CSCI 4534
Operating Systems
Spring 2014
MW 5:30 – 6:50 pm, Delta 136

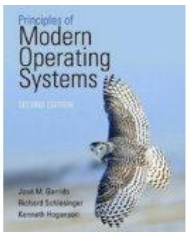
Instructor: Dr. Sharon P. Hall
Office: Delta 115
Phone: 281.283.3868
Email: perkins@uhcl.edu ; please note!
Homepage: sce.uhcl.edu/perkins ; only contains office hours
Blackboard: will be used to display syllabus, homework assignments, major programming assignments, and quiz, programming assignment and homework grades
Office Hours: posted on my homepage
Please call before you come, especially if you are coming from far away!

This course has been authorized by UHCL as an Applied Critical Thinking (ACT) Course which means that in addition to learning about the specified course content, students will be engaged with some or all of the Elements of Thought and Universal Intellectual Standards of critical thinking. The objective of an ACT course is to develop the student's ability to become skilled at analysis and evaluation by applying a set of intellectual tools that may be effectively used across all disciplines (as well as to the student's personal life). Based on the Foundation for Critical Thinking (http://www.criticalthinking.org/), critical thinking involves thinking for a *purpose*, asking *questions*, using *information*, applying *concepts*, drawing *inferences and conclusions*, identifying *assumptions*, anticipating *implications and consequences*, and recognizing *points of view*. The Universal Intellectual Standards that are applied to these Elements of Thought of critical thinking in order to develop Intellectual Traits include *clarity*, *accuracy*, *precision*, *relevance*, *depth*, *breadth*, *logic*, *significance*, and *fairness*.

Course Goals:
This course intends to expose students to the basic principles of operating system design, including topics on process management, interprocess communication, memory management, device management, deadlock problems and file system design. The course has a significant programming component. In the programming assignments students will experiment with

different solutions to problems and issues faced by operating systems designers. The course will also focus on strengthening students' skills in verbal and written communication and problem solving.

Textbook: **Principles of Modern Operating Systems**, 2nd Edition, Garrido, Schlesinger, and Hoganson, Jones & Bartlett Learning, 2013.



Prerequisites: CSCI 3331, CSCI 3333 and CENG 3531, or equivalents.

Teaching Assistant: Ms. Sravani Kanneganti
Email: kannegantis6664@uhcl.edu
Office Hours: posted on Dr. Hall's homepage

Semester Schedule: For the tentative schedule, please follow the link from my homepage.

Computer Scientists and Critical Thinking:
Computer Scientists use Critical Thinking in solving real-world problems that require computer-created solutions. Specifically, such solutions require designs and models that focus on assumptions, information, and consequences. Computer scientists focus on understanding the principles that connect computer hardware with software to provide an infrastructure for problem solution. All of this begins with clearly understanding a question that needs a solution. Specific questions addressed in this course are: How are program instructions carried out? How and where are program code and data stored?

Student Learning Outcomes (SLOs): Upon completion of this course, students will be able:
C1. To write programs which include some form of interprocess communication (IPC), such as a FIFO.
C2. To **clearly** identify the **purpose** of the major subsystems of modern operating systems, including resource management, memory management and file management.
C3. To describe the relationship between process states and the role of schedulers to move processes between those states.
C4. To write programs that **accurately model** CPU scheduling algorithms.
C5. To use semaphore, mutex, or other synchronization tool for implementing critical sections and process synchronization.
C6. To identify the **consequences** of the various methods of handling deadlocks with **relevance** to the impact of the system designer.

Fundamental and Powerful Concepts of the Course:
This course contains several concepts that form the foundation for much of what we do throughout the semester. Through these *fundamental and powerful concepts*, you will be able to see connections and themes that run throughout much of the course. Two of these include:

1. Fetch-Execute Cycle
2. Process States

Vocabulary of Critical Thinking: In this course, we will learn and use the vocabulary of critical thinking. Our critical thinking vocabulary will include an understanding and use of both the elements of thought and the universal intellectual standards.

Elements of Thought[*] In this course, we will consider and use 8 elements of thought:

1. **Purpose** – goals, objectives
2. **Question at Issue** – problem, issue
3. **Information** – data, facts, reasons, observations, experiences, evidence
4. **Interpretation and Inference** – conclusions, solutions
5. **Concepts** – theories, definitions, laws, principles, models
6. **Assumptions** – presuppositions, axioms, taking for granted
7. **Implications and Consequences**
8. **Point of View** – frames of reference, perspectives, orientations

Universal Intellectual Standards[*] In this course, we will consider and use 9 universal intellectual standards:

1. **Clarity**
2. **Accuracy**
3. **Precision**
4. **Relevance**
5. **Depth**
6. **Breadth**
7. **Logic**
8. **Significance**
9. **Fairness**

[*]Source: Richard Paul and Linda Elder, Center for Critical Thinking and Foundation for Critical Thinking.

Critical Thinking Activities:
There will be three course activities that are targeted as critical thinking activities:

1. To address **SLO C2**: An SEEI writing assignment will be used to indicate that the student can **clearly** identify the **purposes** of the major subsystems of modern operating systems by describing the fundamental relationship between hardware and software, and specifically detailing the need for resource management, memory management and file management.
2. To address **SLO C4**: A computer program and supplemental Gantt charts will be assigned to demonstrate that the student can **accurately model** one or more CPU

scheduling algorithms, thereby understanding the sequence of the CPU scheduler.

