

# CS 481 / ECE 437: COMPUTER OPERATING SYSTEMS

Spring 2023

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<b>Instructor:</b>	Prof. Amanda Bienz	<b>Email:</b>	<a href="mailto:bienz@unm.edu">bienz@unm.edu</a>
<b>Classroom:</b>	Woodward Lecture Hall 147	<b>Class Time:</b>	T/Th 9:30-10:45
<b>Office:</b>	FEC 3500	<b>Office Hours:</b>	TBA

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**Course Description:** CS 481 / ECE 437 is a senior level course that will cover the basics of operating systems. Topics covered include processes, threads and concurrency, CPU scheduling, synchronization, deadlocks, I/O, and file systems. The tentative schedule, at the end of the syllabus, contains a more detailed outline of course topics.

**Course Format:** This is a fully face-to-face course. The course will not be live-streamed online. However, classes will be recorded, and recordings will be posted within 24 hours of the end of class. If you are unable to find a recording, please send an email to [bienz@unm.edu](mailto:bienz@unm.edu). In the event that a recording is unsuccessful, you will be responsible for finding notes for missed material.

**Grading:** Grades are given based on the standard 10-point scale (90-100 A, 80-89 B, etc.). There will be pluses and minuses (e.g. 90-93 is A-). There will be no curve for the course. The grades are broken down as follows:

- In-class questions (10%)
- Homework assignments (30%)
- Midterm 1 (15%)
- Midterm 2 (15%)
- Final Exam (30%)

**Course Textbook:** We will be using the textbook Operating Systems Concepts, 10th edition. This book is provided through Inclusive Access. If you prefer to find the textbook elsewhere, you must opt-out of the inclusive access option. More information is available at [Inclusive Access Website](#)

**Prerequisites:** CS 341 (Computer Organization and Design) or similar. You are expected to know the C programming language before taking this course. You will be required to complete homeworks in C and I will not be teaching the language.

**Attendance Policy:** All classes can be attended in person. Attendance is not required, but you will be responsible for material covered during each class. In the event you are unable to attend a lecture, a recording of the class should be posted online within 24 hours. If a recording is not available, please send an email to [bienz@unm.edu](mailto:bienz@unm.edu). In the event that a recording is unsuccessful for any reason, you will be responsible to find notes that cover content for days not attended. All slides will be posted online before each class. **There will be in-class questions during a subset of the lectures. Missed in-class questions cannot be made up. The purpose of the in-class questions is to show how much of the covered material is understood and to determine**

**if further time should be spent on a topic. They are also a useful tool in studying for exams.**

**Incomplete and Late Assignments:** All homework assignments are due on Fridays at 5pm. Grading of assignments will not begin before Monday at 9am. Late assignments will be accepted for full credit if turned in before grading begins. However, emails and questions about assignments are not guaranteed to be answered after the Friday 5pm deadline. Late assignments are accepted but penalized until grades are returned unless a valid excuse is communicated before the deadline. If the deadline is missed due to unforeseeable circumstances, we will work something out. Barring a valid excuse, an assignment will be accepted for a 50% reduction once grading has begun. Once grades have been returned, assignments will no longer be accepted. Grades will typically be returned within 2 weeks of the deadline.

**Regrading Requests:** Requests for regrading of assignments or exams should be made within two weeks of the date from which the assignment is returned. Assignments will not be regraded after that point. Regrading requests can be made via email.

**Academic Integrity:** Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course. Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records. **This class has a zero tolerance policy for Chegg, AI chatbots, and similar online resources. If you are caught using Chegg, an AI chatbot, or a similar resource, you will automatically fail the course and receive an academic honesty violation. Much of the material for this course has been developed by Professor Bienz. Course assignments, in-class questions, and exams should not be redistributed or posted online without permission.**

**Accommodations for Disabilities:** UNM is committed to providing courses that are inclusive and accessible for all participants. As your instructor, it is my objective to facilitate an accessible classroom setting, in which students have full access and opportunity. If you are experiencing physical or academic barriers, or concerns related to mental health, physical health and/or COVID-19, please consult with me after class, via email/phone or during office/check-in hours (I am not legally permitted to inquire about the need for accommodations). We can meet your needs in collaboration with the Accessibility Resource Center (<https://arc.unm.edu/>) at [arcsrvs@unm.edu](mailto:arcsrvs@unm.edu) or by phone (505) 277-3506.

