CSCE-5640 Operating System Design
Syllabus, Fall 2023

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  • Include CSCE 5640.001/003/600/601 in subject line.
  • Always use your official UNT email address.

Locations:
  Section 001: Sa 11:30AM - 2:20PM NTDP B155
  Section 003: Mo 5:00AM - 7:50PM LIFE A106

Office Hours: TuWe 12:00PM - 1:00PM in NTDP E260J and by appointment

Zoom link: https://unt.zoom.us/j/7033013440

TAs/IAs: See canvas page “TAs/IAs: Office Hours Information.”


Course Web Page:
This course will use the Canvas learning management system (LMS) to distribute course materials, communicate and collaborate online, post grades, and submit assignments. You are responsible for checking the Canvas course site regularly for class work and announcements.

Operating Systems Design:
After a brief overview of the different issues, we will encounter during this course, we will review the principles of Operating Systems in detail. This course will focus specifically on the management of processes and their coordination, deadlocks, memory management, cpu scheduling, and security. If time permits, we will discuss some of the important issues in the area of distributed systems. While the course will loosely follow the textbook, however, we will study material from many other sources, e.g., journals. The course will strike a balance between the programmers (applied) perspective and a theoretical view of operating systems.

Course outcomes:
Students will be able to:
1. use the principles of processes and threads for abstraction of real-world events.
2. formulate solutions for mutual exclusion and process synchronization.
3. understand the concept of deadlock to develop deadlock free systems of processes.
4. understand principles of memory and resource management.
5. identify different process scheduling paradigms and utilize them in system development.
6. develop fundamental security features to protect systems and data.
Useful References:

2. *Advanced Concepts in Operating Systems* by M. Singhal and N. G. Shivaratri
4. *Operating Systems* by J. Bacon and T. Harris
5. *Operating Systems* by W. Stallings
6. *Advanced Programming in the UNIX Environment* by W.R. Stevens
7. *Beginning Linux Programming* by R. Stones and N. Matthew
8. Online references will be posted on the course website.

Tentative List of Topics (*subject to change*):

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<th>Date</th>
<th>Topic</th>
<th>Chapter</th>
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<td>08/28 - 09/02</td>
<td>Introduction, OS Structures</td>
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<td>09/04 - 09/09¹</td>
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<td>09/11 - 09/16</td>
<td>Processes</td>
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<td>09/18 - 09/23</td>
<td>Threads and Concurrency</td>
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<td>09/25 - 09/30</td>
<td>Threads and Concurrency, CPU Scheduling</td>
<td>4, 5</td>
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<td>10/02 - 10/07</td>
<td>CPU Scheduling</td>
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<td>10/09 - 10/14</td>
<td>Synchronization Tools</td>
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<td>10/16 - 10/21</td>
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<td>10/23 - 10/28</td>
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<td>10/30 - 11/04</td>
<td>Main Memory</td>
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<td>11/06 – 11/11</td>
<td>Virtual Memory</td>
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<td>11/13 - 11/18</td>
<td>I/O and File System</td>
<td>11, 13</td>
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<td>11/20 - 11/25²</td>
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<td>-</td>
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<td>11/27 - 12/02</td>
<td>Protection and Security, Distributed Systems (time permitting)</td>
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<td>12/04 - 12/09³</td>
<td>Review</td>
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<td>001:12/12, 003:12/11</td>
<td>Final Exam</td>
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Important Dates:

- 08/21: First Day of Class
- ¹09/04: Labor Day (No Classes)
- ²11/20 -11/26: Thanksgiving Break (No Classes)
- ³12/08: Reading Day (No Classes)
- 12/15: Last Day of Term
**Homework:**
There will be about 4-5 homework assignments. Homework assignments are to be completed **individually** unless specified otherwise. Homework will consist of problem sets as well as small programming assignments. It is important to spend the time to experiment with the various program elements, so start your homework promptly. All assignment submissions must be typed. **Handwritten assignments will not be graded.**

**Projects:**
There will be two projects for which you will be expected to work in small groups. The maximum group size will depend on the type of project and will be specified at a later time. The project must be accompanied by a detailed project report describing the problem, the implementation, experiments and results as well as their interpretation.

**Reading Assignments:**
In addition to regular homework, there is a standing reading assignment of all chapters listed in the table above. Material covered in each of the textbook chapters assigned may form the basis for questions in homework, projects, and exams.

