

# CS 3113 – Intro to Operating Systems – Spring 2026

## Syllabus

**Instructor:** Dr. Egawati Panjei, [egawati.panjei@ou.edu](mailto:egawati.panjei@ou.edu)

**Office Location:** Devon Energy Hall, DEH 235

**Office Hours:**

- 10:15 – 11:15 AM (Monday and Wednesday)
- 3:00 – 4:00 PM (Tuesday and Thursday)

**Class Location:** Sarkeys Energy Ctr N0202

**Class Time:** 1:30 to 2:45 PM (Tuesday and Thursday)

**Course Prerequisite:** C S 2413 or C S 2414, and C S 2813 or MATH 2513, and C S 2614 or ECE 3223.

**Textbook:** Abraham Silberschatz, Peter Baer Galvin, Greg Gagne: Operating System Concepts, 10th Edition. Wiley 2018, ISBN 978-1-118-06333-0

### Course Contents

Topics	Chapters
OS Overview	1, 2
Process Management	3, 4, 5
Process Synchronization	6, 7, 8
Memory Management	9, 10
Storage Management	11, 12
File Systems	13, 14, 15
Security and Protection	16

**Learning Management System/Website:** <https://canvas.ou.edu/courses/468521>

**Course Catalog Description:** An introduction to the major concepts and techniques of designing and implementing operating systems, including memory management, process management, information management, and computer security. Class projects require the design and implementation of software systems. A UNIX family operating system will be used.

**Course Format:** This course will be in a traditional in-class format.

**Course Activities, Assignments, and Assigning Grades:** Students are required to take weekly quizzes, two exams and a final, and programming projects. The course letter grade will be assigned based on the overall percentage:  $\geq 90$  (A),  $\geq 80$  and  $< 90$  (B),  $\geq 70$  and  $< 80$  (C),  $\geq 60$  and  $< 70$  (D), and  $< 60$  (F). The instructor reserves the right to lower this grade scale if deemed appropriate. The allocation of percentages is given below:

	Percentages
Attendance	5 %
Weekly Quizzes	15%
Exam 1	20%
Exam 2	20%
Final	25%
Programming Projects	15%

**Bonus Points:** The instructor may offer opportunities for students to earn bonus points, up to a maximum of **5%**. These opportunities may include in-class poll questions or take-home activities.

### **ABET Outcomes of Instruction in CS 3113:**

Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.

**Belonging Statement:** The University of Oklahoma fosters an inclusive culture of respect and civility, belonging, and access, which are essential to our collective pursuit of excellence and our determination to change lives. The unique talents, perspectives, and experiences of our community enrich the learning, and working environment at OU, inspiring us to harness our innovation, creativity, and collaboration for the advancement of people everywhere. s

CS 3113 is a learning community that values curiosity and interaction. Asking questions, participating in discussions, and collaborating with others are essential for understanding operating systems. Students are encouraged to engage actively, challenge ideas, and learn through shared exploration.

### **Course Expectations:**

Students are expected to engage actively by attending lectures, participating in discussions, and asking questions to deepen their understanding. Curiosity and an open mind are essential for exploring operating system concepts. Programming assignments must be completed independently and require a solid foundation in C/C++. Students are expected to follow coding standards, document their work clearly, meet project specifications, and uphold academic integrity by not sharing code.

To succeed in exams and assignments, students should keep up with readings, review lecture notes, practice problem-solving, and seek help when topics are unclear. Good time management, meeting deadlines, allowing time for debugging, and avoiding last-minute work, is key to success.

Collaboration is encouraged through discussion of ideas and problem-solving strategies, while maintaining individual responsibility and respect for others. Students must follow all course policies and are encouraged to seek support from the instructor and TAs, while taking responsibility for their own learning. Developing strong critical thinking and problem-solving skills will help students apply operating system concepts to real-world situations and gain skills valuable in both academics and industry.

