

Course Syllabus



CSC 462/662: Principles of Operating Systems

COURSE INFORMATION

- **For Whom Planned:** Upper-level undergraduate students (CSC 462) and graduate students (CSC 662)
- **Type:** In-Person
- **Credits:** 3
- **Class Time:** Monday and Wednesday 3:30 - 4:45 pm
- **Location:** Petty 313

Prerequisites: Grades of at least C in CSC 261 and CSC 340 (or equivalent if transfer student). Successful completion of CSC 362 will be helpful. The course is designed for junior/senior-level undergraduate computer science majors and graduate students.

INSTRUCTOR INFORMATION:

Name: Dr. Regis Kopper

Office Location: Petty 153

Email: kopper@uncg.edu (<mailto:kopper@uncg.edu>)

Office Hours: Wednesday 9:00 am - 10:30 am

Pronouns: he, him, his

TEXTBOOK:

1. "Operating System Concepts," 9th edition, Silberschatz, Galvin, Gagne: Wiley, 2012. ISBN-13: 978-1118063330, ISBN-10: 1118063333. (required)
2. "Modern Operating Systems," 4th edition, Andrew Tanenbaum: Prentice Hall, 2014. ISBN-13: 978-0133591620, ISBN-10: 013359162X. (recommended reading)

Other Readings: provided through Canvas.

COURSE DESCRIPTION AND LEARNING OUTCOMES:

Catalog Description: Techniques and strategies used in operating system design and implementation: managing processes, input/output, memory, scheduling, file systems, and protection.

Course Objectives: The aim of this course is to teach the concepts and principles of modern operating systems, and to provide opportunities to relate theoretical principles with operating system implementation. Specifically,

- Learn about processes and process management
- Learn about concurrency and synchronization
- Learn about memory management schemes
- Learn about file system and secondary storage management
- Practice, through programming assignments, the use of implementation of the concepts above
- (Graduate students only) Perform paper reviews in related state-of-the-art technical literature.

Course Outcomes: By the end of the course, students should be able to demonstrate understanding of the basic principles and techniques of operating systems covered in the course, and should be able to implement system programs. Specifically,

- CO1: Demonstrate knowledge in fundamental operating system abstractions such as processes, threads, and process management
- CO2: Demonstrate knowledge in semaphores, monitors, conditions, deadlocks, IPC abstractions, shared memory regions, etc.
- CO3: Demonstrate knowledge in principles of memory management
- CO4: Demonstrate knowledge in file abstraction and storage management
- CO5: Be able to apply knowledge outlines in the above to design and develop system programs based on operating system abstractions and to write correct concurrent programs/software, including basic resource management techniques (scheduling or time management, space management) and considering issues such as performance and fairness objectives, and avoiding deadlocks.
- (Graduate students only) Able to identify, evaluate, and communicate information presented in the related technical literature and summarize them in technical writing.

Class Web Page: Canvas (you have to enroll to be able to see it)

TEACHING STRATEGIES:

Teaching Methods and Assignments: The primary method of instruction will be two 75-minute periods per week for lecture and discussion, with students responsible for completing assigned readings, assignments, and preparing for exams. Assignments will be a mix of written analysis and applied programming. Written assignments should be turned in electronically.

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- Assignments will be a mix of typed/written analysis and applied programming. Written assignments should be turned in electronically. Submission include
 - PDF document of typed (preferred) / hand-written (must be legible) analysis.
 - –Filename – {Lastname}_a_{assignment_number}.pdf(For example: Kopper_a_3.zip)
 - Source Code of Programming
 - –Filename – {Lastname}_p_{assignment_number}.c (For example: Kopper_p_3.c)
 - Snapshot of programming output
 - –Filename – {Lastname}_o_{assignment_number}.pdf (For example: Kopper_o_3.pdf)
- Zip the above two into a zip folder
 - –Filename – {Lastname}_s_{assignment_number}.zip (For example: Kopper_s_3.zip)
- Submission not following the criteria above will not be graded.

Late Policy / Make-Up Exams: Assignments submitted after the deadline will be considered late. Assignments late up to 24h will receive 80% credit. Assignments submitted over one day late will not receive credit. If a homework assignment is too difficult or has time conflict with your other academic activities, try to speak out in Canvas forum to request a class-wide extension. Exams may be made up *only* if it was missed due to an extreme emergency and arrangements are made *before* the exam date. Exams may not be taken early or late due to personal travel plans.

TENTATIVE GRADING POLICY

	Undergraduate	Graduate
Assignments (6)	48%	42%
Midterm Exam	26%	26%
Final Exam	26%	26%
Technical Report	n/a	6%

CLASS TOPICS:

(tentative numbers of lectures in parenthesis)

- Course Introduction (1)
- C Programming (1)
- Introduction to OS (2)

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- OS structure overview (1)
- Processes (3)
- Threads (2)
- CPU scheduling (4)
- Process synchronization (4)
- Deadlocks (1)
- Main memory (4)
- Virtual memory (3)

GRADING SCALE:

Letter **% points**
Grade **accumulated**

A	≥ 94.0
A-	90.0-93.9
B+	87.0-89.9
B	84.0-86.9
B-	80.0-83.9
C+	77.0-79.9
C	74.0-76.9
C-	70.0-73.9
D+	67.0-69.9
D	60.0-66.9
F	<60.0

