CS 3100
Operating Systems
Spring 2016

“Learning is essentially pleasurable.” – Kenneth Eble

Instructor Robert Ball
Office TE 111B
Phone 801-626-7942
Email robertball@weber.edu (Do not send me messages through canvas – I will not see them.)

Office Hours
Monday/Wednesday: 9:30am - 11:30am and 1:00pm – 1:30pm

Course Information
Where TE 109C
When Tuesday and Thursday from 9:30am – 11:20am

Required Textbooks
- Operating Systems: Three Easy Pieces by Dusseau & Dusseau. (Free softcopy from http://pages.cs.wisc.edu/~remzi/OSTEP/ or you can buy it from $10 - $36 – see the website)

Optional Textbooks

Prerequisite CS 2420

Course Description and Objectives
From the catalog: An overview of computer operation system concepts, system software components with emphasis on installation, management, monitor/supervisor and I/O management, control commands, network installation, and device drivers. The operating systems studied will focus on Windows or UNIX.
This course assumes familiarity with basic computer organization (e.g. processors, memory, and I/O devices covered in CS2810). You will need to be able to program in C to perform the assignments in this course. If you do not have much experience in this programming language, do not worry (too much), we will spend time covering background, but of course, learning on your own is important and valuable (in this class and in real life). For those of you who are new to C (e.g. you just know Java and/or C++), realize this is an opportunity to broaden your skill set, and take it seriously. Being a good programmer is not sufficient to make you a good computer scientist, but it is necessary.

Lecture/Lab
This course is very hands on. Please bring a laptop everyday and be prepared to apply what you have learned from previous classes and this class.

The point of every class period is for you to learn operating systems concepts and apply them immediately. Simply listening to me will not be helpful. Classroom time will be interspersed with lecture and practical assignments. The point of every class is to engage you so that you learn. My purpose is not to simply “teach” – whatever that means – but to help you learn the material. As a result, please come prepared to work with your computer and learn.

Taking Notes
Please do not write down everything I say – I am not that important! The things that you write down should be the insights that you receive during class. A few keywords, a sentence, or even a picture that will help you remember what you just understood is the point behind note taking. Note taking for someone else is pointless because notes are individualistic and if done correctly will not make any sense to another person. Learning involves thinking and internalizing what you hear. Notes are written down personal insights that should help you remember what you learned.

Should you take notes? Yes! Note taking involves active learning. It makes you think, which in turn helps you be confused, which makes you ask questions, help you be curious, etc. If you aren’t taking notes then you probably are bored and not paying attention.

Attendance
Attendance is strongly encouraged. I may take attendance in class, but it will not impact your grade.

In my experience, if you do not attend class you will fail.

Learning Outcomes
Upon successful completion of this course, the student shall be able to:

- Identify the components of operating systems process management
- Recognize issues related to concurrent processes and synchronization techniques
- Construct software which uses multiple thread
- Discuss and illustrate several scheduling algorithms
- Describe I/O handling in operating systems
- Illustrate file system interfaces and implementation
- Be able to perform independent lab experiments on a focused OS internal topic
• Be able to document research results in a technical paper

ABET Accreditation Program Objectives
• An ability to apply knowledge of math, science, and engineering
• An ability to design and implement programs as well as to analyze and interpret code and data.
• An ability to design a system, component, or process to meet desired needs.
• An ability to identify, formulate and solve computing problems.
• An ability to communicate effectively.
• The broad education necessary to understand the impact of computing solutions in a global and societal context.
• Knowledge of contemporary issues.
• An ability to use the techniques, skills, and modern computing tools necessary for computing practice.

Allocated Time
You should anticipate spending two to three hours of study per week for each credit hour of a university course. Computer and programming classes typically require time in the upper range.

Cheating
Students are expected to maintain academic ethics and integrity in regards to performing their own work. The WSU Student Code states clarifies cheating.

a. Cheating, which includes but is not limited to:
   i. Copying from another student’s test paper;
   ii. Using materials during a test not authorized by the person giving the test;
   iii. Collaborating with any other person during a test without authority;
   iv. Knowingly obtaining, using, buying, selling, transporting, or soliciting in whole or in part the contents of any test, without authorization of the appropriate official;
   v. Bribing any other person to obtain any test;
   vi. Soliciting or receiving unauthorized information about any test;
   vii. Substituting for another student or permitting any other person to substitute for oneself to take a test.

b. Plagiarism, which is the unacknowledged (uncited) use of any other person or group’s ideas or work. This includes purchased or borrowed papers;

c. Collusion, which is the unauthorized collaboration with another person in preparing work offered for credit;

d. Falsification, which is the intentional and unauthorized altering or inventing of any information or citation in an academic exercise, activity, or record-keeping process;

e. Giving, selling or receiving unauthorized course or test information;

f. Using any unauthorized resource or aid in the preparation or completion of any course work, exercise or activity;
Infringing on the copyright law of the United States which prohibits the making of reproductions of copyrighted material except under certain specified conditions;

*CS Department policy dictates that any verifiable evidence of student academic cheating, as defined and determined by the instructor, will result in: 1) an automatic failing grade for the class and 2) a report to the Dean of Students that will include the student's name and a description of the student's dishonest conduct.

