CSCE-5640 Operating Systems Design
Fall 2016
Meeting Time: Tu/Th 11:30am - 12:50pm
Classroom: NTDP D201

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Office Hours: Monday & Wednesday 3:00 – 4:00pm, or by appointment
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IA Office Hours: Monday and Wednesday 11:00am-12:00pm.


Course Web Page: Blackboard

Prerequisites: CSCE 3600: System Programming or equivalent

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, process 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:

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

Tentative List of Topics:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Reading</th>
</tr>
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<tbody>
<tr>
<td>Introduction to OS</td>
<td>Chapters 1 and 2 in Textbook</td>
</tr>
<tr>
<td>Processes and Threads</td>
<td>Chapters 3 and 4</td>
</tr>
<tr>
<td>Process Synchronization and Coordination</td>
<td>Chapter 6</td>
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<tr>
<td>Classic Process Coordination Problems</td>
<td>Chapter 6 and Handouts</td>
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<tr>
<td>Process Scheduling</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Deadlocks, Avoidance and Prevention</td>
<td>Chapter 7, Handouts, References</td>
</tr>
<tr>
<td>Memory Management</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>Virtual Memory and File Systems</td>
<td>Chapters 9, 10, and 12</td>
</tr>
<tr>
<td>Protection and Security</td>
<td>Chapters 14 and 15, Handouts</td>
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<tr>
<td>Distributed Systems</td>
<td>Handouts and References</td>
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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.

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 two exams: midterm and final exams, each covering separate parts of the course material.

Grading:

<table>
<thead>
<tr>
<th>Item</th>
<th>% of final grade</th>
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<tbody>
<tr>
<td>Class Participation</td>
<td>5%</td>
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<tr>
<td>Homework &amp; Quizzes</td>
<td>20%</td>
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<tr>
<td>Midterm Exam</td>
<td>25%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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<tr>
<td>Projects</td>
<td>25%</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. Late assignments will be accepted with a 25% penalty per day. Assignments that are submitted more than three days past their deadline will not be accepted and not graded. All assignment submissions must be typed.
- **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.
- There will be NO "make-up" Exams. In case of verifiable emergencies, arrangements must be made with the instructor.
- There will be NO early midterm or final exams.

Disability Policy:
_The Computer Science Department and this instructor cooperate with the Office of Disability Accommodation to make reasonable accommodations for qualified students (cf. Americans with Disabilities Act and Section 504, Rehabilitation Act) with disabilities. If you have not registered with ODA, we encourage you to do so. If you have a disability for which you will require accommodation please discuss with me after class and present a written accommodation request on or before the 2nd week of class._