**Credit-Hours:** This is a three credit-hour course. Class meets for two 75-minute sessions of direct instruction for fifteen weeks during the Spring 2023 semester. Please plan for a minimum of six hours of out-of-class work (or homework, study, assignment completion, and class preparation) each week.

**Sexual Harassment and Title XI:** Our classroom and our university should always be spaces of mutual respect, kindness, and support, without fear of discrimination, harassment, or violence. Should you ever need assistance or have concerns about incidents that violate this principle, please access the resources available to you on campus. Please note that, because UNM faculty, TAs, and GAs are considered "responsible employees" by the Department of Education, any disclosure of

gender discrimination (including sexual harassment, sexual misconduct, and sexual violence) made to a faculty member, TA, or GA must be reported by that faculty member, TA, or GA to the university's Title IX coordinator. For more information on the campus policy regarding sexual misconduct, please see: <https://policy.unm.edu/university-policies/2000/2740.html>.

**COVID-19:** UNM is a mask friendly, but not a mask required, community. To be registered or employed at UNM, Students, faculty, and staff must all meet UNM's Administrative Mandate on Required COVID-19 vaccination. If you are experiencing COVID-19 symptoms, please do not come to class. If you have a positive COVID-19 test, please stay home for five days and isolate yourself from others, per the Centers for Disease Control (CDC) guidelines. If you do need to stay home, please communicate with me at [bienz@unm.edu](mailto:bienz@unm.edu); I can work with you to provide alternatives for course participation and completion. UNM faculty and staff know that these are challenging times. Please let us know that you need support so that we can connect you to the right resources and please be aware that UNM will publish information on websites and email about any changes to our public health status and community response.

- Student Health and Counseling (SHAC) at (505) 277-3136. If you are having active respiratory symptoms (e.g., fever, cough, sore throat, etc.) AND need testing for COVID-19; OR If you recently tested positive and may need oral treatment, call SHAC.
- LoboRESPECT Advocacy Center (505) 277-2911 can offer help with contacting faculty and managing challenges that impact your UNM experience.

**Tentative Class Schedule** The following is an example of what the course schedule may look like. This schedule will be adjusted as needed throughout the semester. An up-to-date schedule of lecture notes, assignments, and exams will be available on Canvas.

Date	Content
Jan 17	Introduction to Operating Systems
Jan 19	Virtualization/Concurrency/Persistence
Jan 24	Processes
Jan 26	CPU Scheduling, Homework 0 Deadline
Jan 31	CPU Scheduling
Feb 2	Main Memory
Feb 7	Main Memory
Feb 9	Main Memory, Homework 1 Deadline
Feb 14	Paging
Feb 16	Paging

Feb 21	Midterm 1 Review
Feb 23	Midterm 1
Feb 28	Swapping
Mar 2	Demand Paging, Homework 2 Deadline
Mar 7	Replacement Algorithms
Mar 9	Concurrency Intro
Mar 14	<b>Spring Break - No Class</b>
Mar 16	<b>Spring Break - No Class</b>
Mar 21	Critical Sections
Mar 23	Concurrency Data Structures
Mar 28	Condition Variables
Mar 30	Semaphores and Reader/Writer Lock, Homework 3 Deadline
Apr 4	Concurrency Bugs
Apr 6	OpenMP
Apr 11	Midterm 2 Review
Apr 13	Midterm 2
Apr 18	Introduction to I/O
Apr 20	I/O Continued, Homework 4 Deadline
Apr 25	File System Intro
Apr 27	File System Implementation
May 2	File System Failures
May 4	Final Exam Review, Homework 5 Deadline
Final Exam Period	<b>Cumulative Final Exam</b>