

# CMPS 4310 Essentials Of Modern Computing Systems - Course Syllabus

## Online - Summer 2025

### I. Course Description:

Credit 3 hours. Prerequisites: Computer Science 390 and registration in or prior credit for CMPS 375. Design and implementation of operating systems. Topics include process management, processor management, memory management, device management, file management, process synchronization and interprocess communication, and user interface. Other issues such as distributed computing and system performance may be discussed.

This course now also contains an introduction to networking and parallel computing.

### II. Instructor: Dr. Cris Koutsougeras

Office: CSTB, Room 3028

Email Address: ck@selu.edu

Office hours: Online T 4-5:30pm. By appointment: on Google Meet at anytime of the week (weekends also workable) per an arranged meeting (arrange by email in advance).

### III. Course details and Special Requirements:

*Class hours:* Online

*Prerequisites:* Computer Science 390 and registration in or prior credit for CMPS 375

*Text book:* *Operating Systems Concepts*, Silberschatz, Gagne, Galvin. zyBook ISBN: 979-8-203-16822-1

### IV. Course Objectives:

#### Learning Outcomes:

Course level Outcomes (CO)

CO1: Define and articulate the functionality of operating systems and the methods and the tools which operating systems must implement in order to facilitate application level software.

CO2: Define and articulate the technical challenges of operating systems in mapping functions to hardware and in managing and coordinating processes.

CO3: Explain the various methods and technologies which are used to address the technical challenges of operating systems and resolve issues inherent to their processing tasks.

CO4: Explain the role of operating systems in the management of system resources, overall computing system performance, and the management of system level performance.

CO5: Relate examples of operating systems implementations to the abstract methods and techniques presented in the course.

#### Learning Objectives:

Specific Outcomes of Instruction (LO)

LO1: Define and articulate the functionality of operating systems and the methods and the tools which operating systems must implement in order to facilitate application level software.

LO2: Define and articulate the technical challenges of operating systems in mapping functions to hardware and in managing and coordinating processes.

LO3: Explain the various methods and technologies which are used to address the technical challenges of operating systems and resolve issues inherent to their processing tasks.

LO4: Explain the role of operating systems in the management of system resources, overall computing system performance, and the management of system level performance.

LO5: Relate examples of operating systems implementations to the abstract methods and techniques presented in the course.

**Topics to be covered (subject to change):** [Related outcomes/objectives]

1. **Introduction to networking;** Structure of the internet, network topologies, packet switching, protocols.
2. **Operating-System Structures;** System calls, services [CO1:LO1,LO2,LO4; CO3:LO2,LO3; CO4:LO3]
3. **Processes;** scheduling, operations, communication [CO1:LO1; CO3:LO2,LO3]
4. **Threads and Concurrency;** Models, issues, programming [CO1:LO1;CO2:LO2;CO3:LO3;CO5:LO4]
5. **CPU Scheduling;** Objectives, criteria, algorithms [CO2:LO3;CO3:LO1,LO4;CO4:LO2;CO5:LO5]
6. **Synchronization Tools;** Classic problems of synchronization, Mutex locks, Semaphores, Monitors, Liveness [CO2:LO1,LO3;CO3:LO2;CO5:LO4]

7. **Deadlocks;** Deadlock characterization, handling deadlocks, detection and recovery [CO2:LO1;CO3:LO2;CO5:LO3,LO4]
8. **Memory;** Memory allocation, Paging, Swapping [CO2:LO4;CO3:LO2,LO3;CO4:LO1;CO5:LO5]
9. **File-System;** Interface and Implementation [CO1:LO1;CO3:LO2;CO4:LO3;CO5:LO4]
10. **Parallel computing;** Instruction vs task level parallelism, Pipelines.