**Exams:**
There will be three exams:
- **Section 001:**
  - Mid exam: **Saturday, October 14, 2023 (11:00 AM – 1:00 PM).**
  - Final exam: **Tuesday, December 12, 2023 (4:00 PM – 6:00 PM).**
- **Section 003:**
  - Mid exam: **Monday, October 16, 2023 (11:00 AM – 1:00 PM).**
  - Final exam: **Monday, December 11, 2023 (4:00 PM – 6:00 PM).**
The schedule of these exams is fixed and cannot be changed to accommodate individual circumstances except for a major illness or family emergency. In such cases, arrangements must be made before the time of the exam to take the exam at a different time. Makeup exams will not be given without such prior approval and only for the emergency cases indicated.

**Grading:**

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<thead>
<tr>
<th>Item</th>
<th>% of final grade</th>
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<tbody>
<tr>
<td>Quizzes</td>
<td>5%</td>
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<tr>
<td>Homeworks</td>
<td>25%</td>
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<tr>
<td>Projects (2)</td>
<td>25%</td>
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<tr>
<td>Exams (2)</td>
<td>45%</td>
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Policies:

- All homework assignments and projects must be turned in at the beginning of class on their respective due date. These assignments will be accepted up to 24 hours late and be assessed a 50% grade reduction penalty. Assignments submitted more than 24 hours late will not be accepted and receive a grade of 0. All assignment submissions must be typed.

- This course follows UNT’s policy for Student Academic Integrity that can be found at https://policy.unt.edu/policy/06-003 as well as the Cheating Policy for the Department of Computer Science and Engineering (posted on Canvas). Specifically, the first instance of a student found to have violated the academic integrity (i.e., cheating) policy will result in a grade of “F” for the course and have a report filed into the Academic Integrity Database, which may include additional sanctions.

- **Cheating will not be tolerated.** Anyone found guilty of cheating on a test or assignment will be awarded an F grade for the course. Discussions of problems and assignment with your classmates is welcome and encouraged, however, sharing of solutions is not. If you need help, you should ask the instructor. Cheating includes, but is not limited to, all forms of plagiarism and misrepresentation.

- Grades will be posted on Canvas throughout the semester to provide an ongoing assessment of student progress, though final assessment will be measured using the weighted average above.

- **Once a grade is posted on Canvas, students have two (2) weeks to dispute the grade, unless otherwise instructed.**

- The proper channel for grade disputes is to first go to the original grader (either the TA or IA) in an attempt to resolve the issue. If, however, a resolution cannot be reached between the student and the grader, the student shall then go to the instructor who will have the final say on the grade.

- There will be NO "make-up" Exams. In case of verifiable emergencies, arrangements must be made with the instructor.

- **Lecture Section:** Class attendance is regarded as an obligation as well as a privilege. All students are therefore expected to attend each class meeting. A student who misses class is still responsible to find out what was discussed and to learn the material that was covered and obtain the homework that was assigned on the missed day. The instructor is not responsible for re-teaching material missed by a student who did not attend class. Therefore, each student is accountable for and will be evaluated on all material covered in this course, regardless of attendance. If there are extenuating circumstances preventing you from attending the class, please notify your instructor so that you can work together to ensure your success in learning the material.

Course Evaluation

The Student Perception of Teaching (SPOT) survey is a requirement for all organized undergraduate classes at UNT. This short survey will be made available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider SPOT to be an important part of your participation in this class.
ADA STATEMENT
The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time; however, ODA notices of reasonable accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information, refer to the Office of Disability Access website (http://www.unt.edu/oda). You may also contact ODA by phone at (940) 565-4323.

ACCEPTABLE STUDENT BEHAVIOR
Student behavior that interferes with an instructor’s ability to conduct a class or other students’ opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student’s conduct violated the Code of Student Conduct. The university’s expectations for student conduct apply to all instructional forums, including university and electronic classroom, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at http://deanofstudents.unt.edu.

STUDENT RESPONSIBILITY
Students are responsible for submitting the correct assignments (i.e., uploading the proper files) for each applicable assignment submission on Canvas. In certain cases, when an assignment is submitted on time, but to an incorrect assignment location (e.g., submitting Homework 03 to Homework 04 location on Canvas), the assignment may be assessed a 30% reduction penalty if the due date has passed. If you have any questions or concerns about your submission, please work with your instructor or IA to ensure the correct file(s) is/are submitted.

Emergency Notification & Procedures:
UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Canvas for contingency plans for covering course materials or change in calendar per the Emergency Notifications and Procedures Policy.