

Syllabus

Operating Systems – COMP 310
8:00 – 12:15 pm daily – Science 200
Intersession 2019

Instructor: Dr. Frank McCown
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Office Hours: Science 208: 3-4 pm daily or by appointment

Course Description

The historical development and current functions of operating systems. Topics include process management, memory management, disk scheduling, performance evaluation, security, and case studies. Prerequisites: COMP 2450; COMP 2680 or EENG 2400.

Required online textbook: *Operating Systems* by Lubomir Bic from zyBooks.

To get your zyBook:

1. Sign up for an account at <https://learn.zybooks.com> using your Harding email address
2. Enter zyBook code: **HARDINGCOMP310McCownSpring2019**
3. Click *Subscribe*

Cost: \$58

Student Learning Outcomes

At the end of this course, students will be able to...

1. Describe the concepts and techniques used to manage CPUs, memory, and I/O devices.
2. Explain how the interrelationships of computer components affect performance.
3. Construct programs that avoid race conditions when using multiple processes or threads.
4. Construct programs that avoid deadlocks where possible and detect deadlocks when prevention is not possible.
5. Execute commands on a Unix machine using the command line interface.

Attendance

Your daily attendance is essential for successfully learning the class material, so attendance will be recorded. If you are absent, you should check Easel for missing notes and homework assignments and watch the Echo360 video on Canvas. Late work is not accepted unless your absence is excused.

Exams

Three regular exams and a comprehensive final exam will be given. If for **any** reason you are not able to take an exam, you must notify me **before** the exam (or as soon as you are physically possible). Failure to do so may result in a **zero** for the exam. Makeup exams for excused absences will be given, but a penalty of up to 75% will apply for unexcused absences, at the teacher's discretion. Phones and smart watches must be turned off and put away.

Reading Assignments, Homework Assignments, and Projects

Reading assignments require students to read and complete the Participation Activities (animations and questions) in the zyBook *before* class. Points are awarded based on the percent of completed Participation Activities. No credit is given for completing the reading/questions late.

Homework assignments are small assignments that help you better understand concepts discussed in class. Homework assignments are to be completed individually or in pairs (two people only). **Important:** If you complete a homework assignment with a partner, please write you and your partner's name at the top of the assignment.

Two Perl programming projects will be assigned that involve significant effort to complete. Projects may be completed independently or in pairs (two people only). Pair programming has been shown to have a number of benefits including increased personal satisfaction and fewer errors¹. If you work in pairs, both of you must work together on a *single* computer, and both of you must write *approximately half* of the code. **Do not write code without your partner present and watching.** Both of you should understand completely what is being written. When you submit a program to Easel that has been written in pairs, you must put comments in your code indicating the names of both programmers. Only one student needs to submit their solution to Easel.

Grades

Final grades are computed with the following weights:

Exams (3): 45%
Projects (2): 15%
Reading: 5%
Homework: 15%
Final Exam: 20%

Letter grades: A = 90-100%, B = 80-89% C = 70-79%, D = 60-69%, F = 0-59%

Late work: Not accepted during intercession because of the tight schedule.

Final grades are not rounded unless the student has given significant effort which is evidenced by regular attendance, completion of nearly all homework assignments, significant effort on projects, etc.

Course Culture

- Shortcuts don't exist.
 - You cannot learn without considerable effort. Be prepared to spend **two hours** outside of class for every hour in class studying, reading, completing homework and projects, and preparing for exams.
 - Keep up with your reading and homework. Start your homework and projects on time so you can get help from the instructor when needed.
 - Come by during office hours (or we'll arrange a time) for assistance on assignments. Remember that I'm here to help you.
 - Laptops are not allowed in class. Many studies confirm that students learn best by hand-writing notes and avoiding the distractions that laptops present.
- Be considerate of others.
 - Help create an environment where you and your classmates can effectively learn.
 - Be on time. Stay awake. Engage in class discussion. Ask questions.
 - Keep your phone put away.
- Glorify God in all you do.
 - "Whatever you do... do it all to the glory of God." – 1 Cor 10:31
 - Make the most of the time God has given you to learn and develop your skills.
 - Everyone is expected to hold to the **highest standard** of personal conduct and **integrity**. Cheating in all its forms is inconsistent with Christian faith and will result in sanctions up to and including dismissal from the class with a failing grade. You are cheating when you submit work performed by anyone but yourself and your partner. *Never* allow someone to view your source code as this often leads to cheating.

¹ See *All I Really Need to Know about Pair Programming I Learned in Kindergarten* (2000) for more information on effectively using pair programming.

4. Miscellaneous

- Check Canvas **daily** for announcements. Canvas contains class recordings (Echo360 link).
- Please adhere to the dress code as spelled out in the Student Handbook. Don't wear shorts to class, and men should not wear caps while in class. Please wear shoes to class (flip flops are OK).

Assessment

Harding University, since its charter in 1924, has been strongly committed to providing the best resources and environment for the teaching-learning process. The board, administration, faculty, and staff are wholeheartedly committed to full compliance with all criteria of the Higher Learning Commission. The university values continuous, rigorous assessment at every level for its potential to improve student learning and achievement and for its centrality in fulfilling the stated mission of Harding. Thus, a comprehensive assessment program has been developed that includes both the Academic units and the Administrative and Educational Support (AES) units. Specifically, all academic units will be assessed in reference to the following Expanded Statement of Institutional Purpose: **The University provides programs that enable students to acquire essential knowledge, skills, and dispositions in their academic disciplines for successful careers, advanced studies, and servant leadership.**

Students with Disabilities

It is the policy for Harding University to accommodate students with disabilities, pursuant to federal and state law. Therefore, any student with a *documented disability* condition (e.g. physical, learning, psychological, vision, hearing, etc.) who needs to arrange reasonable accommodations must contact the instructor and the Disabilities Office at the *beginning* of each semester. (If the diagnosis of the disability occurs during the academic year, the student must self-identify with the Disabilities Director *as soon as possible* in order to get academic accommodations in place for the remainder of the semester.) The Disabilities Office is located in Room 205 of the Student Center, telephone, (501) 279-4019.

Schedule

The following schedule is subject to change but gives you an idea of how the class will progress:

I. Introduction	D. Deadlock detection	VII. Device management
A. Course overview	E. Deadlock avoidance	A. File systems
B. OS structure		B. I/O devices
C. History	IV. UNIX and Perl	Exam 3 (Thursday, May 23)
II. Process management	A. History of UNIX and Linux	VIII. Security
A. Processes	B. UNIX Commands	A. User authentication
B. Resources	C. Overview of Perl	B. Access control
C. Threads	D. Regular expressions	C. Communication
D. Scheduling	Exam 2 (Monday, May 20)	
Exam 1 (Wednesday, May 15)	VI. Memory management	Final Exam (Friday, May 24)
III. Concurrency and deadlocks	A. Efficiency	
A. Semaphores	B. Paging and segmentation	
B. Monitors	B. Virtual memory	
C. Classic synch problems	C. Page replacement	