading Rubric (i)1 Did the student include a section on other topics of interest or similar topic"? "Mastered" on this rubric = Yes "Satisfactory" on this rubric = could be inferred "Limited" on this rubric = no.
2. Direct assessment: Oral/Written Report Grading Rubric (i)2 Did the Student made the case for a recognition for lifelong learning in a meaningful way? "Mastered" on this rubric = Yes "Satisfactory" on this rubric = could be inferred "Limited" on this rubric = no.

EE 454 SO(j)
Assignments: Professional Practice Papers and Portfolio
1. Direct assessment: Professional Practice Grading Rubric (j)). Was at least one contemporary issue mentioned and was it discussed in detail? Examples: Mastered" on this rubric = Yes/Yes "Satisfactory" on this rubric = Yes/No "Limited" on this rubric = No/No
2. Direct assessment: Portfolio Grading Rubric (j)). Were contemporary issues mentioned and were they discussed in detail? Examples: Mastered" on this rubric = A Few/Yes "Satisfactory" on this rubric = One or Two/Yes "Limited" on this rubric = No/No

Senior Exit Survey

3. Identify the tools (e.g. rubrics, surveys, performance on standardized test questions) used to assess the artifact(s) (i.e. student work).

SO Rubrics to determine level of student attainment of each assessed learning outcome – Limited – Satisfactory – Mastered.

Rubric-based SO Assessment

Name of Evaluator: Juan D. Serna   **Semester Evaluated:** Spring 2017   **Term/Year**

Course: EE 346   **Assignments:** Written Report, Exit Survey

EE Student Outcome	Limited	Satisfactory	Mastered
H. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.	Identifies very few possible societal implications of a given technology and provides little or no justification.	Identifies several possible societal implications of a given technology and provides some justification.	Identifies most possible societal implications of a given technology and provides strong justification.
Assessment Tallies (one for each item of assessed work)			
Written Report	0	3	7
Exit Survey (Q12)	0	0	7
Total*:	0 (0)	3 (0)	7 (7)
% Totals*:	0 (0)	30 (0)	70 (100)

* There were 13 students in the class and 9 submitted the exit survey. The totals in parenthesis are from the survey.

Rubric-based SO Assessment

Name of Evaluator: Juan D. Serna   **Semester Evaluated:** Spring 2017   **Term/Year**

Course: EE 346   **Assignments:** Written Report, Exit Survey

EE Student Outcome	Limited	Satisfactory	Mastered
I. A recognition of the need for, and an ability to engage in life-long learning.	Does not see the need for life-long learning and continual professional improvement.	Sees the need for life-long learning and continual professional improvement.	Sees the need for life-long learning and takes actions that will help the student engage in life-long learning.
Assessment Tallies (one for each item of assessed work)			
Written Report	0	3	7
Exit Survey (Q4)	1	1	5
(Q6)	0	1	6
(Q16)	0	0	7
Total*:	0 (1)	3 (2)	7 (18)
% Totals*:	0 (5)	30 (10)	70 (85)

* There were 13 students in the class and only 9 submitted the exit survey. The totals in parenthesis are from the survey.

Rubric-based SO Assessment

Name of Evaluator: Juan D. Serna   **Semester Evaluated:** Spring 2017   **Term/Year**

Course: EE 346   **Assignments:** Written Report, Exit Survey

EE Student Outcome	Limited	Satisfactory	Mastered
J. A knowledge of contemporary issues.	Demonstrates knowledge of few contemporary issues.	Demonstrates knowledge of several contemporary issues.	Demonstrates knowledge of many contemporary issues.
Assessment Tallies (one for each item of assessed work)			
Written Report	0	10	0
Exit Survey (Q12)	0	0	7
Total:	0 (0)	10 (0)	0 (7)
% Totals:	0 (0)	100 (0)	0 (100)

* There were 13 students in the class and only 9 submitted the exit survey. The totals in parenthesis are from the survey.

Rubric-based SO Assessment

Name of Evaluator: Dr. Robert Spalletta   **Semester Evaluated:**   F/2016   **Term/Year**

Course: EE449/L Embedded Systems   **Assignments:** _____

EE Student Outcome	Limited	Satisfactory	Mastered
F. an understanding of professional and ethical responsibility	Recognizes few if any ethical components of an issue with little or no justification	Recognizes several ethical components of an issue and provides some justification	Recognizes most of the ethical components of an issue and addresses them accordingly
Assessment Tallies (one for each item of assessed work) Oral Report GR	5	15	5
Written Report GR		5	10
Total:	5	20	15
% Totals:	13%	50%	37%

Name of Evaluator: Dr. Robert Spalletta   **Semester Evaluated:**   S/2017   **Term/Year**

Course: EE454 Robotics   **Assignments:** Ethics Reaction Paper, Portfolio, Professional Practice Paper

