

## CSCI 3341 - PRINCIPLES OF OPERATING SYSTEMS

**CREDIT HOURS:** 3  
**PREREQUISITES:** CSCI 2314 and CSCI 3302  
**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. 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 .....	6
Processes and Tasks	
Memory Management .....	6
Memory Organizations and Operation	
Virtual Memory	
Memory Configuration and Management	
Scheduling Theory.....	6
Disk and I/O	
Process 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 .....	6
Threads	
Synchronization	
Deadlock	
Protection and Security.....	4
Security, Integrity	
Controls – Access and Accounts	
Kernel/protected modes (OS Architecture)	
Exams .....	5
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, (2<sup>nd</sup> Ed.) , McGraw-Hill, New York, NY, 2006.

Garrido, J., and Schlesinger, R., Principles of Modern Operating Systems, (2<sup>nd</sup> 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, (3<sup>rd</sup> 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, 4<sup>th</sup> Ed., Course Technology, 2012.

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

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

Remzi H. and Andrea C. Arpaci-Dusseu, Operating Systems: Three Easy Pieces, Arpaci-Dusseu Books, 2018, [www.ostep.org](http://www.ostep.org).