3. To address **SLO C6**: Exam questions will require the student to compare and contrast various methods of handling deadlock by identifying the **consequences** of the various methods of handling deadlocks with **relevance** to the impact of the system designer.

4 C's of Critical Thinking:
The UHCL Quality Enhancement Plan (QEP) endorsed by the university accrediting body is a plan to promote applied critical thinking (ACT) for lifelong learning and adaptability. In particular, the key learning outcomes of the UHCL applied critical thinking plan involve 4 C's: Curiosity, Connections, Creativity, and Communication. In this course, we will primarily focus on **Connections**.

Assessment of Critical Thinking: Individual grades will be given on each of the 3 Critical Thinking Activities. The grades will be converted into Excellent, Acceptable, and Unacceptable. For each of the activities, the conversions will

1. **SLO C2**: A grade between 85% and 100% on the **Major Subsystems SEEI** will be considered Excellent, between 70% and 84% will be considered Acceptable, and between 0 and 69% will be considered Unacceptable.
2. **SLO C4**: A grade between 90% and 100% on the **CPU scheduling programming assignment** will be considered Excellent, between 75% and 89% will be considered Acceptable, and between 0 and 74% will be considered Unacceptable.
3. **SLO C6**: A grade between 90% and 100% on **Exam Questions over Handling Deadlock** will be considered Excellent, between 70% and 89% will be considered Acceptable, and between 0 and 69% will be considered Unacceptable.

The three assessments will be combined for an overall determination of Excellent, Acceptable, or Unacceptable. These assessments will be used as input to the UHCL Critical Thinking database for internal assessment of Critical Thinking, and will not further affect your grade in this course.

Student Expectations: In this course students are expected to read the material from the textbook, work all assigned homework, and work out programming details in C programming language. In class we will have demonstrations and examples, quizzes, and work with programming implementations of the concepts. Students are expected to attend all classes, read assignments before class as requested, work homework exercises and turn them in on time, and participate in class discussion and problem-solving. Since the C language is used for programming assignments in this course, students are expected to catch themselves up to the level of C programming that is required to work the programming assignments.

Academic Honesty:
The honesty policy that is defined in the UHCL Honesty Code states:

I will be honest in all my academic activities and will not tolerate dishonesty.

Students are expected to show respect for themselves and others by being honest in their

educational pursuits. Academic dishonesty will result in a grade penalty and an academic dishonesty notice placed in your file. Upon two honesty violations, students may be expelled from UHCL.

Disability Services:
Any individual with a disability who requires a special accommodation should inform me and contact the Disability Services Office, Room 1402 in the Bayou Building, or call 281.283.2627.

6 Drop Rule:
Students who entered college for the first time in Fall 2007 or later should be aware of the course drop limitation imposed by the Texas Legislature. Dropping this or and other course between the first day of class and the census date for the semester/session does not affect your 6 drop rule count. Dropping a course between the census date and the last day to drop a class for the semester/session will count as one of your 6 permitted drops. You should take this into consideration before dropping this or any other course. Visit www.uhcl.edu/records for more information on the 6 drop rule and the census date information for the semester/session.

Class Policies:

- If you copy another student's work, or let another person copy your work, you will be in violation of the academic honesty policy that is stated in the UHCL catalog.
- Extra credit work is not given.
- Programming and homework assignments are due at the beginning of class.
- Daily class work and quizzes will not be made up if you miss class. If you arrive after a daily quiz is handed out, you will not be able to take the quiz.
- Grade discrepancies will be discussed up to one week following the return of your graded program, homework assignment or exam. After one week, the grade will be as recorded.
- Class attendance is important and will be recorded.

Grading:	Exam 1	20%
	Exam 2	20%
	Final Exam	25%
	Programming Assignments	20%
	Quizzes and Homework	15%

Expected Course Schedule
Spring 2014
CSCI4534: Operating Systems

Monday/Wednesday 5:30p.m. – 6:50 p.m.

Week	Date	Topic	Readings
1	Jan 13 and 15	Introduction to the class	Chapter 1
2	Jan 20	**Martin Luther King Holiday**	
	Jan 22	Processes and Threads	Chapter 2
3	Jan 27 and Jan 29	System Performance and Models	Chapter 3
4	Feb 03 and 05	Client/Server Framework; Systems with Multiprogramming	Chapter 4
5	Feb 10 and 12	Systems with Multiprogramming	Chapter 4
6	Feb 17	**Exam #1**	
	Feb 19	Processor Scheduling	Chapter 5
7	Feb 24 and 26	Processor Scheduling	Chapter 5
8	Mar 03 and 05	Synchronization Principles	Chapter 6
	Mar 10 and 12	**Spring Break**	
9	Mar 17 and 19	Deadlocks	Chapter 7
10	Mar 24 and 26	File Management	Chapter 8
11	March 31	**Exam #2**	
	April 2	The I/O System	Chapter 9
12	April 07 and 09	Memory Management	Chapter 10
13	April 14	Memory Management	Chapter 10
	April 16	Security and Protection	Chapter 11
14	April 21	Security and Protection	Chapter 11
	April 23	Virtual Machines	Chapter 13
15	April 28	Virtual Machines	Chapter 13
	April 30	**Final Exam 4:00-6:45pm**	