**Course Goals:** The goals of this course are to:

1. Provide a Strong Theoretical Foundation in Operating Systems
  - Introduce students to the core principles, design, and implementation of modern operating systems.
  - Cover key concepts such as process management, memory management, file systems, security, and system performance.
2. Enhance Understanding of Process and Resource Management
  - Teach students how operating systems handle multiple processes, scheduling, synchronization, and inter-process communication.
  - Provide insights into concurrency challenges and solutions.
3. Build Competency in Memory and Storage Management
  - Help students understand how operating systems allocate, manage, and protect memory using techniques like paging and segmentation.
  - Explore file system structures, disk management, and I/O handling.
4. Expose Students to OS Security and Protection Mechanisms
  - Introduce key security principles, including access control, authentication, and protection mechanisms within an OS.
  - Discuss real-world threats and mitigation strategies.
5. Develop Practical Programming Skills for OS Concepts
  - Enable students to write and analyze C/C++ programs that interact with various OS components.
  - Reinforce theoretical concepts through hands-on programming assignments.
6. Develop Critical Thinking for System Design and Optimization
  - Encourage students to evaluate trade-offs in OS design choices and analyze system performance.
  - Foster problem-solving skills for optimizing operating system performance.
7. Prepare Students for Advanced Courses and Industry Applications
  - Equip students with the knowledge needed for advanced coursework in systems, networking, security, and distributed computing.
  - Provide skills relevant to real-world software development, system administration, and research in computing.

**Learning Outcomes:** Upon successful completion of this course, students will be able to:

1. Core Operating System Concepts
  - Explain the fundamental principles of operating systems, including process management, memory management, file systems, and security.
2. Process and Thread Management
  - Describe and implement concepts related to processes, threads, and concurrency, including context switching, scheduling algorithms, and synchronization mechanisms.
3. CPU Scheduling and Synchronization
  - Analyze different CPU scheduling algorithms and evaluate their efficiency under various workload conditions.
  - Apply synchronization techniques such as locks, semaphores, and monitors to solve concurrency problems.
4. Memory Management and Virtual Memory
  - Explain memory allocation strategies, paging, segmentation, and virtual memory concepts.

5. File Systems and Storage Management
  - Describe and compare different file system architectures and access methods.
  - Implement file I/O operations and understand disk scheduling techniques.
6. Security and Protection Mechanisms
  - Understand fundamental security concerns in operating systems, including access control, authentication, and system protection techniques.
7. Programming for OS Concepts in C/C++
  - Write C/C++ programs to implement and experiment with various operating system components, including process creation, inter-process communication (IPC), threading, memory management, and file system operations.
8. Performance Analysis and Optimization
  - Apply principles of performance evaluation to analyze OS algorithms and optimize system performance.
9. Critical Thinking and Problem-Solving Skills
  - Identify and solve real-world operating system-related challenges through programming assignments (projects).

**Course Reflection Survey:** You'll receive a Course Reflection Survey at the end of each semester for each course that you are enrolled in. I strongly encourage you to complete this survey. Your feedback can help me adjust my class for future semesters to help other students be successful. Your feedback is confidential, and I will only receive it after final grades are due. Course Reflection Survey results may also factor into teaching evaluations and annual performance reviews and are shared with department and program chairs.

**Copyright Statement:** Sessions of this course may be recorded or live-streamed. These recordings are the intellectual property of the individual faculty member and may not be shared or reproduced without the explicit, written consent of the faculty member. In addition, privacy rights of others such as students, guest lecturers, and providers of copyrighted material displayed in the recording may be of concern. Students may not share any course recordings with individuals not enrolled in the class or upload them to any other online environment.

## Course Policies

**Quizzes:** There will be a quiz every Thursday, starting in Week 2, except during weeks when an exam is scheduled. The Quiz will cover topics discussed on previous Thursday and Tuesday lectures. All quizzes are conducted on paper and are closed book and closed electronics except when we need to do a Take Home Quiz. You may use **one two-sided, one-page letter-size sheet** of handwritten notes. Quiz grades will be posted on Grade Scope. To support your overall success, **your two lowest quiz scores will be dropped** at the end of the semester. Makeup quizzes will not be offered; the two dropped quizzes are intended to accommodate any missed quizzes for any reason.