Instructor Note: The most common form of cheating in programming courses is to “borrow” code from the Internet or copy code from a fellow student. To submit work that you did not create is cheating and will result in failure of the course. No matter how desperate the situation seems, a 0 on an assignment is better than an E for the course. Please do not cheat.

“I really, really need to get a C” policy

The most effective method for obtaining a C or above in this class is to submit assignments when they are due and to stay current with course topics. The curriculum is carefully designed to fit the number of course weeks. In order to uphold academic rigor and integrity, student grades must be based on the degree to which the course requirements listed in the syllabus are fulfilled. Extra credit assignments are not allowed. If you approach me anytime during the term claiming that special allowance should be made because you need a C to move forward in the program, graduate, receive financial aid, etc., I will decline your request and refer you to this clearly worded policy.

Other Important Information

Cell phones

Use the vibrate mode only. If you need to answer a call, please do so outside the classroom. Absolutely no text messaging allowed. If you must take an emergency call or page, quietly leave the classroom to conduct your conversation. We will be using computers in classrooms. Please ensure that all classroom computer activity is directly related to the lecture or assignment.

Emergency campus closure

In the event of an extended campus closure, I will continue to provide instruction by utilizing Canvas, the online course system. I will expect you to log in to the system on a regular basis to keep up with coursework. Assignments will be provided through the online system with clear due dates and expectations. Discussions will be made available to allow you to interact with other students and me about course material. I will check my Weber email on a daily basis should you need to communicate with me personally. It is imperative that I am able to contact you and that I have accurate contact info on you. You are responsible for checking your Weber e-mail or for having Weber messages forwarded to accounts you do check.

Accommodations for disabilities

Any student requiring accommodations or services due to a disability must contact Services for Students with Disabilities (SSD) in room 181 of the Student Service Center.
Grading
The final grade will be given based on points accumulated through exams and labs. Standard grading will apply:

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<thead>
<tr>
<th>Grade</th>
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<tr>
<td>A</td>
<td>94-100</td>
<td>B+</td>
<td>87-89</td>
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<td>A-</td>
<td>90-93</td>
<td>B</td>
<td>84-86</td>
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<td>C</td>
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<td>E</td>
<td>below 60</td>
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Due Dates
The official due date for every assignment is what is shown on Canvas. If Canvas shows that an assignment is due at 10am for a particular date for a particular assignment then that is when it is due. If you feel that what is shown on Canvas is wrong then please contact me immediately. If I announced in class a particular due date and time but Canvas shows another due date and time then Canvas is right and I am wrong. I find this helps students because Canvas is always available and I am not.

Late policy
I am extremely nice and flexible when people ask if they can turn in assignments early. Go for it! Turn everything in early!!

I do not accept late work unless you have a very good reason. If you had an extenuating situation that required that you turn in your assignment late then you must talk to me in person about the situation.

Assignments and Exams
There will be approximately 8 assignments and 2 exams. The assignments will generally be of approximately the same weight – check Canvas for exact points for every assignment. The assignments will count towards 55% of your grade. I may have quizzes and other homework that will posted on Canvas that will be part of the 45%.

There will be 2 exams that count towards 45% of your grade – a midterm and a final exam. Each exam will count towards 22.5% of your grade. **Exams can only be taken on the days given unless arrangements are made to take them ahead of time.**
## Tentative Class Schedule and Course Outline

The following class schedule is subject to change at any time

<table>
<thead>
<tr>
<th>Week of</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Jan 11</td>
<td>Introduction</td>
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<td></td>
<td>Icarus access and C review/introduction</td>
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<td></td>
<td>Linux review</td>
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<td></td>
<td>OS introduction</td>
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<td>Jan 18</td>
<td>Processes</td>
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<td>Jan 18 (No class Jan 18)</td>
<td>Processes</td>
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<tr>
<td>Jan 25</td>
<td>CPU Scheduling</td>
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<tr>
<td>Feb 1</td>
<td>Main Memory</td>
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<td></td>
<td>Address Translation</td>
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<td>Feb 8</td>
<td>Segmentation</td>
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<td>Free Space Management</td>
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<tr>
<td>Feb 15</td>
<td>Paging</td>
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<tr>
<td>Feb 22</td>
<td>Virtual Memory</td>
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<tr>
<td>Feb 29</td>
<td><strong>Midterm Exam Week</strong></td>
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<tr>
<td>Mar 14</td>
<td>Threads</td>
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<td>Mar 21</td>
<td>Locks</td>
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<td>Mar 28</td>
<td>Process Synchronization</td>
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<td>Apr 4</td>
<td>I/O Devices</td>
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<td>Apr 11</td>
<td>RAID and Files</td>
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<td>Apr 18</td>
<td>File Systems</td>
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<td>Apr 25</td>
<td><strong>Last day of class Apr 25</strong></td>
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<tr>
<td>Final Exam Week</td>
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