ECE 209 Syllabus

Course:                  ECE 209
Credit Hours:            3
Course Title:            Computer Systems Programming

Course Description:

This course continues the introduction to computing systems by focusing on programming. In particular, students will learn more about the C programming language, how its features can be implemented using a processor’s instruction set, and how to use data structures in C to write programs to solve complex problems.

Prerequisite(s):         ECE 109 (C- or better)

Textbook(s) and/or other required material:

Yale N. Patt, Sanjay J. Patel
Introduction to Computing Systems: From Bits and Gates to C and Beyond, 2nd edition

Stephen Prata
C Primer Plus, 5th edition

CodeLab online programming assignments: www.turingscraft.com

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

Convert the following C language elements to LC-3 assembly language: functions, pointers, arrays, structs.
Demonstrate the use of C compilers and debugging tools.
Implement the following data structures in C: array, list, tree, hash table.
Define, implement, and use an abstract data type.
Analyze an algorithm to determine its execution time.
Design and implement a C program that performs a specified task.

Topics covered:

Intro and review of LC-3 and C basics
C programming tools: compiler and debugger
Functions and recursion
C programming tools: makefiles, std C library
Pointers
Arrays, strings
Pointer arrays, multi-dimensional arrays
C structs
Linked lists
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Dynamic memory allocation
Intro to algorithm analysis
Abstract data types
Elementary sorting algorithms
Sequential searching algorithms
Hash tables

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

Two lectures per week, 75 mins each
One problem session per week (approx.), 60-75 mins

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>
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</thead>
<tbody>
<tr>
<td>Outcome A</td>
<td>Major</td>
<td>computer programming, design of algorithms, analysis of algorithms</td>
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<tr>
<td>Outcome B</td>
<td>N/A</td>
<td>design of algorithms, computer programming</td>
</tr>
<tr>
<td>Outcome C</td>
<td>Intermediate</td>
<td>create computer program to solve a given problem</td>
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<tr>
<td>Outcome D</td>
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<tr>
<td>Outcome E</td>
<td>Major</td>
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<tr>
<td>Outcome F</td>
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<td>Outcome G</td>
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<tr>
<td>Outcome H</td>
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<tr>
<td>Outcome J</td>
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<tr>
<td>Outcome K</td>
<td>Major</td>
<td>computer programming, C programming</td>
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Person who last prepared this description and date of preparation:

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