

CS 450 Operating Systems Structure, Course Overview Spring 2020, 137 AER, 10:10:50 MWF

(Sect: 01 CRN: 10506, 3 credits, 3 hr lectures per week)

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Laboratory: This course does not include closed lab sessions. **Friday of each week, will be a lab session, not lecture.** For this project you will install a virtual machine running Linux, in this environment you will work on an incomplete OS, developing a simulation of a multiprogramming operating system shell. This project will be completed through a series of modules, some independent, some inter-related. The exact number and topic of each module may vary from one semester to another.

Prerequisites: CS 350 (or equivalent). This course requires that students have at least an introductory knowledge of the C programming language (**NOT just C++ or Java**).. **Prerequisites will be enforced. Students who are not comfortable writing C programs using pointers and multiple source files will have difficulty with course projects.**

Required Text: “Operating System Concepts”, by Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, 10th edition. (Edition 9 or 8 can be found on line and will work as well)

Expected Learning Outcomes:

1. Demonstrate a working knowledge of basic OS concepts, especially process management, I/O management, and the user interface
2. Briefly discuss several advanced OS concepts including file systems and virtual memory.
3. Explain Highlights of OS history and its relation to present-day OSs
4. Carry out the development of a significant OS implementation project using the C language
5. Work effectively as a member of a software development project group

There will be no class the Wednesday and Friday of dead week; the time will be used for project work and oral exams. Projects MUST be finished, and oral exams scheduled by the end of dead week. PROJECTS MUST BE FINISHED BEFORE FINALS WEEK!!!!!!!!!!!!

Rules of Operation:

Attendance: Class attendance is strongly recommended. Students are responsible for all material covered in the course, keeping track of assignments and examination dates. Attendance on lab days is required. Three unapproved absences will result in a 5% reduction of your individual project average.

MPX Group Project: The MPX project is a very important component of this course. During the course students will work in groups of 3-4 students to develop components of a **primitive** multitasking operating system through a series of deliverables. The components of the project grade are assigned on a group basis and all members of the group receive the same grade. Your instructor reserves the right to make INDIVIDUAL assignments, which will add additional detail to the project and will contribute to an individual's project grade. **You instructor also reserves the right to adjust an individual's project grade either up or down based on their participation within their group. PICK YOUR GROUP CAREFULLY.**

The final deliverable will be due during dead week when each group will participate in an **oral exam and project demonstration**. Individual grades for the final Module, will be based on each person's **PERFORMANCE** during the oral examination, and your **software's performance** during the project demonstration.

The project is intended both to strengthen your understanding of OS concepts, and to provide an experience in developing system software as a part of a project group. Since an operating system must interact directly with hardware resources, you will also increase your familiarity with basic hardware structures such as interrupts and simple I/O devices. The course will also develop your proficiency in the C Language, commonly used in systems programming. Groups will also be expected to produce both a programmers and users guide for their evolving system.

Modules will be assigned approximately every three-four weeks, and may overlap. Your instructor reserves the right to assign additional modules or reduce the number of modules throughout the semester.

IF you substantially fail to fulfill your responsibilities in your project group, YOU will have your grade on individual modules reduced or you might receive a zero on the module.

IF you do not participate in the oral examination, you will receive a zero for your project score and you will fail the course.

R1: Interface setup and implementation: this module will focus on developing a simple command line interface, developing a series of commands that the user can execute, and underlying C “string” functions needed by your interface to facilitate communications with your user.

R2: Process Management: This module will focus on designing those components that support the creation and manipulation of processes, ultimately representing processes in execution. This module will involve creating process queues, process structures, and commands that allow the user to validate your implementation via the interface developed in R1.

R3: Dispatching: This module will involve dispatching a series of simple processes using a simple round robin scheduling algorithm. Making the command handler a system process, dispatching with user processes

R4: Make the command handler a system process, demonstrate it dispatching with user processes

R5: Memory Management- In this module you will replace the default MPX memory manager with your own heap manager. Your code will process requests to allocate and deallocate varying amount of dynamic memory while your MPX is running. ???????

R6: Interrupt driven I/O

Note: Modules 5 & 6 are subject to change.

Major Assignments/Assessments – Descriptions and Grading Criteria:

Exams: There will be a midterm and final exam. Both exams will be administered in the regular class room.

Exam Absences: There are no scheduled make-up exams. Absence from examinations must be arranged with the instructor prior to the examination. However, consistent with WVU guidelines, students absent from regularly scheduled examinations because of authorized University activities or military exercises will have the opportunity to take them at an alternate time.

Weight/distribution of Course components:

Grades for the course will be based on the point assignments given below. At the end of the semester letter grades will be assigned based on the final composite average for the course. The grading distribution is also shown.

Midterm	20%
Final Exam	25%
Homework	15%
MPX Group Project:	40%

Final Grading Scale:

90 - 100%	A
80 - 91%	B
70 - 81%	C
60 - 71%	D
< 60%	F

A grade of I (incomplete) may be given only in cases of bonafide personal emergency. You are required to sign a contract explaining the nature of the emergency and agreeing to complete all necessary work within 60 days.

Academic Honesty: All work, on exams to be done on an individual basis.

Project work must be the original work of the project group, not borrowed from other groups in this class or previous classes. Evidence to the contrary will be regarded as academic dishonesty and will be dealt with accordance with the Lane Department of CSEE academic dishonesty policy. You are expected to abide by the WVU principles of academic honesty. **This may include dismissal from the class.**

Other Policies:

Academic Integrity

The integrity of the classes offered by any academic institution solidifies the foundation of its mission and cannot be sacrificed to expediency, ignorance, or blatant fraud. Therefore, I will enforce rigorous standards of academic integrity in all aspects and assignments of this course.

The major provisions of the Statler College policies for enforcing academic integrity follow:

- **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.**
- **Common standards of academic integrity prohibit not only cheating or plagiarizing, but also the unethical conduct of trying to obtain grades that the student has not earned. Violations of academic integrity are described in the WVU Catalog: <http://bit.ly/2hDAeUa>.**
- **Students have the right to appeal final grades that do not involve charges of academic dishonesty. Students may appeal 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. The case will be referred to the Office of Student Conduct. Violations may lead to dismissal from the Statler College and expulsion from the University.**

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 uncover any incidences 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

Social Justice: 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.

NOTE: If you are a learning, sensory or physically disabled student and feel that you need special assistance in regard to lectures, reading assignments or testing, please contact your instructor after class or during office hours. The first week of the semester is the best time to inform your instructor of any disability, and make appropriate arrangements with Disability Services (293-6700)