**Exams:** All exams will be conducted on paper and taken in class. Exams are closed book and closed electronics (no laptops or electronic devices). Only handwritten notes are allowed.

For each exam, you may bring a number of handwritten note pages equal to:

- **(Number of quizzes completed before the exam) + 1**

For the final exam, you may bring a maximum number of handwritten note pages equal to:

- **(Total number of quizzes) + 3**

The final exam will be comprehensive and will cover all topics discussed during the semester. Exams 1 and 2 will each cover only the topics discussed prior to the exam. Topics covered in an earlier exam will not be included in later exams (for example, topics from Exam 1 will not appear on Exam 2).

There is no makeup for the final exam. However, if you miss Exam 1 or 2, please refer to the following rules.

### Makeup Exam – Category 1 (Planned Absences)

If you must miss Exam 1 or 2 due to a university approved events (e.g. attending conference, job interview, religious observance), you must email the instructor at least one week before the exam with the **subject line:** *C S 3313: Missing Exam X* (replace X with the exam number).

Your email must include documentation explaining why you will miss the exam. With **prior approval from the instructor**, you may take a makeup exam within one week after the scheduled exam. The instructor will arrange the date and time for the makeup exam.

### Makeup Exam – Category 2 (Emergencies)

If you miss Exam 1 or 2 due to an emergency and **receive approval from the instructor**, you may take the makeup exam together with Category 1 students, if possible. If you are unable to take the Category 1 makeup exam, the percentage weight of the missed exam will be added to your final exam grade. In this case, no additional makeup exam will be given.

### **Programming Projects:**

Projects must be coded in C or C++. We will use ANSI C or C++, so if your program compiles with any G++ or GCC compiler, you are set to go.

1. You will use GradeScope to submit the source program.
2. For every 24 hours late, you will be deducted 5% of the grade of the programming project. Any project that is more than 5 days late will not be evaluated.
3. You are better off submitting a working project on the fifth day rather than one that does not work on the due date.
4. Programs have to be documented clearly. Programs that lack or are weak in documentation will receive a deduction of up to 30% of the grade. Follow the documentation methods used in programs in your data structures book.
5. You will demo your project to the grader during the grader-assigned special office hours **if the grader so wishes**. Graders are not responsible for debugging your programs.
6. The project specifications presented by the instructor may not contain all the implementation details. It is your responsibility to understand the specifications thoroughly. Please ensure that all relevant questions regarding the project are asked during class time.
7. **All coding assignments must be completed independently**. You may discuss ideas with others or consult external resources (such as the internet or generative AI tools); however, you must write all code yourself. Do not copy or share code with anyone. All discussions and external influences must be clearly documented in your submission.
8. In addition to the above general evaluation policies, each programming project will have a set of specifications that must be met.

**Attendance Policy:** Regular attendance is essential for success in this course, as active participation in lectures and discussions is key to understanding operating system concepts. Attendance will be recorded in each class using **Top Hat** and will count for **5%** of the overall course grade. Recording attendance through Top Hat while not physically present in class is considered cheating and will be handled according to the academic misconduct policy.

Students are responsible for ensuring their attendance is recorded correctly. Absences due to emergencies or university-approved events should be communicated in advance whenever possible and supporting documentation may be required for consideration.

While lecture recordings may be available for some sessions, they are not a substitute for in-class participation. Students are encouraged to engage actively in discussions and ask questions, as interaction is a key component of learning in this course.

**Incompletes:** The grade of “I” is intended for the rare circumstance when a student who has been successful in a class has an unexpected event shortly before the class's end. We will not consider giving a student a grade of “I” unless the following three conditions have been met:

1. It is within two weeks of the end of the semester.
2. The student has a grade of C or better in the class.
3. The reason that the student cannot complete the class is properly documented and compelling.

