ESE112

Course Overview

Introduction

- Instructor:
  - Diana Palsetia
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- Meeting Times:
  - Lecture - T: 11:00-1 in Moore 212
  - Lab - W: 4-6 and F 10-12 in Moore 101 (RCA Lab)

- Course Website:
  - http://www.seas.upenn.edu/~ese112/

Goals of Engineering Degree

- Able to apply knowledge of mathematics, and science to solve engineering problems
  - How to light bulb vs. how to light an entire city!

- Develop problem solving and critical thinking skills
  - Investigate solutions by applying and evaluating information gathered from, or generated by observation, experience, and reasoning

- Learn how to communicate your ideas to others in the field

ESE major overview

- Electrical and Systems Engineering (ESE)
  - BSE Programs
    - http://www.ese.upenn.edu/ugrad/bse.html

- Electrical Engineering
  - Technology behind
    - Power & Energy
    - Gadgets: LCD displays, computers, phones, robots
    - Communication Devices: Radio, cell phones, WiFi, satellites
  - Electrical engineers are concerned with
    - Electricity to transmit energy (power engineering)
    - Using electric signals to sense, store and transmit information (electronics engineering)

- System Science and Engineering (SSE)
  - Aspects of engineering pertaining to a system
System

- An arrangement of parts which interact with each other within the system's boundaries (form, structure, organization) to function as a whole

ESE112

Integrated introduction to selected fundamental concepts and principles in ESE
- Basic Circuit theory
- Computing
- Communication and Control theory

ESE (contd..)

SSE contd..
- Designing and developing a system requires integration of several scientific and technical fields
  - Math and Sciences
  - Computing (computer science)
  - Mechanical & Material Engineering
  - Many more...
- Computer Engineering
  - Design & building computers (embedded and general purpose) & networking systems
- Sample curriculum can be found at:

Objectives
- Get perspective for ESE
  - Unique set of labs that give you perspective to ESE
- Programming skills
  - A must have skill – just not for CS students
- Communicate technical content
- Work on exciting and hands on projects
  - E.g. Maze Navigating Bots, Sumo Bots
Boe-Bot Platform w/ Javelin Stamp

- Short for Board of Education robot used in educational classes

- Boe-Bot Consists of:
  - plug in microcontroller
  - 2 small servo motors
  - a bread board
  - a main circuit board
  - small aluminum chassis

- Javelin Stamp
  - Small, programmable, integrated microcontroller system with a built-in Java interpreter on the main circuit board.
  - Functions:
    - read sensor data
    - communicate with other devices
    - control servos and motors

Boe-Bot Platform w/ Javelin Stamp

- Exemplifies Core ESE Disciplines
  - EE – electrical devices
    - E.g. Sensors convert measurements of temperature, touch, light, acceleration, or magnetic field into electrical signals
  - CE – embedded computation
    - E.g. Javelin, which is a specialized computer used to read input devices (sensors) and to control output devices (motors, relays, servos, lights, sirens, etc.)
  - SSE – composition
    - Chassis, servos and electrical/electronic components.

Grading

- 75% - Lab assignment and Write-ups
  - Comprises of pre-lab write-up, in class activity and post-lab write-up
  - No makeup for lab assignments
  - Pre-lab write-ups are due at start of the lab period
    - Late pre-labs will not be accepted
  - Post-lab write-ups are submitted after completion of lab activity
    - Late write-ups will incur 10% penalty per day and will not be accepted beyond 5 days

- 25% - Final Exam
  - Covers all material
  - During university allotted time slot

Lab Logistics - Prelab

- Before lab period we will post lab with related background material

- Questions termed as “Pre-lab” are to be completed & turned in at the start of the lab
  - Work individually
    - Accept when working with the Boe-Bot setup
  - Answers should be typed using a word editor
Lab Logistics – Post Lab Write-up

- Questions termed as “Post-lab” are to be completed after the lab activity
  - Communicate the findings and accomplishments of your lab experiments
- Is to be done individually
- Must also must be typed
  - See guidelines on the website
- You may use course notes & lectures provided
  - Any external source must be properly cited
    - You are not allowed to use sources from past students
    - Please read Penn's Code of Academic Integrity from course site

Lab Logistics – Working in Lab

- Labs are to be done in groups of 2
- Collaborate within your group but you cannot discuss the lab with other groups
- For Boe-Bot labs, work with a partner permanently till the end of the semester – why?
  - Your team will be given a Boe-Bot to keep till the end of the semester
  - Your team will return all material at end of the semester

Lecture Logistics

- 2 hour lecture – meets once a week
  - Attendance is not mandatory but highly recommended!
- Topics
  - Basic Circuit Theory
  - Programming with Java
  - Boe-Bot material
  - Material specific to lab
- There are no textbooks for the course
  - Lab documents and lecture notes will posted on the course website

Movie Making

- Contribute towards developing feature for ESE112 showcasing Boe-Bot w/ Javelin platform
- Make footage of time spent working on certain lab activities and showing off the final result
- More details with specific lab activities