LANE DEPARTMENT OF COMPUTER SCIENCE AND ELECTRICAL ENGINEERING
CS 350: Computer System Concepts
Fall 2019

Course Instructor: Dr. Don Adjeroh
Room AERB 263A (Evansdale Campus)
Tel: 304-293-9681; email: donald.adjeroh@mail.wvu.edu
Office Hours: Tuesday 12:30am – 2:00pm; Thursday 12:30am – 2:00pm.

Course Tutor: TBA
Course Schedule:
Lectures: Tuesday and Thursday 9:30-10:45am, AERB 135, Evansdale Campus
Labs: Optional labs for Operating Systems Section Only.
Course website: via eCampus

Purpose
The hardware and software subsystems are two basic components of a computer system. The aim of this course is to provide an introduction to fundamental topics in computer systems, especially the hardware-software interface, and the system-call interface provided by the operating system. The first part of the course will introduce basic concepts in programming using the C language. The emphasis will be on C programming in a UNIX environment. The remaining part of the course will introduce basic concepts in operating systems. Operating systems are a special type of software that sits between the hardware and other software applications. They function to manage various computer resources, and to provide a convenient interface to the users. This part of the course will lay emphasis on processes, interprocess communications and system calls, which provide an interface between the operating system and higher-level software layers. Simple networking concepts will be introduced from the viewpoint of interprocess communication. This course will be important for students that want to know more about the internals of a computer system, and how the different components interact to produce a working system.

Expected Learning Outcomes
At the end of this course, students are expected to:

- Have acquired good programming skills, and understood good programming practices
- Be able to solve problems and program proficiently using the C language
- Have understood the working principle of an operating system, especially from the user interface viewpoint
- Have understood the basic concepts used in operating systems, such as processes, IPC, pipes, file I/O and threads.
- Have understood the basic concepts in computer networks, such as the OSI model, socket communication, etc.
- Be able to write system level C programs using low-level system calls
- Be able to solve practical problems using C programs with multiple processes (and/or multiple threads of execution)
- Have understood the problems of deadlocks and starvation in operating system, and how to handle them

Prerequisites CS 111.

Recommended Texts

Others Texts

Assessment
Weekly quizzes : 15%
3 In-class tests : 50%
3 Programming assignments : 35%
Class Participation : 3% extra on tests

Important Dates (Estimates)
In-class Test I: Week of Sep. 23, 2019
In-class Test II: Week of Oct. 28, 2019
In-class Test III: Week of Dec. 2, 2019
Final Exam: No final exam

Grade Assignment
A: ≥ 85; B: 75 – 84; C: 65 – 74; D: 50 – 64; F < 50
Others

Labs
There will be no formal lab sessions. However, some lab materials may be made available and students will be expected to work on them at their own time. Also, some optional lab sessions may be organized from time to time during the course.

Expected Workload
CS 350 is a hands-on course, and the expected workload is relatively high. Prepare to dedicate AT LEAST 5-8 working hours a week to this class (excluding the time spent in the classroom). A minimal prerequisite for the successful completion of the course is a good understanding of programming concepts. Some familiarity with C, Java, or a high level programming language is assumed. Laboratory instruction is not required in CS 350. However, the section on operating systems will involve (optional) laboratory work. You will be given class accounts on the Department's linux/unix workstations and all assignments will have to be submitted and run there.

Final Exam
No Finals for this course.

Academic Honesty
Students are encouraged to discuss class topics and analyze problems among themselves. However, collaboration during the implementation of programming assignments, laboratory assignments and tests is strictly forbidden. Copying assignment solutions or written reports (or part of) will not be tolerated. Please, be aware that your submitted programs may be AUTOMATICALLY compared with each other during the evaluation.