#### Expected weekly schedule:

- Week 1: Module 1: Intro to Networking (notes)  
 Week 2: Module 2: Intro (Chapters 1,2)  
 Week 3: Module 3: Processes (Chapter 3); Threads and Concurrency (Chapter 4)  
 Week 4: Module 4: CPU scheduling (Chapter 5)  
 Week 5: Module 5: Synchronization (Chapters 6,7)  
 Week 6: Module 6: Deadlocks (Chapter 8)  
 Week 7: Module 7: Memory (Chapters 9,10); File system (Chapter 11,12,13)  
 Week 8: Module 8: Parallel computing (notes)

#### V. Evaluation Procedure

- A. Late Assignments: Assignments are due at the time specified in the assignment. **Late assignments will not be accepted** unless different and specific arrangements have been made with the instructor. No assignments of any sort will be accepted after 10:00 a.m. on the last official day of classes.
- B. Grade Calculation: Your grade will be calculated according to the following point distribution:
 

65%	Quizzes on the various study segments
20%	Assignments and other required activities
5%	Reflections
10%	Final Exam

Grades will be computed by a curve method. In the event that the distribution does not present enough breaks or if it has too many breaks, letter grades should be approximately expected according to the following chart which is only given as an indication of probable expectations:

A	B	C	D	F
90-100	80-89	70-79	60-69	0-59

#### Important notes:

1. You must submit all of the assignments (even if incomplete) to get any passing grade.
2. Deliberate abuse and malicious treatment of university systems will lead to course failure and other disciplinary actions.

#### VII. Course Requirements:

1. For ONLINE classes it is required for all students to communicate with the instructor either via videoconferencing or via email at least twice before the middle of the term. The purpose of this communication is mainly a status report and reflection; you must report how you are coping with the material, what particular difficulties you may be facing, and what can be improved which would help you do better in the class. Additionally, you may report any other issue that you would like to discuss with the instructor. This reporting is required and may be designated as a class assignment.
2. Internet Access and Computing Facilities:
  - Internet access is required for submission of assignments, Moodle use, and class communication. The use of the "Respondus Lockdown Browser" will be required for tests. This requires a camera and microphone available on your system in order to be monitored while taking tests. Make sure to get and test this browser by following it from the "Course Dashboard" on Moodle. Students are responsible for having properly working equipment and good enough internet connections. The university provides internet access on its facilities but is not responsible for such provisions outside its premises or for any associated costs for third party services. Students are expected to check their SELU-provided email accounts, as well as the class web site on Moodle regularly. For this class, every attempt will be made to provide access to necessary software for use on your own computer, however no guarantee is made about any individual student's ability to maintain the proper working environment. If you wish to have Internet access from off-campus, you will have to provide for Internet service at your own expense. Students are personally responsible for maintaining an adequate work environment on their own computers. If you are unable to do so, please remember that adequate on-campus labs are provided at SELU with the necessary Internet access,

although necessary software may only be available on a limited schedule in special laboratories. Failure to maintain an adequate off-campus work environment will not be accepted as an excuse for late or incomplete work.

- Posting assignments or tests in online venues that are outside the class and not expressly approved is forbidden and a violation of code of class conduct. It is also considered cheating and/or as an attempt to circumvent the integrity of the class. Anyone caught to employ online venues to invite solutions or services of others for solutions and thus reduce his/her own work burden to produce a solution, or to reduce the same burden or obligations of others to the class, will fail this class and will be dealt with accordingly at higher university levels. This is a firm warning and nothing of this sort will be tolerated.

- You may post questions or respond to questions in one of the forums of the Moodle discussion board.

Remember that these questions and answers are public (within the class), and should maintain standards of academic integrity. You can talk about problems and possible solutions, but do not provide complete answers or working code for assignments.

