

CS 311 – Operating Systems I

Catalog Description: Introduction to operating systems using UNIX as the case study. System calls and utilities, fundamentals of processes and interprocess communication.

Credits: 4

Prerequisites: CS 261 and (ECE 271 or CS 271), and experience programming in the C language.
Enforced prerequisites must have a C or higher grade.

Courses that require this as a prerequisite: CS 411, CS 480

Structure: Three 50-minute lectures per week
Note: Due to extensive programming assignments, this course has an implied, non-scheduled lab. The lab takes place in an EECS computer lab at various times, and is not part of the official course schedule. TAs are available to help the students with programming assignments at times announced in the syllabus.

Instructors: D. Kevin McGrath

Course Content:

- Unix programming tools
- Operating system overview
- Processes including process states, transitions, and IPC
- Mutual exclusion

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

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

1. **Explain** why multiprogramming is important for modern operating systems (ABET Outcomes: A, I)
2. **Explain** the general structure of a multiprogrammed operating system (ABET Outcomes: A, I)
3. **Explain** the purpose and operation of system calls (ABET Outcomes: K)
4. **Write** a program utilizing system calls (ABET Outcomes: C, I)
5. **Write** a program using a scripting language (ABET Outcomes: C, I)
6. **Write** a program that uses regular expressions to parse input data (ABET Outcomes: C, I)
7. **Explain** how a common file system works, including structure, I/O operations, and security (ABET Outcomes: A)
8. **Describe** the memory organization of a typical process in a common operating system (ABET Outcomes: A)
9. **Write** a program that spawns processes and provides mutual exclusion for variables or other resources shared by the processes* (ABET Outcomes: C, I, J, K)
10. **Write** a program that uses sockets to implement a client/server system (ABET Outcomes: C, I, K)

Learning Resources:

- Kerrisk, Michael, *A Linux and UNIX System Programming Handbook*, No Starch Press, 2010 (required)
- Kernighan, Brian W. and Ritchie, Dennis M., *The C Programming Language*, 2nd ed., Prentice-Hall, 1988 (recommended)
- Kochan, Stephen G., *Programming in C*, 3rd ed., Sams, 2004 (recommended)
- Web tutorials, *vi* and *perl* quick references, source code handouts (optional)

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>