Course Outcomes Guide

Course/Program Title: ELE 103 Analog and Digital Electronics   **Date: 8/26/2013**

Course/Program Team: Robert Fergesen & TCS

Expected Learning Outcomes

1. Demonstrate knowledge of digital and analog electronics including dedicated microcomputers in instrumentation and control systems
    • Evaluate circuits involving inductors, capacitors, and transformers.
    • Investigate various semiconductor devices by building and testing circuits using such components as diodes, scr's, triacs, high speed solid state switches used in A.C. and D.C. power applications
    • Describe Digital Electronics and the relationship to Analog circuits
    • Interface simple micro-processor based controls
2. Knowledge of Instrumentation and Process Control hardware and software
        • Select and implement various instrumentation devices required to accomplish a task within a control system
3. Knowledge of Instrumentation troubleshooting, repair and maintenance
    • Troubleshoot, isolate and fix electronic instrumentation problems
    • Carry out simple repair procedures for the correction of faults on instrument systems
4. Exhibit professional/occupational behavior and work habits

Assessment (How do or will students demonstrate achievement of each outcome?)
This course was given to a limited number of students in a tutorial mode only (3 students in Spring 2013). The teaching was provided in a series of hands-on sessions that combined exercise, discussion and review of the material. The learning outcomes were demonstrated in the following manner:

Demonstrate knowledge of digital and analog electronics including dedicated microcomputers in instrumentation and control systems	Selected Test Questions and Exercises
Knowledge of Instrumentation and Process Control hardware and software	
Knowledge of Instrumentation troubleshooting, repair and maintenance	
Exhibit professional/occupational behavior and work habits	On-time Attendance

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

The course assessments will be validated by review from the following sources:

1. Facility Peer validation through continued feedback from fellow faculty members
2. Industry validation through the Advisory Committee. The advisory committee has a chance to review the course outcomes and discuss how that fits with the over all program outcomes and regional industry needs

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

Since all students taught in this course model have been taught in a very hands-one tutorial mode, I'm happy to report that we have had a 100% success rate in meeting course outcome requirements:

Demonstrate knowledge of digital and analog electronics including dedicated microcomputers in instrumentation and control systems	Average Key Question Test Scores 92%
Knowledge of Instrumentation and Process Control hardware and software	
Knowledge of Instrumentation troubleshooting, repair and maintenance	
Exhibit professional/occupational behavior and work habits	On-time Attendance: 100%

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

At this time we do not have sufficient data to require making any changes to course content, however, we did run into problems during the first semester with the electronic trainers: they were found insufficient for the work based on their age and poor condition (they didn't function except for a small subset of the exercises attempted). We switched to a simple mode of using some older breadboards and purchased components from regional vendors (such as Radio Shack), and found that this approached suffced. In fact, this approached allowed the students to see the easy accessibility of such electronic projects to build their own ideas.

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

An appropriate new Electronic Trainer must be investigated and placed into the next Unit Planning. Anthony Valente has recently purchased new electrical equipment for INT-110, and this equipment may be extended to include the require components for ELE-103. Estimated cost will be $8900.