ATTENDANCE POLICY: (thanks to Prof. Armstrong)

- Attendance is a key component in learning. You must attend during your scheduled class section time.
- Attendance will be taken. You will be marked absent: if you do not attend the lectures; if you leave the classroom for a significant portion of the time; or if it is observed that you are attending but are not actually paying attention to the class.
- There will be graded in-class assignments, and if you miss a lecture, you won't be able to make up the missed assignment.
- The instructor reserves the right to drop any student who misses three class meetings/tests without prior approval.
- The university allows for a limited number of excused absences for religious observances --- students who plan to take such an absence should notify the instructor two weeks in advance so that accommodations can be made.
- It is your responsibility to obtain notes from another student if you miss a lecture. The instructor will not give private instruction for missed lectures nor will the instructor provide personal lecture notes. Get the notes from another student, review the material, and then seek assistance for topics that are not clear.

ACADEMIC INTEGRITY POLICY:

Each student is required to sign the Academic Integrity Policy on all major work submitted for the course. Refer to the following URL: [Academic Integrity \(https://osrr.uncg.edu/academic-integrity/\)](https://osrr.uncg.edu/academic-integrity/).

Violations to academic integrity will be taken seriously. All and any violations will be reported at the departmental level and may be reported to the university. Please see the department [policy \(https://compsci.uncg.edu/students/academic-integrity-policy/\)](https://compsci.uncg.edu/students/academic-integrity-policy/) for details.

LAPTOP/CELLPHONE POLICY:

Laptops can be both a benefit and a distraction in classroom. While many students benefit from taking notes using a laptop, or having access to outside class-related resources during class, other students cannot resist the temptation of checking e-mail, social texting, or even playing games during class time. This class has a strict “no non-class related use” rule for laptops or cell phones — if you are found violating this policy, then your in-class laptop/phone privileges will be taken away. Cell phones are a distraction for everyone, and should be turned off or muted during class.

OTHER POLICIES:

Audio Taping Lectures: Audio taping of our lectures is generally allowed as long as they are used solely for this course. Do not upload/distribute the recordings. No video-taping is allowed.

E-cigarette: Please do not smoke e-cigarette in class.

Health and Wellness: Your health impacts your learning. Throughout your time in college, you may experience a range of health issues that can cause barriers to your learning. These might include physical ailments, illnesses, strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, or loss of motivation. Student Health Services and The Counseling Center can help with these or other issues you may be experiencing. You can learn about the free, confidential mental health services available on campus by calling 336-334-5874, visiting the website at <https://shs.uncg.edu/> (<https://shs.uncg.edu/>) or visiting the Anna M. Gove Student Health Center at 107 Gray Drive. Help is always available.

ACCOMMODATIONS:

UNCG seeks to comply fully with the Americans with Disabilities Act (ADA). Students requesting accommodations based on a disability must be registered with the Office of Accessibility Resources and Services (OARS) in 215 Elliott University Center, 334-5440, oars.uncg.edu (<http://ods.uncg.edu/>).

COVID-19 STATEMENT:

As we return for spring 2022, all students, faculty, and staff are required to uphold UNCG's culture of care by actively engaging in behaviors that limit the spread of COVID-19. These actions include, but are not limited to:

- [Following face-covering guidelines](https://covid.uncg.edu/face-coverings-remain-required-at-uncg/) (<https://covid.uncg.edu/face-coverings-remain-required-at-uncg/>)
- Engaging in proper hand-washing hygiene
- Self-monitoring for symptoms of COVID-19
- Staying home when ill
- Complying with directions from health care providers or public health officials to quarantine or isolate if ill or exposed to someone who is ill
- Completing a [self-report](https://veoci.com/v/p/132667/workflow/fs2x25pzqnd5) (<https://veoci.com/v/p/132667/workflow/fs2x25pzqnd5>) when

experiencing COVID-19 symptoms, testing positive for COVID-19, or being identified as a close contact of someone who has tested positive

- Staying informed about the University's policies and announcements via the [COVID-19 \(https://covid.uncg.edu/\)](https://covid.uncg.edu/) website

Instructors will have seating charts for their classes. These are important for facilitating contact tracing should there be a confirmed case of COVID-19. Students must sit in their assigned seats at every class meeting. Students may move their chairs in class to facilitate group work, as long as instructors keep seating chart records. Students should not eat or drink during class time.

A limited number of disposable masks will be available in classrooms for students who have forgotten theirs. Face coverings are also available for purchase in the UNCG Campus Bookstore. Students who do not follow masking requirements will be asked to put on a face covering or leave the classroom to retrieve one and only return when they follow the basic standards of safety and care for the UNCG community. Once students have a face covering, they are permitted to re-enter a class already in progress. Repeated issues may result in conduct action. The course policies regarding attendance and academics remain in effect for partial or full absence from class due to lack of adherence with face covering and other requirements.

For instances where the Office of Accessibility Resources and Services (OARS) has granted accommodations regarding wearing face coverings, students should contact their instructors to develop appropriate alternatives to class participation and/or activities as needed. Instructors or the student may also contact OARS (336.334.5440) who, in consultation with Student Health services, will review requests for accommodations.

If you need any help for this course, feel free to contact me during office hours, by appointment or by e-mail. I am more than happy to help you.