ECE 109 Syllabus

Course: ECE 109
Credit Hours: 3
Course Title: Introduction to Computer Systems

Course Description:

This course introduces you to the fundamentals of computer engineering from both the hardware and software points of view. It serves as a roadmap for the rest of the computer courses that you will take here. After taking this course, you will have a better understanding of how a program is translated into commands for execution on hardware, and how the hardware executes those commands using, ultimately, electrons to do the work.

Prerequisite(s):

E 115

Textbook(s) and/or other required material:


Course objectives. By the end of this course, the student should be able to (use demonstrative verbs):

1. Demonstrate a basic understanding of computer system architecture.
2. Program computer systems at the machine and assembly level.
3. Describe the roles carried out by the microarchitecture, data flow and control flow portions of computers.
4. Demonstrate how a high level language such as C is translated from text, to assembly, to machine language, to run time actions, to voltage variations in the underlying switching fabric, and
5. Describe how simple input/output (I/O) devices are controlled by microprocessors, and write program code to control such devices.

Topics covered:

1. Computer System Levels of Abstraction
2. Numbers and Two's complement
3. Logical Operations and Circuits
4. Combinational & Sequential Logic
5. Storage and von Neumann Model
6. Von Neumann model and LC-3
7. LC-3 Instruction Set and Datapath
8. Assembly Language Programming
9. Polling I/O
10. Traps and Subroutines
11. Interrupt-Driven I/O
12. Operating System Routines
13. Subroutines
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14. Stacks

Class/laboratory schedule (sessions per week and duration of each session):

Lecture -- two 75-minute sessions per week
Problem sessions -- one 75-minute session, approx. every other week

Contribution of course to meeting the requirements of Criterion 5 - other:

N/A

Contribution of course to meeting the requirements of Criterion 5 - math and basic sciences:

N/A

Contribution of course to meeting the requirements of Criterion 5 - engineering topics:

3 hours

Contribution of course to meeting the requirements of Criterion 5 - general education:

N/A

Relationship of this course to program learning outcomes:

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>Level of Instruction</th>
<th>Related Course Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome A</td>
<td>Intermediate</td>
<td>Boolean logic, binary data representation, math and logic operations on binary data</td>
</tr>
<tr>
<td>Outcome B</td>
<td>N/A</td>
<td>Design of logic gates, combinational and sequential logic circuits</td>
</tr>
<tr>
<td>Outcome C</td>
<td>Basic</td>
<td>Computer programming</td>
</tr>
<tr>
<td>Outcome D</td>
<td>N/A</td>
<td>Dataflow diagrams, flow charts, pseudocode, assembly language</td>
</tr>
<tr>
<td>Outcome E</td>
<td>Major</td>
<td>Application of computers to solve general problems</td>
</tr>
<tr>
<td>Outcome F</td>
<td>N/A</td>
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<tr>
<td>Outcome G</td>
<td>Basic</td>
<td></td>
</tr>
<tr>
<td>Outcome H</td>
<td>Basic</td>
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<tbody>
<tr>
<td>Outcome I</td>
<td>N/A</td>
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</tr>
<tr>
<td>Outcome J</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Outcome K</td>
<td>Major</td>
<td>Computer programming, logic design</td>
</tr>
</tbody>
</table>

**Person who last prepared this description and date of preparation:**

- Raubenheimer, Carol Dianne (cdrauben) - Jan 15th, 2010 (12:54pm)