CMPS 455 G Operating Systems – Undergraduate Section (CMPS 455 001)
Spring 2019
School of Computing and Informatics
University of Louisiana at Lafayette

Class Time: Tuesday, Thursday: 2 PM-3:15 PM, OLVR 112
Instructor: Dr. Ashok Kumar
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Office Hours: Monday through Thursday 10am-11am
Moodle Page: moodle.louisiana.edu (follow the link for CMPS455 Spring 2019 for section 001)

Teaching Assistants: Brennan Guidry and Zachary Kirby (please check moodle for their office hours)

Text Book:
"Operating Systems: Internals and Design Principles, 9th edition, William Stallings, ISBN-10 0134670957 (8th edition is equally good as well).

OR

 "*Operating System Concepts*", A. Silberschatz, P. Galvin and G. Gagne, 10th Edition, John Wiley & Sons, Inc., (Note: 9th and 8th are OK too, if you can make minor adjustments).

Course Goals: The main goal of this course is to study how modern operating systems work and learn the underlying theory for their design and implementation. An equally important goal of this course is to develop the design, implementation, and debugging skills in students for fairly complex software (a sought-after skill for industrial positions).

The students will learn how processes and threads are created and managed, how a processor's time is shared among multiple entities, how memories are organized, how virtual memory is crucial in the modern computer and how storage systems are managed. The students will also learn what real time operating systems are and how they differ from traditional operating systems. The students will be able to learn significant portions of theory via hands-on experience with NACHOS operating system code (several implementation projects help achieve this).

Grading Policy:

Grades:

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

Distribution:

Projects using UC Berkeley's NACHOS:	40%
Test 1*:	20%
Test 2*:	20%
Research / advanced project	10%
Mini assignments & classroom quizzes	10%

Notes*:
1. All tests are comprehensive
2. In general, late project submissions receive no credit; project-specific handouts will have more details
3. All relevant study material, except for the textbook, will be available in Moodle
4. There will be several projects of different weights; specific details will be provided at the time assignments are made. Some of the projects are group projects.

Method of Instruction: Whiteboard writing, Illustration through PowerPoint, Regular class interaction, Quizzes, Problem solving and implementation through projects. Emphasis will be on "hands-on" learning as much as possible.

Note: Lecture slides are available in moodle. However, it is in students' best interest to attend classes to learn more in depth.

No Cheating: There is zero tolerance for cheating. Such students will be referred for disciplinary action. Please read the Departmental and University policy on academic honesty.

Student (Learning) Outcomes Addressed by the Course

Outcomes Assessed
Understand and use the fundamental principles of the science of computation including those of algorithm analysis, software design, operating systems, and database.
Have the ability to analyze, design, implement, and test computer systems or components.
Possess the ability to solve problems using efficient algorithms and data structures.
Work effectively, both independently and in a team.

Description of Course Organization

I. Overview of Operating System

-   Operating system's role and structure
-   Fundamental principles of modern processors
-   Installation and running of Nachos

II. Essentials of Process Management

-   Processes and threads
-   Process Synchronization

III. Nachos Operating System

-   Composition of the Nachos operating systems
-   Threads in Nachos
-   Scheduling, synchronization, and mutual exclusion with threads
-   Creation and management of user level processes in Nachos
-   Nachos Filesystem
-   Other advanced concepts in Nachos

IV. Advance Theory of Process Management

-   CPU Scheduling
-   Deadlocks

V. Memory Management

-   Main memory and virtual memory
-   Page replacement algorithms

VI. Storage Management & File System

VII. Protection & Security

VII. Advanced Topics

-           Virtualization
-           Introduction to distributed systems

Additional Policies

1. There will be no incomplete ('I') grade assigned in this course except under extremely unusual circumstances. Students doing poorly in the course will not be given an 'I' under any circumstances. ***There will be no 'make up' work for extra or better credit***.

2. Students who fail to show up for any test(s) and/or final exam will receive a failing grade in accordance with the departmental guidelines.

3. If an assignment, design, implementation, or document turned in by a students turns out to be identical or very similar to any other student's work, both his/her and the works that are very similar to the student's work will receive zero credit. Unless specified specifically, collaboration is strictly forbidden. Submitting a work done by anyone else other than the student, to whom it is assigned, will be a cause for severe disciplinary action in addition to zero credit.