EECE 200: Introduction to Electrical and Computer Engineering

Catalog description:
Overview of electrical and computer engineering; engineering as a profession; introduction to the different areas of ECE such as biomedical systems, circuits, communications, computer design, control, distributed systems, electromagnetics, energy, machines, and signal processing; basic computer tools such as SPICE, MATLAB, and LabVIEW; basic laboratory instruments; laboratory experiments and design project.

Credit hours: 3 credits

Required or elective:
Required for CCE / ECE students

Prerequisites:
By course: None
By topic: High school mathematics and physics.

Textbook(s) and/or required materials

References:
- Introduction to Electrical Engineering, Sarma, Oxford University Press, 2001 (621.3:S246i)
- Introduction to Electrical and Computer Engineering, Fleddermann and Bradshaw, Prentice Hall, 2003

Course Objectives
1. Introduce students to the engineering profession
2. Provide students with an overview of engineering ethics
3. Present to the students the various areas of electrical and computer engineering
4. Introduce students to some basic mathematical and computing tools used in electrical and computer engineering
5. Foster effective communication and teamwork skills among students
Course Topics
1. Introduction to different areas of engineering
2. Mathematical Skills (Complex numbers, number systems)
3. Engineering as a profession (engineering analysis and design, engineering ethics, engineering project management, professional communications, IEEE)
4. ECE areas (circuits & electronics, power, renewable energy, communications, electromagnetics & radio frequency, signal and image processing, computer hardware, software, networks & distributed systems, control, machines, and biomedical engineering.)
5. Introduction to ABET
6. ECE tools (PSpice, LabVIEW, MATLAB, Library resources)

Laboratory Topics
1. Introduction to MS Office
2. Introduction to SPICE
3. Introduction to MATLAB
4. SPICE/ MATLAB application on engineering problem
5. Library resources and information sources usage
6. Getting familiar with LabVIEW
7. Getting familiar with LabVIEW DSP module and SPEEDY-33
8. Analog and Digital Applications
9. Introduction to Robotics
10. Audio Effects using LabVIEW and SPEEDY-33
11. Communication Systems using LabVIEW and SPEEDY-33
12. Image Processing using LabVIEW
13. Design Project (Hardware and Software implementation and integration)

Course Learning Outcomes
1. Have a realistic understanding of the different engineering profession and the working environment of engineers
2. Understand engineering ethics and are familiar with the IEEE code of ethics
3. Understand engineering problem-solving concepts and principles
4. Demonstrate an understanding of the engineering design process including problem formulation, constraints, alternatives, prototyping and testing
5. Have developed an awareness of challenges occurring in teamwork (Task division, communication skills…)
6. Appreciate the importance of project planning and scheduling
7. Have developed presentation skills
8. Are able to recognize and locate reliable sources of information (library, web…)
9. Are aware of the various areas of electrical and computer engineering: circuits & electronics, power and renewable energy, communications, electromagnetics & radio frequency, signal and image processing, computer hardware, software, networks & distributed systems, control, machines, and biomedical engineering.
10. Are introduced to several engineering software that will be utilized in the coming years (Spice, MATLAB, and MS Office)
11. Are familiar with the use of LabVIEW as a programming and design tool
12. Have learned proper project management and documentation

Class/laboratory schedule
a- Two 50-minute lectures per week.
b- One three-hour lab session per week.

Resources of the course
Reference books, online references, Lecture material, Lab manuals, Clickers.

Computer usage
LabVIEW, PSpice, MATLAB, MS Office, Email/Web, Moodle.

Evaluation methods
1. Exam1 15% individual
2. Exam 2 15% individual
3. Computer Lab Assessment 18% individual
4. Homework assignments (2) 2 x 3% = 6% individual
5. LabVIEW Quizzes (5) 5 x 2.5% = 12.5% individual
6. Project 28% teams
7. Lecture Quizzes and Attendance 4.5% individual
8. Assessment of course outcomes 1% individual

Professional component
Engineering topics: 95%
General education: 0%
Mathematics and basic sciences: 5%

Preparation and Revision
Prepared by Ayman Kayssi in September 2006
Revised by Ayman Kayssi in January 2009
Revised by EECE 200 Ad-Hoc Committee in June 2009
Revised by EECE 200 Ad-Hoc Committee in November 2012