

## SUBJECT DESCRIPTION FORM

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**Subject Title:** Operating Systems

**Subject Code:** COMP 304

**Number of Credits:** 3

**Hours Assigned:** Lecture 35 hours  
Tutorial/Lab 21 hours

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**Pre-requisite:** COMP 201

**Co-requisite:** Nil

**Exclusion:** Nil

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### Objectives:

This subject provides students knowledge on:

- resource management provided by operating systems;
- concepts and theories of operating systems;
- implementation issues of operating systems.

### Student Learning Outcomes:

After taking this subject, the students should be able to:

#### Professional/academic knowledge and skills

- (1) identify the services provided by operating systems;
- (2) understand the internal structure of an operating system and be able to write programs using system calls;
- (3) understand and solve problems involving process control, mutual exclusion, deadlock and synchronization.

#### Attributes for all-roundedness

- (4) develop skills in problem solving using systematic approaches;
- (5) solve complex problems in groups and develop group work.

### Alignment of Programme Outcomes:

Programme Outcome 1: This subject contributes to having students practice their writing skills with project document and report writing.

Programme Outcome 4: This subject contributes to developing student critical thinking through tutorial and lab exercises on solving problems. They will also practice more in written assignments, programming exercises, and project.

Programme Outcome 5: This subject contributes to problem solving with programming skills through lab exercise and project with proper design and implementation.

Programme Outcome 7: This subject contributes to team work with group-based project for students to practice team spirit.

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### Syllabus:

Topic	Duration of Lectures
<b>1. Introduction to operating systems</b> Types and functionalities of operating systems; system components and services; resource management.	2.5

<b>2. Unix and Linux</b> Usage of Unix and Linux; shell and commands; scripts; system calls.	5
<b>3. Process management</b> Process concepts; process manipulation; asynchronous concurrent processes; mutual exclusion; synchronization; deadlock; scheduling algorithms.	12.5
<b>4. Memory and secondary storage management</b> Virtual memory; paging and segmentation system; secondary storage allocation; directory and file system structure.	10
<b>5. Protection and security</b> Protection and access control; capabilities; security and cryptography.	2.5
<b>6. Case studies on operating systems</b> Structure of Unix, Windows NT, etc.	2.5
<b>Total</b>	<b>35</b>

**Laboratory Experiment:**

Unix environment, shell scripts, system calls.

**Case Study:**

Contemporary OS like Unix, Linux, Windows.

**Method of Assessment for Learning Outcomes:**

Assessment method / task	% weighting	Intended subject learning outcomes to be assessed (Please check as appropriate)							
		1	2	3	4	5			
Assignments	55			x	x				
Lab exercises			x		x				
Project		x	x	x	x	x			
Mid-term		x	x	x	x				
Examination	45	x	x	x	x				
Total	100								

**Textbooks:**

1. Silberschatz, A., Galvin, P.B. and Gagne, G., Operating System Principles, 7/E, John Wiley and Sons, 2006.

**Reference Books:**

1. Keith Flynn, I.M. and McHoes, A.M., Understanding Operating Systems, 4/E, Thomson, 2006.
2. Diaz, C., Introduction to Unix/Linux, Thomson, 2007.
3. Robbins, K.A., Unix Systems Programming, Prentice Hall, 2003.

4. Stallings, W., Operating Systems: Internals and Design Principles, 5/E, Pearson/Prentice Hall, 2005.