

## Advanced Operating System

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| <b>Code</b><br>CS-837 | <b>Credit Hours</b><br>3-0 |
|-----------------------|----------------------------|

### Course Description

CS-837 is an introduction to operating system design principles. The topics we will cover include processes, threads, inter-process communication, scheduling, synchronization, filesystems, I/O management, virtualization, security, and distributed processing. Students are expected to be familiar with C/C++ and must be amazingly comfortable with its programming techniques. Operating systems are prevalent in many areas of technology today. An operating system is a software layer that is closest to the hardware and provides a standardized interface to the application-level software. At the end of this course, students should have a very thorough understanding of how hardware and the operating system kernel can affect software design.

### Text Book:

**Text Book:** 1. Abraham Silberschatz et al., Operating System Concepts, 10/E, Wiley, 2018

**Reference** 1. William Stallings, Operating Systems: Internals and Design Principles, 7/E, Prentice Hall, 2012

### Books:

2. Andrew S. Tanenbaum, Modern Operating Systems, 3/E, Prentice Hall, 2012

### ASSESSMENT SYSTEM FOR THEORY

|             |     |
|-------------|-----|
| Quizzes     | 15% |
| Assignments | 10% |
| Mid Terms   | 30% |
| ESE         | 40% |

### ASSESSMENT SYSTEM FOR LAB

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|----------------|---------|
| <b>Quizzes</b> | 10%-15% |
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| N/A |  |
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### Teaching Plan

| Week | Topics  |
|------|---|
| 01   | Introduction to Operating Systems and Computer Architecture |
| 02   | Operating System Structures                                 |
| 03   | Processes and Threads (POSIX, User/Kernel)                  |
| 04   | Threads & Concurrency                                       |
| 05   | CPU Scheduling  |
| 06   | Synchronization Tools                                       |
| 07   | Concurrency: Mutual Exclusion and Synchronization           |
| 08   | Concurrency: Deadlock and Starvation                        |
| 09   | <b>MSE</b>  |
| 10   | Memory Management: Partitioning, Segmentation and Paging    |
| 11   | Memory Management: Virtual Memory and Page Replacement      |
| 12   | File Systems and Mass Storage Management                    |
| 13   | I/O Management and Disk Scheduling                          |
| 14   | Multiprocessor Systems and Virtualization                   |
| 15   | Security: Cryptography, Protection and Authentication       |
| 16   | Virtual Machines  |
| 17   | <b>End Semester Exam</b>                                    |

**Practical: N/A for this Course**