COSC 439 Operating Systems

COSC 439-002, Spring 2025

Computer and Information Sciences, Towson University

Instructor	Dr. Md Sajid	TA	Stephen Aboagye-Ntow
E-mail	msajid@towson.edu	Class Time	Mon/Wed 12:30-1:45pm
Office	7800 York Rd. Room#456	Credit Hours	3 credits
Classroom	YR 0301	Office Hours	Tue: 12pm – 1pm

Course objectives and topics

The primary emphasis of this course will be based on a practical approach to designing, implementing, and managing operating systems. The overall objectives of this course are to build a solid theoretical groundwork in operating systems, understand the role of operating systems in emerging applications, acquire knowledge about techniques related to process, memory, storage, and file management, explore various models of operating systems, and gain hands-on experience in building OS components. The course covers a range of topics, which include but are not limited to operating system concepts, system programming, networked and distributed systems, storage systems, multiple-program systems (processes, inter-process communication, and synchronization), memory allocation (segmentation, paging), resource allocation and scheduling, file systems, and some aspects of OS security. Additionally, the course focuses on designing, developing, analyzing, and evaluating a group project. The assessment of the project will be guided by an evaluation rubric. This course is not intended to teach a specific OS, such as Windows or Linux.

Pre-requisites for the course: Assembly language, C/C++ Programming, Data Structure.

Course Materials

Required Textbook: Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts Essentials", 2nd edition.

Slides: Lecture slides will be provided through BlackBoard.

Grades

The final grade will be a weighted average of the following components:

Graded components	Contribution to the overall grade
Code/Lab Style Assignments	20%
Midterm exam	20%
Final exam	20%
Project	20%
Quizzes	15%
Attendance	5%

The following scale will be used to determine grades:

Marks (Range)	Grade	Grade Points Per Unit
90 – 100	A	4.00
85 – 89	A-	3.67
80 – 84	B+	3.33
75 – 79	B	3.00
70 – 74	B-	2.67
65 – 69	C	2.00
60 – 64	D	1.00
< 60	F	0.00

Homework/Assignments Guidelines (20%)

This course includes a total of **eight (8) assignments**, designed to enhance both your understanding and **practical implementation of various operating system (OS) structures/modules/algorithms**. These assignments will consist of both coding and written components, where students are expected to write and rigorously test their code. Timely submission is essential; late submissions will incur a score deduction, with the specific deduction policy outlined in the submission guidelines.

Initial Setup and Familiarization Assignments (4%):

Two assignments (Assignment#1 and #6) are mandatory for all students. These assignments primarily aim to:

1. **Familiarize students with different operating systems** such as Unix (Linux/MacOS) and Windows. Since most of us typically have only one operating system installed on our computer or laptop, these assignments will introduce students to **VirtualBox** or **VMWare**. These are virtualization tools that allow you to install and run multiple operating systems on your current OS, offering a practical way to work with different systems without needing separate hardware.

2. **Refresh C/C++ coding skills.** Proficiency in C/C++ is crucial for understanding and working with operating systems because these languages are fundamental in OS development and system-level programming. The assignments will help ensure that your coding skills are up to date and ready for more complex OS concepts later in the course.

Topic-Based Testing Assignments (16%):

The remaining six assignments are designed to test your grasp of the topics taught throughout the semester. **To provide some flexibility only the top four scores from these six assignments will be considered for your final grade calculation.** This policy allows some leeway in case of lower performance on any given assignment.

Assignment Submission Guidelines:

- Homework must be completed independently, with original work expected from each student. Sharing solutions is strictly prohibited.

- In exceptional cases, late submissions may be accepted with prior faculty approval, provided there is a legitimate emergency.

- Any instances of plagiarism, including unauthorized collaboration or copying, will result in a zero score for the assignment, and an official notice will be placed in the student's record.

Group Project and Participation Guidelines (20%)

The group project is a mandatory aspect, designed to deepen your grasp of the subject matter while fostering teamwork and innovation. Here's what you need to know:

Group Formation: Each group, consisting of 2 - 3 students, will have the exciting opportunity to explore operating system concepts through a practical application. Feel free to form groups with fellow students of your choice.

Project Responsibility: Your group's primary responsibility is to develop and implement an application related to your chosen problem. Active participation from every student is essential to the project's success.

Grading: Grading details of project will be posted and discussed in the course later.

Project Details: Comprehensive project application details will be discussed in class. While some familiarity with assembly language can be beneficial, **having a foundation in C and python programming language is assumed before joining this course**. If you lack these foundations, consider enrolling in this course at a later time in your academic journey.

Topic Selection: Each group can choose a topic of interest from the provided list to present in class. Project proposals, which should be 1 to 2 pages in length, must include the project title, participant names, objectives, a project description, and a brief overview of the problem. The due dates for proposals will be announced later.

Originality and Contribution: While online resources can be referenced, it's vital that you understand every line of code you use. Proper credit to original authors is crucial, and your individual contributions must be clearly highlighted in your project.

Distinctiveness: Ensure that your group's project stands out by being distinct from others. Uniqueness is encouraged.

Final Report: Your final report should be a comprehensive account of the problem, description, source code, design, analysis, implementation, testing, and other relevant project information. Abide by the rubric (will be provided later) for evaluating project objectives and learning outcomes, keeping your report within 20 pages.

Presentation: Each group will present their project during the last week of class. While designated presenters can explain the material, all group members should be prepared for potential questions from the instructor. Additionally, a functional demonstration in the lab is expected.