EE Student Outcome	Limited	Satisfactory	Mastered
F. an understanding of professional and ethical responsibility	Recognizes few if any ethical components of an issue with little or no justification	Recognizes several ethical components of an issue and provides some justification	Recognizes most of the ethical components of an issue and addresses them accordingly
Assessment Tallies (one for each item of assessed work)			
Ethics Reaction		2	3

Professional Practice Grading Rubric (f)	1	3	7
Portfolio Grading Rubric(f)		2	10
Total:	1	7	20
% Totals:	4%	25%	71%

Name of Evaluator: Dr. Robert Spalletta   **Semester Evaluated:** F/2016   **Term/Year**
Course: EE449/L Embedded Systems   **Assignments:** Design Report

EE Student Outcome	Limited	Satisfactory	Mastered
H. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	Identifies very few possible societal implications of a given technology and provides little or no justification.	Identifies several possible societal implications of a given technology and provides some justification.	Identifies most possible societal implications of a given technology and provides strong justification.
Assessment Tallies (one for each item of assessed work)			
Design Report GR	1	2	2
Total:	1	2	2
% Totals:	20%	40%	40%

* Only two impacts (economic and societal context) were assessed. This assessment was not required for this course this semester.

Name of Evaluator: Dr. Robert Spalletta   **Semester Evaluated:** S/2017 **Term/Year**
Course: EE454 Robotics   **Assignments:** Professional Practice Exercise, Portfolio

EE Student Outcome	Limited	Satisfactory	Mastered
H. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	Identifies very few possible societal implications of a given technology and provides little or no justification.	Identifies several possible societal implications of a given technology and provides some justification.	Identifies most possible societal implications of a given technology and provides strong justification.
Assessment Tallies			

(one for each item of assessed work)			
Professional Practice Grading Rubric (h)	2	5	16
Portfolio Grading Rubric (h)		3	2
Total:	2	8	13
% Totals:	8%	35%	57%

Name of Evaluator: ___Dr. Robert Spalletta_____   **Semester Evaluated:** _F/2016__ **Term/Year**
Course: ___EE449/L Embedded Systems___   **Assignments:** __Final Report__

EE Student Outcome	Limited	Satisfactory	Mastered
I. a recognition of the need for, and an ability to engage in life-long learning	Does not see the need for life-long learning and continual professional improvement.	Sees the need for life-long learning and continual professional improvement.	Sees the need for life-long learning and takes actions that will help the student engage in life-long learning.
Assessment Tallies (one for each item of assessed work)			
Final Report GR	3	2	
Total:	3	2	
% Totals:	60%	40%	

* This outcome was not met at the 80% level. Additional time will be spent in the next iteration of EE449/L to discuss the importance of life long learning in Engineering practice and some tools to enhance this activity.

Name of Evaluator: ___Dr. Robert Spalletta_____   **Semester Evaluated:** ___S/2017_ **Term/Year**
Course: ___EE454 Robotics___   **Assignments:** _____

EE Student Outcome	Limited	Satisfactory	Mastered
I. a recognition of the need for, and an ability to engage in life-long learning	Does not see the need for life-long learning and continual professional improvement.	Sees the need for life-long learning and continual professional improvement.	Sees the need for life-long learning and takes actions that will help the student engage in life-long learning.
Assessment Tallies (one for each item of assessed work)			
Portfolio GR (i)1	1	1	4
Portfolio GR (i)2	1	1	4
Total:	2	2	8
% Totals:	16%	16%	68%

Name of Evaluator: Dr. Robert Spalletta   **Semester Evaluated:**___F/2016_____   **Term/Year**
Course: EE449/L Embedded Systems   **Assignments:** _Preliminary & Final Report___

EE	Limited	Satisfactory	Mastered

Student Outcome			
J. a knowledge of contemporary issues	Demonstrates knowledge of few contemporary issues.	Demonstrates knowledge of several contemporary issues.	Demonstrates knowledge of many contemporary issues.
Assessment Tallies (one for each item of assessed work)			
Preliminary Design Report GR (j)		5	
Final Report GR	1	2	2
Total:	1	7	2
% Totals:	10%	70%	20%

Name of Evaluator: Dr. Robert Spalletta   **Semester Evaluated:** S/2017 **Term/Year**
Course: EE454 Robotics   **Assignments:** Professional Practice Exercise, Portfolio

EE Student Outcome	Limited	Satisfactory	Mastered
J. a knowledge of contemporary issues	Demonstrates knowledge of few contemporary issues.	Demonstrates knowledge of several contemporary issues.	Demonstrates knowledge of many contemporary issues.
Assessment Tallies (one for each item of assessed work)			
Professional Practice Paper GR (j)			6
Portfolio Grading Rubric (j)		2	3
Total:		2	9
% Totals:		18%	82%

Findings

4. Explain the results of the assessment activities.

Target from direct assessment results was that 80% or more of the student evidence would be at the Satisfactory or Mastered levels.

