EE 007S – Adventures in Electrical Engineering

Designation: First Year Seminar elective.

Catalog Data:
EE 007s: Exploration of electrical engineering through several hands-on activities that cover a broad spectrum of applications and fundamental concepts.

Prerequisites: none.

Course Objectives:
Through lectures and laboratory exercises, this course provides first-year students exposure to a diverse spectrum of electrical engineering topics that normally would not be introduced until the junior or senior year.

Topics:
1. Passive and active DC circuits (1 lecture, 1 laboratory)
2. Analysis, fabrication, and testing of a semiconductor diode (1 lecture, 1 laboratory)
3. First-order circuits and square-wave generators (1 lecture, 1 laboratory)
4. Feedback control systems (1 lecture, 1 laboratory)
5. Optical communication systems (1 lecture, 1 laboratory)
6. Image processing (1 lecture, 1 laboratory)
7. Microcontroller interfacing and programming (1 lecture, 2 laboratories)

Class/laboratory schedule:
The class meets once a week for either a two-hour lecture or a two-hour laboratory. In addition, students are provided with hand tools, basic instrumentation and components so that they can complete work outside of the scheduled laboratory sessions.

Computer Usage:
1. MATLAB and SIMULINK are used to collect, process, plot data.
2. Two short papers require the use of word processing.
3. Students program a microcontroller using BASIC.

Laboratory projects and/or assignments:
1. Seven laboratory projects are completed during the semester. Students work in teams of two and each student maintains a laboratory notebook that is graded.
2. Projects involve the use of basic test equipment (digital oscilloscope, function generator, power supply), and a PC-based data acquisition system controlled through SIMULINK.

Contribution to meeting the professional component:
Economics and manufacturability issues are considered in the context of choosing the simplest solution for attaining specified design requirements.

Relationship to program outcome:

The course relates to the following program outcomes:

1. Graduates will possess mathematics skills valuable for electrical engineering. [Ref: Outcome O1.1.]
2. Graduates will have a theoretical and practical background in both physics and chemistry. [Ref: Outcome O1.2.]
3. Graduates will have attained computer efficiency. [Ref: Outcome O1.3.]
4. Graduates will have practical understanding of the major electrical engineering concepts and demonstrate application of their theoretical knowledge of the concepts. [Ref: Outcome O3.2.]
5. Graduates will develop an appreciation of life-long learning. [Ref: Outcome O4.2.]
6. Graduates will have teamwork skills. [Ref: Outcome O5.1.]
7. Graduates will possess oral and written communication skills. [Ref: Outcome O5.2.]