# CPCS-361 Syllabus

## Catalog Description

**CPCS-361** Operating Systems (I)
**Credit:** 3 ( Theory: 3, Lab: 0, Practical: 1)
**Prerequisite:** CPCS-214 , CPCS-204
**Classification:** Department Required

The objective of this course is to provide a general overview of operating systems concepts and recent methodologies and techniques used in the field and their trades-offs, with various examples from the contemporary used systems. Topics include the basic structure of an operating system, its interaction with the hardware, software, and users, and the services it provides. The course illustrates different algorithms and techniques used in controlling, managing, and allocating various computer resources, such as CPU, memory, storage and I/O devices. It demonstrates the tuning of the operating system for maximizing the utilization and increasing the performance of the computer system.

**Class Schedule**

Meet 50 minutes 3 times/week or 80 minutes 2 times/week

Lab/Tutorial 90 minutes 1 times/week

## Textbook

Silberschatz, Abraham, Gagne, Greg, Galvin, Peter B., , "Operating System Concepts", Wiley; 8 edition (2011-07-05)

**ISBN-13** 9781118112731 **ISBN-10** 1118112733

## Last Articulated

April 11, 2018

## Relationship to Student Outcomes

| a | b | c | d | e | f | g | h | i | j | k |
|---|---|---|---|---|---|---|---|---|---|---|
| x | x | x | | | | | | x | | |

## Course Learning Outcomes (CLO)

By completion of the course the students should be able to

1. Define operating system and list its basic components. (a)
2. Describe computer system structure and interaction with the operating system. (a)
3. Explain various operating system related concepts such as interrupts, storage structure, multiprogramming, multitasking, and multiprocessing. (a)
4. Describe the services provided by operating system (a)
5. Explain operating system structures, design and implementation trade-offs (c)
6. **Detect the different states that a task may pass through and the data structures and operations (such as context switching and dispatching) needed, given the source code of a simple task working in multiprogramming or timesharing environment. (b)**
7. Identify the notion of a thread and discuss issues related to multithreaded programming (a)
8. **Apply schedulling algorithms (FCFS, SJF, priority, Round Robin, Multilevel queue and multilevel feedback queue) and calculate their evaluation criteria (turnaround time,waiting time,...) for a given a list of processes and their arrival and burst time. (a)**
9. **Contrast the various approaches to solve the problem of mutual exclusion and to support synchronization in an operating system (i)**
10. Explain deadlocks and the methods and algorithms of handling deadlocks (a)
11. **Contrast the different ways of allocating memory to a given list of tasks (a)**
12. **Identify the benefits of virtual memory system and apply its algorithms (i)**
13. Explain the file concept and the function of file systems, file operations, directory structures, and protection (a)
14. Analyze mass-storage management algorithms and services provided to mass storage (b)
15. Explain the structure of an operating system's I/O subsystem, principles of I/O hardware, and provide performance aspects of I/O hardware and software (a)

## Coordinator(s)

Dr. Muhammad Umair Ramzan, Associate Professor

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## Grade Distribution

| Week | Assessment | Grade % |
|---|---|---|
| 3 | Quiz 1 | 2.5 |
| 3 | Graded Lab Work 1 | .25 |
| 4 | Graded Lab Work 2 | .25 |
| 5 | Quiz 2 | 2.5 |
| 5 | Graded Lab Work 3 | .5 |
| 6 | Graded Lab Work 4 | .5 |
| 7 | Exam 1 | 15 |
| 7 | Graded Lab Work 5 | .5 |
| 8 | Graded Lab Work 6 | .5 |
| 9 | Graded Lab Work 7 | .5 |
| 10 | Graded Lab Work 8 | .5 |
| 10 | Quiz 3 | 2.5 |
| 11 | Graded Lab Work 9 | .5 |
| 11 | Quiz 4 | 2.5 |
| 12 | Graded Lab Work 10 | .5 |
| 12 | Exam 2 | 15 |
| 13 | Graded Lab Work 11 | .5 |
| 14 | Lab Exam | 15 |
| 15 | Group Project | 10 |
| 16 | Comprehensive Final Exam | 30 |

## Coordinator(s)

Dr. Salma Kammoun, Associate Professor

## Topics Coverage Durations

| Topics | Weeks |
|---|---|
| Introduction | 1 |
| Operating-System Structures | 1 |
| Processes | 1 |
| Multithreaded Programming | 1 |
| CPU Scheduling | 1 |
| Process Synchronization | 1 |
| Deadlocks | 1 |
| Main Memory | 1 |
| Virtual Memory | 1 |
| File-System Interface | 1 |
| Mass-Storage Structure | 2 |
| I/O Systems | 1 |