CSC 341 - PRINCIPLES OF OPERATING SYSTEMS

CREDIT HOURS: 3
PREREQUISITES: CSC 214 and CSC 302
GRADE REMINDER: Must have a grade of C or better in each prerequisite course.

CATALOG DESCRIPTION

Operating systems principles, memory management and systems utilities.

PURPOSE OF COURSE

The purpose of this course is to enable the student to develop an understanding of the integral role played by operating systems in a computing system. The components of an operating system are studied along with the interactions between software, hardware, and the user.

EDUCATIONAL OBJECTIVES

Upon successful completion of the course, students should be able to:

1. Create programs that demonstrate understanding and comprehension of the services provided by the operating system and how they are delivered.

2. Demonstrate through artifact creation a solid knowledge of the organization and operation of the operating system software.

3. Analyze fundamental issues and algorithms in the design and implementation of an operating system including management of resources, concurrency control, synchronization, and deadlock.

4. Use current operating systems and become aware of performance issues and future trends.

5. Apply process management, memory management, file management, communications management, and device management to different artifacts and designs.

COURSE CALENDAR

This course meets for a minimum of 37.5 lecture contact hours during the semester, including the final exam. Students have significant weekly reading assignments. Students are expected to complete 5-6 programming assignments, 5-6 homework assignments, and 2-3 periodic exams in addition to the final exam. Students are expected to prepare for any class assignments or quizzes over the material covered in class or in the reading material. Successful completion of these activities requires at a minimum six additional hours of outside of classroom work each week.

CONTENT	**Hours**
Introduction	3
Principles, Issues, Models Fundamental Problems	
Process Management	9
Processes and Tasks	

Threads
Synchronization
Deadlock

Memory Management 6
Memory Organizations and Operation
Virtual Memory
Memory Configuration and Management

Scheduling Theory 6
Disk and I/O
Process scheduling
Networking (packet) scheduling

Storage Management 6
File Systems – Organization, I/O Operation
Mass Storage
Distributed Storage

System Libraries and Utilities 3
Shared and static libraries
Linkers and Loaders

Concurrency and Parallelism 3

Protection and Security 6
Security, Integrity
Controls – Access and Accounts
Kernel/protected modes (OS Architecture)

Exams 3

TOTAL 45

REFERENCES

Bach, M., Design of the UNIX Operating System, Prentice-Hall, Inc., Englewood Cliffs, NJ, 1986.

Dhamdere, D., Operating System: A Concept Based Approach, (2nd Ed.) , McGraw-Hill, New York, NY, 2006.

Garrido, J., and Schlesinger, R., Principles of Modern Operating Systems, (2nd Ed.), Jones & Bartlett, Sudbury, MA, 2013.

Intel Corporation., Intel® 64 and IA-32 Architectures Software Developer's Manual Volume 3 (3A & 3B): System Programming Guide, Intel, 2011.

Love, R., Linux Kernel Development, (3rd Ed.), Addison-Wesley Professional, New York, NY, 2010.

Mauerer, W., Professional Linux Kernel Architecture, John Wiley and Sons, New York, NY, 2008.

Palmer, M. and Walters, M., Guide to Operating Systems, 4th Ed., Course Technology, 2012.

Silberschatz A., Galvin P., and Gagne G., Operating Systems Concepts, (8th Ed.), Wiley, 2009.

Stallings, W., Operating Systems: Internals and Design Principles, (8th Ed.), Pearson, 2015.