**Classroom Conduct:** Because cell phones and laptops can distract substantially from the classroom experience, students are asked not to use either during class except when required as part of a classroom exercise. Disruptions of the class will also not be permitted. In the case of disruptive

behavior, we may ask that you leave the classroom and charge you with violating the Student Code of Responsibilities and Conduct. Examples of disruptive behavior include:

- Allowing a cell phone or pager to repeatedly beep audibly.
- Playing music or computer games during class in such a way that they are visible or audible to other class members.
- Exhibiting erratic or irrational behavior.
- Behavior that distracts the class from the subject matter or discussion.
- Making physical or verbal threats to a faculty member, teaching assistant, or class member.
- Refusal to comply with faculty or teaching assistant direction.

**Proper Academic Conduct:** Feel free to discuss all assignments with the instructors or the TAs. Code (projects and assignment): you may discuss solutions with other students. However:

1. You may not look at or share code with others.
2. If you discuss a solution with anyone, you must document their names in your assignment.
3. You must document this in your code if you use external resources (e.g., Piazza, StackOverflow.com, ChatGPT, or other LLMs).

Make sure that your computer account is properly protected. Use an appropriate password, and do not give your friends access to your account or computer system. Do not leave printouts, computers, or thumb drives around a laboratory where others might access them. Programming projects will be checked by software designed to detect collaboration.

Upon the first documented occurrence of inappropriate collaborative work or of taking a solution from a network resource, the instructors will report the academic misconduct to the Campus Judicial Coordinator. The procedure is documented in the University of Oklahoma Academic Misconduct Code (<http://integrity.ou.edu>). The provider and receiver of a solution will be treated equally in the misconduct process.

**Generative AI Policy:** Students are permitted to use Generative AI tools, such as ChatGPT and Copilot, as aids in understanding operating system concepts, debugging code, and generating ideas for programming assignments. However, all work submitted must reflect the student's own understanding and effort. If Generative AI is used to assist in coding, problem-solving, or explanation, students must explicitly acknowledge its use by adding comments in their code or submissions detailing what aspects were AI-assisted. Directly copying AI-generated solutions without comprehension or modification is not acceptable and may be considered academic misconduct. This course aims to develop independent problem-solving skills, so while AI can be a helpful tool, it should complement learning rather than replace critical thinking and hands-on programming experience. Students should consult the instructor if they have questions about appropriate AI usage.

# University Policies

## Mental Health Support Services

Support is available for any student experiencing mental health issues that are impacting their academic success. Students can either be seen at the University Counseling Center (UCC) located on the second floor of Goddard Health Center or receive 24/7/365 crisis support from a licensed mental health provider through [TELUS Health](#). To schedule an appointment or receive more information about mental health resources at OU please call the UCC at 405-325-2911 or visit [University Counseling Center](#). The UCC is located at 620 Elm Ave., Room 201, Norman, OK 73019.

## Title IX Resources and Reporting Requirement

The University of Oklahoma faculty are committed to creating a safe learning environment for all members of our community, free from gender and sex-based discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking, in accordance with Title IX. There are resources available to those impacted, including: speaking with someone confidentially about your options, medical attention, counseling, reporting, academic support, and safety plans. If you have (or someone you know has) experienced any form of sex or gender-based discrimination or violence and wish to speak with someone confidentially, please contact [OU Advocates](#) (available 24/7 at 405-615-0013) or [University Counseling Center](#) (M-F 8 a.m. to 5 p.m. at 405-325-2911).

Because the University of Oklahoma is committed to the safety of you and other students, and because of our Title IX obligations, I, as well as other faculty, Graduate Assistants, and Teaching Assistants, are mandatory reporters. This means that we are obligated to report gender-based violence that has been disclosed to us to the Institutional Equity Office. This means that we are obligated to report gender-based violence that has been disclosed to us to the Institutional Equity Office. This includes disclosures that occur in: class discussion, writing assignments, discussion boards, emails and during Student/Office Hours. You may also choose to report directly to the Institutional Equity Office. After a report is filed, the Title IX Coordinator will reach out to provide resources, support, and information and the reported information will remain private. For more information regarding the University's Title IX Grievance procedures, reporting, or support measures, please visit [Institutional Equity Office](#) at 405-325-3546.

