Lane Department of Computer Science and Electrical Engineering
CS 350
Computer System Concepts
Fall 2013
Time: T R 9:30 – 10:45 AM
Room: ESB-E G83

Instructor: Bojan Cukic
Office: ESB 731
Office Hours: T R 11:00 AM – 12:00 noon or by appointment
Phone: 304-293-9686
E-mail: Bojan.CukicATmail.wvu.edu (the preferred method for reaching me)
Prerequisite: CS 111.
Textbook:
  We will cover Chapters 1-4. The rest of the same textbook is covered in CS 450. Older editions are OK too.

Additional references:
• Partial class notes are made available at the Web (http://www.csee.wvu.edu/~cukic/CS350).

1. Class Objectives
Hardware and software are, broadly speaking, two primary subsystems in modern computers. The aim of this course is to provide an introduction to systems software organization, primarily the software-hardware interface provided by operating systems. In order to achieve this, the class provides an in-depth coverage of the programming language of choice for system level programming, C, an introductory coverage of principles behind operating systems, and the programming interface between C and Linux family of operating systems. The topics of interest include process and thread management, interprocess communication, and an introduction to computer networks.

2. Expected Learning Outcomes
Upon successful completion of this course, students should have:
   1. Ability to design and implement programs in programming language C.
   2. Ability to use operating system interfaces: interrupts and system calls.
   3. Ability to program run-time environments: processes, threads, synchronization primitives.
   4. Ability to implement elementary networking (TCP, IP, client / server) and use inter-process communication primitives.

3. Topics Covered

<table>
<thead>
<tr>
<th>WEEK #</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1, 2</td>
<td>System Abstractions, C Review, Static Data Structures, Functions, Recursion</td>
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<tr>
<td>3, 4</td>
<td>Pointers, Pointer Arithmetic, Parameter Passing by Reference</td>
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<td>5</td>
<td>Binary File I/O, Binary Arithmetic</td>
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<tr>
<td>6, 7</td>
<td>Asynchronous Programming (interrupts, system calls), Introduction to operating systems (OS)</td>
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<td>8, 9, 10</td>
<td>Processes and Threads.</td>
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<td>11, 12</td>
<td>Inter-process communication (IPC), Process Synchronization, Semaphores.</td>
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<tr>
<td>13</td>
<td>Introduction to networking, OSI, TCP/IP.</td>
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<td>14</td>
<td>Pipes, Sockets.</td>
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<td>15</td>
<td>The File System.</td>
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4. Tests
There will be 3 tests, accounting for an equal part of the final grade, and the final exam. Their tentative dates are:

- Test 1: The week of September 16th
- Test 2: The week of October 28th
- Test 3: December 3rd
- Final exam: Tuesday, December 17th, 11 AM - 1 PM.

The final exam will be comprehensive, that is, it will cover all the material taught throughout the semester.

5. Programming Assignments
There will be 3 programming assignments. You are advised to start working on assignments well before the deadline, in order to avoid delayed submission. Each day of delay will cost you 5% of the earned grade. Linux programming environment will be required for program development, execution and submission. You will be given class accounts on LCSEE Department’s Linux cluster. Please note that a Linux server can be accessed from your homes using a secure connection service, such as SSH. All programming in CS 350 will be done in C (Java or C++ are not acceptable).

- Required software: SSH Secure Shell client (on your home/lab machine), gcc, Emacs, pico, etc on the cluster.

There is no lab associated with this course. We must be able to compile your source code using GCC compiler (no exceptions). Detailed assignment descriptions will be given in class and made available on the class Web page.

Tentative assignment dates:
- Assignment #1: Aug 27th to Sept 10th
- Assignment #2: Sept 26th to Oct 17th
- Assignment #3: Nov 5th to Nov 21st

6. Grading
Tests and the final exam will account for 60% of the final grade. The remaining 40% will be derived from programming assignments. You must obtain a passing grade (60% or higher average) in both parts (tests and assignments) in order to pass the course. THERE WILL BE NO EXCEPTIONS TO THIS RULE. The final exam is optional if you are satisfied with your grade from the three tests. The final exam is mandatory if you do not take one of the tests (regardless of the reason). Skipping two or more tests in a semester results in a failing grade.

7. Expected workload
CS-350 is a hands-on course, and the expected workload is relatively high. You MUST be prepared to dedicate AT LEAST 5 working hours a week to this class (excluding the time spent in the classroom). This is the average. The workload for some of the programming assignments will significantly exceed the 5 hours mark.

8. Academic Honesty
Students are encouraged to share discussions regarding class topics. However, collaboration during the implementation of programming assignments and tests is strictly forbidden. Also forbidden is downloading of solutions from Internet. Please, be aware that your programs will be AUTOMATICALLY compared with each other during the evaluation. Assignments with non-accidental similarities will receive the grade zero (0%). Repeated offense will lead to an F in the class.

9. Inclusivity Statement
The West Virginia University community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion.

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Accessibility Services (293-6700). For more information on West Virginia University’s Diversity, Equity, and Inclusion initiatives, please see http://diversity.wvu.edu.