The following Student Outcomes <u>were</u> <u>successfully</u> met:	EE 241/241L SO(f) Direct 83% Indirect 100%	EE 241/241L SO(f) Direct and indirect assessment indicate that students have an introductory understanding of ethical and professional responsibility.
	EE 450 SO(h) Direct 96%	EE 450 SO(h) In the future include a question on this SO on student survey. Also have all students take a quiz on presentations to ensure they have a broader exposure to the impact of engineering in a global and societal context.

The following Student Outcomes <u>were</u> <u>successfully</u> met:	EE 346 SO(H) Direct 100% Indirect 100% SO(I) Direct 100% Indirect 95% SO(J) Direct 100% Indirect 100%	EE 346 SO(H) Direct and indirect assessment indicate that students **satisfactorily** identify "several" possible societal implications of a given technology and provides "some" justification. SO(I) Direct and indirect assessment indicate that students **satisfactorily** see the need for a life-long learning and continual professional education. SO(J) Direct and indirect assessment indicate that students **satisfactorily** demonstrate knowledge of "several" contemporary issues.

Target from direct assessment results was that 80% or more of the student evidence would be at the Satisfactory or Mastered levels.

The following Student Outcomes <u>were</u> <u>successfully</u> met:	EE 449/L SO(f) Direct EE 454 SO(f) Direct EE 449/L SO(h) Direct EE 454 SO(h) Direct EE 454 SO(i) Direct EE 449/L SO(j) Direct EE 454 SO(j) Direct	EE 449/L SO (f) Mastered/Satisfactory 87% EE 454 SO (f) Mastered/Satisfactory 96% EE 449/L SO (h) Mastered/Satisfactory 80% EE 454 SO (h) Mastered/Satisfactory 92% EE 449/L SO (i) Mastered/Satisfactory 84% EE 449/L SO (j) Mastered/Satisfactory 90% EE 454 SO (j) Mastered/Satisfactory 82%

The following Student Outcomes <u>were not</u> <u>successfully</u> met:	EE 449/L SO (i) Direct	EE 449/L SO(i) Mastered/Satisfactory 40% This outcome was not met at the 80% level. Additional time will be spent in the Fall 2017 EE449/L class/lab to discuss the importance of life long learning in engineering practice and some tools to enhance this activity.

Senior exit survey results:

SO(f) Question 16. Average 4.8/5

I am more aware of professional and ethical issues and responsibilities relating to my profession.

Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
4	1			

SO(h) Question 18. Average 4.8/5

I am more aware of importance of broad education to understand the impact of engineering solutions in a global and societal context.

Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
4	1			

SO(i): Question 19. Average 4.8/5

I recognize better the need for and an ability to engage in life-long learning.

Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
4	1			

SO(j): Question 22. Average 4.8/5

Through my background, education, and professional activities (like participation in student branch of IEEE, external professional speakers and research/technology literature handouts), I can understand better and relate to contemporary issues and the impact of engineering solutions in a global, economic, environmental, and societal context.

Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
4	1			

Senior Exit Survey

Question: What could we have done differently that would have better prepared you for a career in engineering or graduate school?

Student comment: Done my schedule in order and had access to components and equipment that isn't outdated

5. Where applicable, outline the steps you will take to make improvements to the program based on the results of assessment activities identified in #3.

EE 346: To be discussed with Dr. Berger. (Juan Serna taught EE 346 in the Spring 2017 while Andrew Berger was on sabbatical.)

Additional time will be spent in the Fall 2017 EE449/L class/lab to discuss the importance of life long learning in engineering practice and some tools to enhance this activity.

Senior exit survey: to address student comment about their schedule and equipment – a replacement faculty line has been requested for Paul Fahey's retirement for FALL 2018 to allow us to remove course cycling and offer courses in the order prescribed by the engineering curriculum, and additional 710 budget has been requested to pay for SOFTWARE LICENSES that consume more than 15% of our total budget, leaving insufficient money in budget to upgrade and replace non-capital equipment.

6. Are there any new resources needed to make program improvements? If so, please include the resources and provide justification for each in the Budget section of the Annual Report.

EE 346: To be discussed with Dr. Berger. (Juan Serna taught EE 346 in the Spring 2017 while Andrew Berger was on sabbatical.)

Additional resources for better integration of the electronic portfolio with class topics will be requested, and ways to enhance the student notebook will be investigated. This last academic year, the quality of student notebooks deteriorated significantly from all prior years.

Senior exit survey: to address student comment about their schedule and equipment – a replacement faculty line has been requested for Paul Fahey's retirement for FALL 2018 to allow us to remove course cycling and offer courses in the order prescribed by the engineering curriculum, and additional 710 budget has been requested to pay for SOFTWARE LICENSES that consume more than 15% of our total budget, leaving insufficient money in budget to upgrade and replace non-capital equipment.