## Reasonable Accommodation Policy

The University of Oklahoma (OU) is committed to the goal of achieving equal educational opportunity and full educational participation for students with disabilities. If you have already established reasonable accommodations with the Accessibility and Disability Resource Center (ADRC), please [submit your semester accommodation request through the ADRC](#) as soon as possible and contact me privately, so that we have adequate time to arrange your approved academic accommodations.

If you have not yet established services through ADRC, but have a documented disability and require accommodations, please complete [ADRC's pre-registration form](#) to begin the registration process. ADRC facilitates the interactive process that establishes reasonable accommodations for

students at OU. For more information on ADRC registration procedures, please review their [Register with the ADRC](#) web page. You may also contact them at (405)325-3852 or [adrc@ou.edu](mailto:adrc@ou.edu), or visit [www.ou.edu/adrc](http://www.ou.edu/adrc) for more information.

Note: disabilities may include, but are not limited to, mental health, chronic health, physical, vision, hearing, learning and attention disabilities, pregnancy-related. ADRC can also support students experiencing temporary medical conditions.

### **Religious Observance**

It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty. [\[See Faculty Handbook 3.15.2\]](#)

### **Adjustments for Pregnancy and Related Issues**

Should you need modifications or adjustments to your course requirements because of pregnancy or a pregnancy-related condition, please request modifications via the [Institutional Equity Office](#) website or call the Institutional Equity Office at 405/325-3546 as soon as possible. Also, see the Institutional Equity Office [FAQ on Pregnant and Parenting Students' Rights](#) for answers to commonly asked questions.

### **Final Exam Preparation Period**

Pre-finals week will be defined as the seven calendar days before the first day of finals. Faculty may cover new course material throughout this week. For specific provisions of the policy please refer to OU's [Final Exam Preparation Period policy](#).

### **Emergency Protocol**

During an emergency, there are official university [procedures](#) that will maximize your safety.

**Severe Weather:** If you receive an OU Alert to seek refuge or hear a tornado siren that signals severe weather.

1. [Look](#) for severe weather refuge location maps located inside most OU buildings near the entrances.
2. [Seek](#) refuge inside a building. Do not leave one building to seek shelter in another building that you deem safer. If outside, get into the nearest building.
3. [Go](#) to the building's severe weather refuge location. If you do not know where that is, go to the lowest level possible and seek refuge in an innermost room. Avoid outside doors and windows.
4. [Get in, Get Down, Cover Up](#)
5. [Wait](#) for official notice to resume normal activities.

Additional [Weather Safety Information](#) is available through the Department of Campus Safety.

## The University of Oklahoma Active Threat Guidance

The University of Oklahoma embraces a Run, Hide, Fight strategy for active threats on campus. This strategy is well known, widely accepted, and proven to save lives. To receive emergency campus alerts, be sure to update your contact information and preferences in the account settings section at [one.ou.edu](http://one.ou.edu).

**RUN:** Running away from the threat is usually the best option. If it is safe to run, run as far away from the threat as possible. Call 911 when you are in a safe location and let them know from which OU campus you're calling from and location of active threat.

**HIDE:** If running is not practical, the next best option is to hide. Lock and barricade all doors; turn off all lights; turn down your phone's volume; search for improvised weapons; hide behind solid objects and walls; and hide yourself completely and stay quiet. Remain in place until law enforcement arrives. Be patient and remain hidden.

**FIGHT:** If you are unable to run or hide, the last best option is to fight. Have one or more improvised weapons with you and be prepared to attack. Attack them when they are least expecting it and hit them where it hurts most: the face (specifically eyes, nose, and ears), the throat, the diaphragm (solar plexus), and the groin.