3. Respondus Lockdown Browser and automated test proctoring will be required for all online tests. A camera connected to your computer and adequate internet bandwidth will also be required. It is the student's responsibility to ensure that an adequate system and environment is available.
4. Backup & Storage: Each student must provide themselves with some sort of backup facility (such as a USB flash drive, Google drive, or CD-ROM). Malfunction/loss of student's personal hardware before an important deadline, presentation, due date, etc. will not be reason to receive special consideration or extensions. Students are required to maintain regular backups of critical work and take reasonable precautions for the event of such unexpected issues.
5. Important dates: Check the academic calendar available here: [www.selu.edu/admin/registrar/dates/calendar](http://www.selu.edu/admin/registrar/dates/calendar)  
The following dates should be noted:
  - a. June 4, First day of class; Drop/Add Period until June 5
  - b. June 18: Academic Checkpoint I for Summer Session
  - c. June 2: Academic Checkpoint II for Summer Session
  - d. July 9: Last day to withdraw from regular classes; deadline at 5:30 p.m.
  - e. July 29: Last day of classes
6. Accommodation of Disabilities: If you are a qualified student with a disability seeking accommodations under the Americans with Disabilities Act, you are required to self-identify with the Office of Disability Services, Student Union, Room 1304. No accommodations will be granted without documentation from the Office of Disability Services. The deadline for registering or making accommodation changes is two weeks prior to the start of the Final Exam period. Any requests received after the deadline will generally be considered for the following semester.
7. Class Decorum: Free discussion, inquiry, and expression is encouraged in this class. Classroom behavior that interferes with either (a) the instructor's ability to conduct the class or (b) the ability of students to benefit from the instruction is not acceptable. Civility is also expected in your online communications and website submissions. Offensive themes and language, "adult" materials, or obscenity is not appropriate in materials submitted for this class. Classroom behavior which is deemed inappropriate and cannot be resolved by the student and the faculty member may be referred to the Office of Judicial Affairs for administrative or disciplinary review as per the Code of Student Conduct which may be found at [www.selu.edu/admin/stu\\_affairs/handbook](http://www.selu.edu/admin/stu_affairs/handbook).
8. Email Communication: University e-mail policy reads (in part) as follows, "[Faculty] Uses of non-Southeastern e-mail addresses for communication with students regarding University business or educational matters are not acceptable...." In compliance with this policy, please use only your SLU e-mail address when contacting me about the course. The instructor is not obligated to respond to email addresses outside the domain of the university when personal non-catalog information about students is involved. Recall that your SLU e-mail accounts are accessible through the Internet via "Web-Mail" which can be reached from the SLU homepage: <http://www.selu.edu/webmail>.
9. Plagiarism: In the event that reports, code, or papers are required as part of any assignment in this class, you should be aware that plagiarism will not be tolerated, and may be detected through the use of Turnitin or similar (VeriCite etc.). Students agree by taking this course that all required papers may be subject to submission for textual similarity to such tools for the detection of plagiarism. All submitted papers may be included as source documents in the associated reference database solely for the purpose of detecting plagiarism of such papers.
10. Changes in Requirements: Due date changes, test postponements, etc. will be announced on Moodle. In case of emergencies, I may attempt to contact you by phone, so please make sure that your contact information and phone number is current on Leonet, and let me know if it changes. Notices may also be given by email, or on Moodle. This syllabus will be posted on the Moodle, and that copy will always be the official copy, even if changes are necessary.

### VIII. Academic Integrity:

Learning is a social experience, and I wouldn't dream of trying to change that. Studying with friends, and talking among yourselves about how to attack a problem is important to success in a class. But if you don't do your own thinking -- if you only take from these discussions, and never give -- then you won't understand well enough to function as a professional and will not perform well on tests. Your submitted work must be your own, and you must give proper credit to the work of others used or referenced. Outsourcing assignments and required class work, or copying part of another student's assignment, program, or exam is inappropriate and so is allowing/facilitating such actions.

By "outsourcing work" we mean employing third parties or online venues to invite solutions or services of others for solutions and thus reduce one's own work burden to produce a solution, or to reduce the same burden or obligations of others to the class. Examples of such outsourcing would be (but not limited to) copying other student's works, employing third parties to do the work (whether it is persons, or automated AI venues which provide or generate assignment solutions etc.), with the intent to misrepresent one's ability to apply the class materials and skills to solve the designated problems. Copying part of another student's assignment, program, or exam is inappropriate and so is allowing another student to copy. For more information refer to the "Academic Dishonesty" policy in the University Undergraduate Catalog: <http://www2.selu.edu/StudentAffaires/Handbook>

Of course, online research and use of online tools for the purposes of learning is fine and strongly encouraged; what is not ok is attempts to obtain already worked out solutions to assessment instruments (such as assignments, tests, etc.) or to avoid doing the solution work in an effort to misrepresent one's own ability or understanding of the relevant material or the skills gained. The materials which you turn in for assessment (assignments, tests, etc.) should reflect your own effort and ability to solve problems. This is a firm warning and nothing that circumvents the integrity of the class will be tolerated. Please note that you may be asked to explain/justify/articulate in-person and unaided your submitted works which you have represented as being your own.

