

## DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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### OPERATING SYSTEMS

**Course Code: 22CSE137**

**L-T-P: 0-0-4**

**Total Hours: 60 Hours**

**Credits: 2**

#### **Course Learning Objectives (CLO)**

*The objective of this course is to make students to*

1. Understand operating system and identify the main components of an operating systems and their functions.
2. Get a high level view of following operating systems
  - a. Windows
  - b. Linux
  - c. Android
  - d. Mac and iOS

#### **MODULE I- Introduction to Operating System**

**[12 Hours]**

Introduction, Objectives and Functions of OS, Evolution of OS, OS Structures, OS Components, OS Services, System calls, System programs, Virtual Machines. **Operating System Components:** Process Management, File Management

#### **MODULE II- Operating System Concepts**

**[12 Hours]**

**Operating System Components:** Main Memory Management, I/O Device Management, Security Management, Command Interpreter System and Network Management

#### **MODULE III- Windows and Linux as Operating System**

**[12 Hours]**

##### **Windows as Operating System**

Understanding User Interfaces for Windows, Understanding of Native Applications, Managing Devices, File Operations and Printing and Backup and Recovery

##### **Linux as Operating System**

Understanding User Interfaces, Understanding of Native Applications, Managing Devices, File, Operations and Printing and Backup and Recovery

#### **MODULE IV- Android as Operating System**

**[12 Hours]**

Understanding User Interfaces, Understanding of Native Applications, Managing Devices, File, Operations and Printing and Backup and Recovery

## **MODULE V- Mac and iOS as Operating system**

**[12 Hours]**

Understanding User Interfaces, Understanding of Native Applications, Managing Devices, File, Operations and Printing and Backup and Recovery

### **TEXTBOOKS:**

1. Abraham Silberschatz and peter Baer Galvin, Operating System Concepts, 8th Edition, Pearson Education.

### **REFERENCE BOOKS:**

1. Milan Milonkovic, Operating System Concepts and design, II Edition, McGraw Hill 1992.
2. Tanenbaum, Operation System Concepts, 2nd Edition, Pearson Education.
3. Windows Operating System Fundamentals by Crystal Panek, November 2019, Publisher(s): Sybex ISBN: 9781119650515
4. Linux Pocket Guide: Essential Commands by Daniel J. Barrett Publisher: O'Reilly
5. Inside the Android OS by Lawrence Schiefer (Author) Publisher: Addison-Wesley;

### **Skill Based Activities (SBE):**

*Note:- These Projects/activities are only indicative; the Faculty member can innovate*

### **Lab Experiments:**

1. Implementation of various process Scheduling Algorithms
2. Implementation of Solutions for classic problems of Process Synchronization
3. Implementation of Bankers Algorithm for ensuring the safe sequence of process execution
4. Implement Page Replacement Algorithms FIFO, LRU and OPT
5. Implement Memory Allocation using First Fit, Best Fit, Worst Fit,
6. Implementation of File and I/O System calls
7. Linux Shell Scripts:

Write shell script to determine whether a number is a prime or now

<https://www.codegrepper.com/code-examples/shell/how+to+check+prime+number+in+shell+script>

### **Assignments:**

1. Install Ubuntu on Window 10

<https://ubuntu.com/tutorials/install-ubuntu-on-wsl2-on-windows-10#1-overview>

2. Outline how file management is different between Android and iOS

### Case Studies:

1. Install and Configure Postfix as a Send-Only SMTP Server on Ubuntu Postfix is a mail transfer agent (MTA), an application used to send and receive email. It can be configured so that it can be used to send emails by local application only. It's also a lighter alternative to running a full-blown SMTP server, while retaining the required functionality.  
<https://www.digitalocean.com/community/tutorials/how-to-install-and-configure-postfix-as-a-send-only-smtp-server-on-ubuntu-18-04>
2. Setup backup script/processes with Mac User Automator to create a backup script  
<https://healthit.com.au/create-a-scheduled-backup-mac/>

### Mini Projects:

1. Install macOS on Windows using virtual box  
<https://www.howtogeek.com/289594/how-to-install-macos-sierra-in-virtualbox-on-windows-10/>

### Course Outcomes:

At the end of the course, students will be able to

Course Outcomes	Description	Bloom's Taxonomy Level
CO1	Discuss the core concepts of Operating Systems.	Understanding (2)
CO2	Demonstrate the role of operating system for managing resources.	Applying (3)
CO3	Discuss the native applications in most frequently used Operating Systems	Applying (3)
CO4	Demonstrate the memory management techniques for most frequently used Operating Systems	Applying (3)
CO5	Classify different file systems and their implementations for most frequently used Operating Systems	Applying (2)
CO6	Compare Backup and Recovery processes for most frequently used Operating Systems.	Applying (3)

CO/PO: Mapping												
(3/2/1 indicates strength of correlation) 3-High, 2-Medium, 1-Low												
Course Outcome (COs)	Program Outcome (POs)											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1										
CO2	2	1										
CO3	3	2			3							1
CO4	3	2			3							1
CO5	2	1										
CO6	3	2			3							1

## Bloom's Taxonomy-Revised

LEVEL	DESCRIPTION	MEANING	ACTION VERBS
6	Creating	Can the student create a new product or POV?	Assemble, construct, create, change, combine, compose, design, develop, formulate, invent, modify, organize, propose, theorize, write
5	Evaluating	Can the student justify a stand or decision?	Appraise, agree, assess, argue, conclude, decide, defend, judge, prioritize, prove, rate, recommend, select, support, value
4	Analyzing	Can the student distinguish between different parts?	Contrast, compare, criticize, differentiate, discriminate, dissect, distinguish, examine, experiment, operate, question, simplify, test
3	Applying	Can the student use information in a new way?	Choose, demonstrate, dramatize, employ, illustrate, interpret, schedule, sketch, solve, use
2	Understanding	Can the student explain ideas and concepts?	Classify, describe, discuss, explain, identify, infer, locate, outline, paraphrase, recognize, report, summarize, select, translate
1	Remembering	Can the student recall or remember information?	Define, duplicate, find, list, label, match, memorize, name, omit, recall, repeat, state, spell, tell