***Please save OUPD's contact information in your phone.***

**NORMAN** campus: *For non-emergencies call (405) 325-1717. For emergencies call (405) 325-1911 or dial 911.*

**TULSA** campus: *For non-emergencies call (918) 660-3900. For emergencies call (918) 660-3333 or dial 911.*

### Fire Alarm/General Emergency

If you receive an OU Alert that there is danger inside or near the building, or the fire alarm inside the building activates:

1. *LEAVE* the building. Do not use the elevators.
2. *KNOW* at least two building exits
3. *ASSIST* those that may need help
4. *PROCEED* to the emergency assembly area
5. *ONCE safely outside, NOTIFY first responders of anyone that may still be inside building due to mobility issues.*
6. *WAIT* for official notice before attempting to re-enter the building.

### OU Fire Safety on Campus

## Tentative Schedule

\*\*\* Exams 1 and 2, Final Exam, and Quizzes schedules are fixed

Week	Day	Date	Topics	Quiz	Project
1	Tuesday	20-Jan-26	Syllabus, OS Overview (Chapter 1)		
	Thursday	22-Jan-26	OS Overview (Chapter 1 and 2)		
2	Tuesday	27-Jan-26	OS Overview (Chapter 2)		
	Thursday	29-Jan-26	Processes (Chapter 3)	Quiz 1	
3	Tuesday	3-Feb-26	Processes (Chapter 3)		
	Thursday	5-Feb-26	Processes (Chapter 3)	Quiz 2	
4	Tuesday	10-Feb-26	Threads and Concurrency (Chapter 4)		
	Thursday	12-Feb-26	Threads and Concurrency (Chapter 4)	Quiz 3	
5	Tuesday	17-Feb-26	CPU Scheduling (Chapter 5)		<b>Project 1 Due</b>
	Thursday	19-Feb-26	CPU Scheduling (Chapter 5)	Quiz 4	
6	Tuesday	24-Feb-26	CPU Scheduling (Chapter 5)		
	Thursday	26-Feb-26	Synchronization (Chapter 6)	Quiz 5	
7	Tuesday	3-Mar-26	<b>Exam 1</b>		
	Thursday	5-Mar-26	Synchronization (Chapter 6, 7)		
8	Tuesday	10-Mar-26	Synchronization (Chapter 6, 7)		<b>Project 2 Due</b>
	Thursday	12-Mar-26	Deadlocks (Chapter 8)	Quiz 6	
9	Tuesday	17-Mar-26	Spring Break		
	Thursday	19-Mar-26	Spring Break		
10	Tuesday	24-Mar-26	Deadlocks (Chapter 8)		
	Thursday	26-Mar-26	Main Memory (Chapter 9)	Quiz 7	
11	Tuesday	31-Mar-26	Main Memory (Chapter 9)		
	Thursday	2-Apr-26	Main Memory (Chapter 9)	Quiz 8	
12	Tuesday	7-Apr-26	Virtual Memory (Chapter 10)		<b>Project 3 Due</b>
	Thursday	9-Apr-26	Virtual Memory (Chapter 10)	Quiz 9	
13	Tuesday	14-Apr-26	<b>Exam 2</b>		
	Thursday	16-Apr-26	Storage Structure (Chapter 11 and 12)		
14	Tuesday	21-Apr-26	Storage Structure (Chapter 11 and 12)		
	Thursday	23-Apr-26	File Systems (Chapter 13,14,15)	Quiz 10	
15	Tuesday	28-Apr-26	File Systems (Chapter 13,14,15)		<b>Project 4 Due</b>
	Thursday	30-Apr-26	Security and Protection (Chapter 16, 17)	Quiz 11	

	Tuesday	5-May-26	Security and Protection (Chapter 16, 17)		
16	Thursday	7-May-26	Final Exam Review		
17	Monday	11-May-26	<b>Final Exam M 5/11/26 1:30-3:30 PM</b>		