Posting assignments or tests in online venues which are outside the class designated tools and not expressly approved, is forbidden and a violation of code of class conduct. More specifically, posting in any venue or form of class assessment materials (such as tests, test questions, assignment descriptions and solutions, or anything which facilitates you or others to circumvent the integrity of the assessments and thereby misrepresent one's ability to meet targeted performance or one's understanding of the material is strictly prohibited and against class policy. It is also considered as an attempt to circumvent the integrity of the class itself (which is typically either considered cheating or aiding of cheating) and will fall under the University's Academic Integrity Policy..

You may post questions or respond to questions in one of the forums of the Canvas discussion board. Remember that these questions and answers are public (within the class), and should maintain standards of academic integrity. You can talk about problems and possible solutions, but do not provide complete answers or working code for assignments.

Use of unapproved electronic devices such as laptops, tablets, cell phones, data-capable devices other than the one you may be taking the test on are prohibited during tests and any kind of examinations.

Violations of academic integrity policies are considered very serious offenses which will lead to failing this class and shall be grounds for disciplinary action at higher university levels as outlined in the Academic Integrity Policy located in the current General Catalogue. While this must be stated in the syllabus, I am confident and hopeful that students understand that they are here to learn and gain the skills to facilitate their careers, and so we will not encounter such issues.

**If a project is supposed to be done by a group, it will be specifically announced and arranged that way; otherwise, by default, all assignments and projects are to be worked on by each student individually.** If your project is a team project then make sure to understand what is your responsibilities and what has been carved out for you as your task. Team work does not mean that any student's work is "sufficiently buried" in the whole project to allow any student to ride on the work of the rest of the team - so expect that I will be looking at each student's individual work and will be demanding documentation. No assumptions are to be made which do not appear in the project descriptions. If you need further help, please talk to me. I try to be as accessible as possible. If you can't make my office hours, send me an email and if we need to, we can make a special appointment.

For more information refer to the University Undergraduate Catalog as well as the University policies available on Canvas; all students are required to familiarize themselves with the policies. Please feel welcome to ask for any clarifications if needed.

### IX. School Interruption Contingency Planning:

In case there is interruption of classes such as closure due to a storm, progress will still need to be made to ensure that we will catch up. To ensure the continuity of courses in the event of a natural disaster or similar emergency, the standard procedure is as follows:

1. At the start of the semester, students need to download the syllabus and course schedule to their Google drive. Google drive will remain accessible during a disaster.
2. In the event a student must evacuate his/her home, if possible bring textbooks, notebooks and other class materials (such as reports, assignments that can be stored electronically, etc.)
3. Check email at least once per day. As Gmail is a reliable, cloud-based service, E-mails will be our primary means of communication.
4. Continue to follow the weekly schedule from the syllabus. This includes reading the chapter, viewing power-point slides, and doing homework and labs.
5. Monitor [www.southeastern.edu](http://www.southeastern.edu) periodically for information on campus closures.

## **X. General Guidelines for Success**

1. The Moodle system will be used extensively in this course, monitor it often for course announcements, assignments, the syllabus and many external links for use in addition to the course textbooks.
2. Read and understand the assigned material from the text, if the material is not understood ask questions in class so the whole class can hear the answer. Do not memorize just for the exam.
3. Plan ahead to complete and submit homework when it is due. That way you can have an opportunity to ask the instructor for clarifications or help. If you attempt to do the homework the night before it is due there is no time for the instructor to help you.
4. Do your own work. Do all the assignments on your own. Work with others to discuss and understand but do your own work. Working with other students and kicking around ideas is a great way to learn, but in the end you should be able to do the work on your own, otherwise you will not gain the mastery that is the goal of the class.
5. Start studying at least 3 days before the test. The day/night before the quiz should be a review day. An appropriate time of study for a quiz is 6 to 9 hours.
6. For a 3 hour class an average student needs to spend about 9 hours outside of class per week to get an A or B.
7. In order to pass this class you need to master certain design topics. It is the instructor's job to present the material and coach you through the learning experience. It is the students responsibility to do the work, learn, and ask for assistance when it is needed.
8. Observe SAFETY rules and posted notes in labs if any lab activities are needed for the class.