Submission: Submit your project report, code, and a user's guide for compiling and running the code via email on the final day of class. Non-functional components will impact your project's grade.

Participation Issues: In cases where a student's participation falls short of group expectations, group members can email the instructor. The matter will be discussed with the concerned student, and their project grade may be affected. Address these concerns earlier in the semester for ample resolution time.

Quiz Guidelines (15%)

Throughout the course, the student will encounter six (6) quizzes, each designed to assess their understanding of the material. **Out of these six quizzes, the four with the highest scores will be used for final grade calculation, providing a buffer against lower marks.** Quizzes are set to kick off classes and will gauge the student's grasp of the fundamental concepts. The specific timing for each quiz will be communicated in due course, giving the student ample time to prepare. Each quiz will revolve around the material covered in the previous two chapters. This structure ensures that you're well-versed in the content that's most recently been explored /lectured in class.

Exam Guidelines (40%)

The course includes a midterm and a final exam. Both the mid-term and final examinations will cover content taught in class, material from textbooks, classroom discussions, and lessons from assignments. Class notes and consistent attendance hold immense importance when aiming for strong exam performance.

Office Hours and Response and TA Information

Office hours are scheduled as follows:

- Tuesdays: 12 pm – 1 pm (Location: 7800 York Rd. Room#456)

While the designated office hours are outlined above, please know that I'm here to provide assistance. Should a student require immediate help or attention with an assignment, feel free to reach out via email. I can then arrange a suitable time to meet, even outside of the official office hours. A response to student emails can be expected within 24-36 hours on weekdays.

TA: Stephen Aboagye-Ntow (Email: saboagy1@students.towson.edu), Office hours: TBA

Attendance (5%)

Classroom Presence: While the majority of (almost all) the class will take place in person, it's crucial that all students attend and remain present for the entire duration of each session. For online sessions (if any will be notified a day or two earlier), logging in a bit earlier can help you avoid last-minute technical hiccups. If you join an online session late, please keep your voice at a lower volume to prevent disruptions.

Exams and Project Presentations: If you can't participate in an exam or project presentation due to a valid reason, ensure you provide the relevant documentation as per Towson University's Attendance/Absence Policy. This ensures that your situation is appropriately considered.

Late Work Policy

Late submissions are subject to deduction.

Academic Integrity Policy

Academic Integrity: Should you encounter any matters pertaining to academic integrity, I strongly encourage you to consult the Student Academic Integrity Policy. Please be aware that as an instructor, I am obligated to report any instances of academic dishonesty to the Office of Academic Affairs.

Use of AI Tools: While it's acceptable to use AI tools like ChatGPT to understand certain topics, code snippets, or to check the grammar of your reports, **generating entire assignments or completing coding tasks using ChatGPT or similar tools is strongly discouraged.** All submissions will be checked through ZeroGPT to detect any AI-generated content. If AI-generated answers or code are detected, a deduction of marks will be applied.

Cheating and Plagiarism: Instances of cheating or plagiarism, including copying source code or solutions from the internet, may result in a failing grade for the specific assignment or even the entire course. Blackboard (BB) will flag any copied answers or code, so it is crucial to avoid both AI-generated content and directly copying from online sources. Familiarize yourself with the university's academic integrity policies, accessible at this link.

Guidance for Unaddressed Issues: For any concerns or questions not explicitly addressed in this syllabus, I encourage you to refer to the Towson University Undergraduate Catalog, which can be accessed here.

Source Citing and Collaboration: Collaboration is only permissible when working on group projects. Always ensure you cite sources for code and ideas appropriately.

Students with Disability Policy

If you're a student with a disability, please don't hesitate to contact me to discuss your specific needs. To facilitate appropriate accommodation, we require a memo from Disability Support Services (DSS) detailing your authorized accommodations. Recognize that accommodations for an online course might differ from those in a traditional classroom, so it's crucial to collaborate with DSS to determine suitable adjustments for this course as early as possible. For queries or more information about accommodations, reach out to Disability Support Services at 410-704-2638 or visit https://www.towson.edu/dss/.

General Guidelines

Blackboard and TU Email: Make it a habit to log into our Blackboard course daily and regularly check your TU email. This ensures you're up to date with important information. Aim to access the course site at least once every 48 hours to stay current.

Personal Matters: If you have personal matters to discuss, such as academic concerns, study conflicts, or planned absences, please email the instructor using the given email format. In the email subject, include our course number and title. While communicating, write in clear logic with appropriate language.

Tentative Course Schedule (subject to change)

Week/Date Range	Lecture (Topics/Chapters)	Quizzes	Homework/ Assignment
Jan 27 - 29	Intro: Chapter 1, 2		Assignment 1
Feb 03 – Mar 10	Process Management: Chapter 3, 4, 5, 6	Quiz: 1 (on Ch 1, 2) Quiz: 2 (on Ch 3, 4) Quiz: 3 (on Ch 5 or/and 6)	Assignment 2, 3, 4
Mar 12	**Midterm Exam**		
Mar 16 - 23	**Spring Break**		
Mar 24 – Apr 2	Memory Management: Chapter 7, 8 and Project Discussion		Assignment 5, 6
Apr 07 – May 5	Storage Management: Chapter 9, 10, 11, 12	Quiz: 4 (on Ch 7, 8) Quiz: 5 (on Ch 9, 10)	Assignment 7, 8
May 7 – 12	**Review Class and Project Presentation**	Quiz: 6 (on Ch 11 - 12)	