

**Master Course Syllabus**  
School of Engineering and Computer Science  
Washington State University Vancouver

**CS 460**

**Operating Systems**

3 Semester Hours

(3 lecture hours)

**Catalog Description**

Role and purpose of operating systems, process and memory management, I/O device management and drivers, file system concepts and design.

**Prerequisite Courses**

- CS 360 with a C or better

**Prerequisite Topics**

- Proficiency with the C programming language
- Use of Unix environment for coding, compilation, debugging and testing
- Use of Unix operating system API, particularly low level I/O and file system access
- Concepts of Unix file system structure

**Measured Course Outcomes**

Students taking this course will:

1. Evaluate the merits and downfalls of multiple scheduling policies (contributes to performance criterion 1-c).
2. Implement basic kernel functionalities in OS kernels (contributes to performance criterion 2-b).
3. Design and implement correct concurrent programs using proper synchronization techniques (contributes to performance criterion 6-c).

**Other covered course outcomes but not measured**

1. Design PCB data structures that support priority scheduling (contributes to performance criterion 6-b).
2. Develop user-level programs using system-call API (contributes to performance criterion 6-d).

**Required Textbooks**

Silberschatz, Galvin, Gagne, *Operating Systems Concepts*, Wiley.

**Reference Material**

None.

**Major Topics Covered in the Course**

1. Overview and history of computer operating systems
2. Operating system abstractions (processes, threads, interrupts, etc.)
3. Program loading and execution

4. CPU scheduling
5. Memory management and virtual memory
6. Synchronization and deadlocks
7. File systems

## Projects

Programming Project Area	Weeks
System calls	2
Shell	2
Threads and Synchronization	2
CPU Scheduler	2

Students are expected to instrument the teaching operating system Xv6 for projects on "System Calls" and "CPU Scheduler". They will use POSIX C and Pthread for the other two projects on "Shell" and "Threads and Synchronization".

## Design, Implementation and Analysis

Students are given 4-5 programming assignments. The requirements for these assignments are outlined by the instructor but modified by the students. It is the student's responsibility to apply lecture material and understand the implications of the requirements upon their program design.

## CC2013

This course provides coverage of CS2013 knowledge areas. Values listed are minimum course hours dedicated to the topic, percentages indicate the fraction of CS2013 knowledge area topics covered (acceptable values are: <25%, 25-75%, >75%, or 100%).

Area	Tier 1	Tier 2	Elective
OS/Overview of operating systems	2 (25-75%)		
OS/Operating systems principles	2 (>75%)		
OS/Concurrency		3 (25-75%)	
OS/Scheduling and dispatch		3 (25-75%)	
OS/Memory management		5 (100%)	
OS/File systems			4 (25-75%)

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