Course Outcomes Guide (COG)

Course Title: Circuits, Schematics & Test Equipment ELE 158

Date: August 2019

Course Team: Juan C. Luna.

Expected Learning Outcomes

These match what is on the master syllabus. Guidelines for writing course student learning outcomes are very similar to writing program level outcomes.

- Recognize standard schematic symbols for common electrical and electronic components.
- Recognize and competently use common test equipment to evaluate test circuits.
- Understand measurement errors and calibration procedures.
- Understand the complete cycle of printed circuit board fabrication.

Assessment (How do or will students demonstrate achievement of each outcome? Please attach a copy of your assessment electronically.)

At the end of the Fall 2018 semester, the instructor administered a final ELE158 assessment exam. The assessment exam covers all course outcomes. The final grade is a composition of the final exam, homework assignments, and hands-on activities.

Validation (What methods have you used or will you use to validate your assessment?)

The course outcomes and assessment tool for Instrumentation and Process Control I (ELE 113) are consistent and aligned with recommendations from the following IEEE publications:

Merging Pedagogical Approaches: University of Glasgow-UESTC Joint Education Programme in Electronics and Electrical Engineering. K. Meehan et al.
Frontiers in Education Conference (FIE), 2014 IEEE. 978-1-4799-3922-0

Intelligent Performance Assessment of Students’ Laboratory Work in a Virtual Electronic Laboratory Environment. Achumba et al.
IEEE TRANSACTIONS ON LEARNING TECHNOLOGIES, VOL. 6, NO. 2, APRIL-JUNE 2013

Assessment of undergraduate electrical engineering laboratory studies. G. Carter et al.

The final grade comprises a combination of homework, lab activities, with several exams in between. A final assessment exam can determine the overall comprehension of the subject, although it will not measure other components typical of lab activities, like team player skills, hands-on expertise. The final assessment exam cannot measure homework effort and time.
management skills. Nevertheless, the final assessment exam can be an expected consequence of the effort put into the lab and homework activities.

Results (What do your assessment data show? If you have not yet assessed student achievement of your learning outcomes, when is assessment planned?)

As it was expected the final grade is highly correlated with completion of assignments, lab activities, quizzes and exams.

**COMPARISONS TO PREVIOUS SEMESTERS:**

**Assessment Final Exam Results: Fall 2017**

The overall average score for the exam was 95%, the median was 95%, and the highest score was 100%. The sample size was 3 for the Fall 2017 semester.

There is no breakdown by relevant course outcome questions.

Spring 2017. N=3
**Assessment Final Exam Results: Fall 2018**

The overall average score for the exam was 98%, the median was 100%, and the highest score was 100%. The sample size was 10 for the Fall 2018 semester. There is no breakdown by relevant course outcome questions.

*Fall 2018. N=10*

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**Strengths & Weaknesses:**
The data is not conclusive since there was a change of syllabus in Fall 2018, the new syllabus used new printed circuit board equipment in the labs. Students performed extremely well in questions pertaining to

- cad circuit design.
- component selection.
- electronic equipment test and instruments.

The final exam like in Fall 2017 was a final project that comprised several phases covered during the course.

**Follow-up (How have you used or how will you use the data to improve student learning?)**

ELE158 will continue to have some modifications in the syllabus since it needs certain emphasis in industrial control schematics. There is no single textbook that can cover all topics of this course, this is a challenge and an opportunity for the instructor.

**Budget Justification (What resources are necessary to improve student learning?)**

No resources needed.