

## CS 411 – Operating Systems II

**Catalog Description:** Principles of computer operating systems: concurrent processes, memory management, job scheduling, multiprocessing, file systems, performance evaluation, networking.

**Credits:** 4

**Prerequisites:** CS 311, and either CS 271 or ECE 375

**Courses that require this as a prerequisite:** None

**Structure:** Three 50-minute lectures per week

**Instructors:** D. Kevin McGrath

### Course Content:

- Operating systems (OS) concepts focusing on OS internals
- Processes, multiprogramming, threads, system calls, CPU scheduling, synchronization, deadlock prevention and avoidance, virtual memory, file allocation on secondary storage, I/O, and disk scheduling.

### Learning Resources:

- *Linux Kernel Development*, 2nd ed. Robert Love. Novell Press, 2005 (required)

**Course Learning Outcomes:** (\* indicates quantitative outcome—see Criterion 4)

At the completion of the course, students will be able to...

1. **Design, implement, and test** operating system related functions within a large and complex open source code base (ABET Outcomes: A, B, C, I, J, K)
2. **Select** appropriately among processes, user threads, or kernel threads to solve a concurrent problem (ABET Outcomes: B)
3. **Explain** why synchronization is necessary for a concurrent processes scenario, and design synchronization solutions (ABET Outcomes: A, J)
4. **Apply** appropriate algorithms to avoid deadlock for given concurrent processes (ABET Outcomes: A, B, C, I, J)
5. **Explain** the strengths and weaknesses of several CPU scheduling algorithms with respect to wait time, turnaround time, throughput, and context-switching implementation challenges (ABET Outcomes: A)
6. **Explain** various mechanism for protection of memory, the operating system, and system/user files (ABET Outcomes: A)
7. **Map** virtual addresses to physical addresses (ABET Outcomes: A)
8. **Analyze** program data access patterns that may affect the performance of a virtual memory system (ABET Outcomes: A)
9. **Explain** various disk block allocation / free-space management strategies (ABET Outcomes: A)
10. **Compute** access times for various disk scheduling algorithms (ABET Outcomes: A)
11. **Participate** effectively in a team environment\* (ABET Outcomes: D, F)

**Students with Disabilities:**

Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

**Link to Statement of Expectations for Student Conduct**, i.e., cheating policies

<http://oregonstate.edu/admin/stucon/achon.htm>