

**CSCI 5531 - 02: Advanced Operating Systems
Fall 2014**

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Office Hours: Mon. Thu: 3:30pm – 7:30pm; and by appointment..
Meeting Time: Tuesday: 7pm – 9:50pm.
Meeting Room: D-204.

Teaching Assistant (TA): Pranaya Kalluru **Email:** KalluruP2562@UHCL.edu
TA Office hours:

Tuesday: 5-10pm, Wednesday: 7-10pm, Thursday 11am – 1pm, and 3-7pm

Text:

Distributed Systems Concepts and Design 5th Ed., G. Coulouris, J. Dollimore, T. Kindberg, and G. Blair. Addison Wesley 2012. ISBN-10: 0-13-214301-1, ISBN-13: 978-0-13-214301-1

Prerequisites:

CSCI 4534 Operating Systems [or equivalent undergraduate senior-level OS course]
Familiarity with C/C++ and Java.
Familiarity with Unix and System Calls

Grading:

Homework and Quizzes	20%
Programming Assignments	20%
Midterm	25%
Final exam	35%

Grading Scale:

93+ = A; 90+ = A-; 87+ = B+; 83+ = B; 80+ = B-; 77+ = C+;
73+ = C; 70+ = C-; 67+ = D+; 63+ = D; 60+ = D-; 0+ = F

Course Description:

This is a required core course for the graduate program in Computer Science. The course covers the fundamental concepts of distributed operating systems. Students are expected to have background on the basic operating systems concepts and single-processor operating systems. In this course, students will be exposed to more advanced concepts and issues in Operating Systems, especially concepts related to multiusers and distributed domains. We will also discuss the different implementation issues related to material through programming projects. Topics to be discussed include processes and threads, IPC, RPC, sockets, process synchronization, global clocks, logical clocks, distributed mutual exclusion, communication and synchronization in distributed systems, consistency and replication, security and fault tolerance in distributed systems, distributed file systems, and distributed object-based systems.

Course Objectives:

After completing this class, students will be able to:

- Students will be able to use and apply important concepts in distributed systems and advanced operating systems.
- Students will be able to work on the design and development of distributed systems components: inter-process communication, global clocks and synchronization, consistency and replication, fault

- tolerance, security, etc.
- Students will be exposed to the main research issues faced by the designers of distributed systems. Students will be prepared for reading, understanding, and participating in research in distributed and advanced operating systems.
- Students will be exposed to technologies such as Virtualization, Cloud Computing, Pervasive Computing, Distributed Web-Based Systems, etc.
- Students will have the opportunity to practice and write applications that simulate the various concepts related to the material.

General Course Outline:

1. Related programming material which includes but not limited to: Processes, Threads, System V/POSIX IPCs, Shared memory, Berkeley Sockets, Semaphores, Message Queues, and pipes.
2. Characterization of Distributed Systems. (Ch. 1)
3. System Models (Ch. 2)
4. Networking and Internetworking. (Ch. 3)
5. Interprocess Communication (Ch. 4)
6. Remote Invocation (Ch. 5)
7. Indirect Communication (Ch. 6)
8. Operating System Support (Ch. 7)
9. Peer-to-Peer Systems (Ch. 10)
10. Distributed File Systems (Ch. 12)
11. Name Services (Ch. 13)
12. Time and Global States (Ch. 14)
13. Coordination and Agreement (Ch. 15)
14. Replication (Ch. 18)
15. Mobile, Ubiquitous, and Cloud Computing (Ch. 19)

Important dates:

Midterm:	Wed. October 15th
Final:	Wed. December 10 th , 7:00 PM – 9:00PM

Other important dates: (You must confirm on the University Website)

- August 25 First Class Day for Regular Session
- September 1 University Holiday (Labor Day)
- November 10.....Last Day to Withdraw – Fall Regular 15-Week Session Course(s)
- November 26-28..... University Holiday (Thanksgiving)
- December 8 – December 13..... Final Exams Fall 2014 (Regular Session)

General Notes and Policies:

- This is a face-to-face course conducted as lectures and presentations. The material will be posted on the course Blackboard CMT (BB9). Students are expected to download, print, and read class material from the book and from notes. **The material on Blackboard is not to be viewed as a substitute for lectures. Therefore attendance is highly important in this course especially that there will be graded quizzes given during the lectures. Quizzes will be announced the week before they are given.**
- All submissions and deliverables of assignments are due by 11:59PM on the due date. Each assignment due date will be determined when the assignment is posted.
- Class attendance is expected and is **highly essential** in this course. It is the student’s responsibility to get the material discussed, announcements, handouts, or anything conducted during a missed class meeting.

- Participations and discussions from students are highly encouraged.
- All class assignments: 25% taken off per day penalty on late submissions for a maximum of two days. After the two days the assignment will not be accepted.
- Makeup of exams, quizzes, and assignments will be very restricted, and is allowed only under a documented (appropriate documents) legitimate excuse that is to the discretion of the instructor.
- Students with special needs and disability should contact the instructor as soon as possible and contact Disability Services Office at 281-283-2627 website: www.uhcl.edu/disability
- Academic Honesty: HONESTY CODE of UHCL states: **I will be honest in all my academic activities and will not tolerate dishonesty.** Students and Faculty are bound to the honor code; therefore, academic dishonesty will not be tolerated in this class! See the UHCL catalog for more details. You are encouraged to become familiar with the policy of academic dishonesty found in the UHCL official student handbook. All submissions are considered completely 100% your own work. Copying the work of others (this includes Internet copying and downloading) and allowing others to copy your own work is not acceptable and is considered academic dishonesty. Also, sharing the course material after finishing this course is not allowed. Any violation of the dishonesty rules will result in a grade of zero, filing of *Academic Dishonesty Form*, and subtracting 10% of total course grade for each incident and for all students involved in the incident.

Academic Honesty Code: see section 2.1.4 in the Students Life Policies handbook for the UHCL
Academic Honesty Code:
http://prtl.uhcl.edu/portal/page/portal/PRV/FORMS_POLICY_PROCEDURES/STUDENT_POLICIES/Academic_Honesty_Policy .