Social Justice Statement
West Virginia University is committed to social justice. I concur with that commitment and expect to foster a nurturing learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration. 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 Disability Services (293-6700).
## Weekly Course Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Starting</th>
<th>Topic</th>
<th>Notes</th>
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<tbody>
<tr>
<td>1</td>
<td>Aug. 19</td>
<td>Introduction</td>
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<tr>
<td></td>
<td></td>
<td>Overview of C Language</td>
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<td>2</td>
<td>Aug. 26</td>
<td>Structured programming in C</td>
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<td>3</td>
<td>Sep. 2</td>
<td>Functions and recursion</td>
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<td>4</td>
<td>Sep. 9</td>
<td>Arrays &amp; Strings</td>
<td>Programming Project 1</td>
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<td></td>
<td>(due 2 weeks after)</td>
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<tr>
<td>5</td>
<td>Sep. 16</td>
<td>Pointers</td>
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<td>6</td>
<td>Sep. 23</td>
<td>Pointers (cont’d)</td>
<td>In-class Test I (C part)</td>
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<td>7</td>
<td>Sep. 30</td>
<td>Structures and Bitwise Operators</td>
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<td>File I/O; Data Structures in C</td>
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<td>OPERATING SYSTEMS SECTION</td>
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<td>8</td>
<td>Oct. 7</td>
<td>Introduction to operating systems (OS)</td>
<td>Programming Project 2</td>
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<td>MID-TERM BREAK (Oct 10, 11)</td>
<td>(due 2 weeks after)</td>
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<td>9</td>
<td>Oct. 14</td>
<td>Processes in OS</td>
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<td>10</td>
<td>Oct. 21</td>
<td>Inter-process communications (IPC)</td>
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<td>11</td>
<td>Oct. 28</td>
<td>Semaphores and pipes Signals</td>
<td>In-class Test II (C+OS)</td>
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<td>12</td>
<td>Nov. 4</td>
<td>Threads</td>
<td>Programming Project 3: (OS project)</td>
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<td>(due 2 weeks after)</td>
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<td>13</td>
<td>Nov. 11</td>
<td>Brief introduction to networking Sockets</td>
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<td>14</td>
<td>Nov. 18</td>
<td>Deadlocks in operating systems</td>
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<td>15</td>
<td>Nov. 25</td>
<td>THANKSGIVING BREAK</td>
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<td>16</td>
<td>Dec. 2</td>
<td>Deadlocks (cont’d)</td>
<td>In-class Test III (OS part)</td>
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<td>The File System/Memory management</td>
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<td>17</td>
<td>Dec. 9</td>
<td>Course Review</td>
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<td>18</td>
<td>Dec. 16</td>
<td>FINALS WEEK</td>
<td>No Finals for this course</td>
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Note that the above represents only an estimate of the weekly schedule. The actual date/week that a particular topic is discussed, and the specific topic sequence could vary during the semester.
MEMORANDUM

TO: All Statler College Undergraduate and Graduate Students

FROM: Dean Gene Cilento
       Glen H. Hiner Dean, and Professor of Chemical and Biomedical Engineering

DATE: August 15, 2018

RE: Academic Integrity, Academic Dishonesty, and Expected Behavior

On behalf of the faculty and staff in the Statler College, I welcome you to the 2018-19 academic year! The Statler College is firmly committed to offering you a high-quality education that will provide a strong foundation on which to build your professional career.

One of the tenets of being a professional engineer is to “participate in none but honest enterprise.” You are expected to maintain the highest ethical standards as outlined in WVU’s Student Conduct Code and Discipline Procedure, found at http://bit.ly/2hBU4tP. Engineering is a noble profession that must maintain the highest ethical standards.

Recent cases of academic dishonesty and misconduct have resulted in sanctions up to permanent notes on the official transcript and suspension from the University. Academic dishonesty and misconduct jeopardize the offending student’s academic and professional career, and it tarnishes the reputation of all our honest, hard-working students. We are all responsible for encouraging the integrity of others, and this starts by us setting our own example for others to follow.

Major provisions of the Statler College policies for academic integrity include:

- Grades assigned during the semester on exams, quizzes, reports, or homework assignments are considered final and are not subject to negotiation for any reason other than an indisputable mistake in grading.
- Use of cell phones, smart wearable devices, or possession of other external communication devices are strictly prohibited during exams, tests, or quizzes administered inside the classroom. Departments may specify acceptable calculators and additional restrictions.
- Cheating, plagiarizing, and unethical conduct of trying to obtain grades that the student has not earned are prohibited. Violations of academic integrity are described in the WVU Catalog: http://bit.ly/2hDAeJua.
- Students have the right to appeal final grades that do not involve charges or appeal of charges of academic dishonesty. The appeal process is outlined in the WVU Catalog: http://bit.ly/2uiMM9E.
- Incidents of student misconduct or academic dishonesty will be handled promptly and appropriately in accordance with the WVU Student Conduct Code and Discipline Procedure. Cases are referred to the Office of Student Conduct. Violations may lead to dismissal from the Statler College and expulsion from WVU.

All students must have the same opportunity to succeed in their studies and must be held to the same standards of academic rigor. We expect our students to be conscientious, ethical, and highly motivated. We count on the cooperation of our students to help us identify any incidents of academic dishonesty or unethical behavior. If you see it, please report it to someone you trust.

Departments are expected to take prompt action to penalize cheating, plagiarism, disrespect, and misbehavior. The report filed by the faculty member will identify the specific consequences that the student will experience as the result of his/her particular act of academic dishonesty or misconduct.

Academic integrity is the cornerstone of your professional career. We have many services and opportunities to help you succeed with your studies and gain the knowledge, skills, and abilities of your chosen profession. I encourage you to take advantage of the College’s resources, work hard, and take pride in mastering your student outcomes!

Best wishes for continued success as you embark on a new academic year! Do well and be a true Mountaineer.

cc: Department Chairs, Faculty and Staff, WVU Office of Student Conduct

Office of the Dean
PO box 6070
Morgantown, WV 26506-6070

Equal Opportunity/Affirmative Action Institution