## COURSE STRUCTURE

| Course Code | BCA20070 | | | | |
|---|---|---|---|---|---|
| Course Category | Program Foundation | | | | |
| Course Title | Operating System | | | | |
| **Teaching Scheme** | **Lectures** | **Tutorials** | **Laboratory/Practical** | **Project** | **Total** |
| Weekly Load Hrs. | 3 | - | | | 3 |
| Credits | 3 | - | | - | 3 |
| Assessment Schema Code | TT1 | | | | |

**Pre-requisites**:
Basic knowledge of computer organization

**Course Objectives:**

1. To describe the services an operating system provides to users and other systems.
2. To describe the various process scheduling, creation, termination, and communication.
3. To comprehend the structures and functions of Operating Systems and process management.
4. To deal with concurrency and deadlock in the Operating System
5. To learn and understand memory management of Operating System

**Course Outcomes:**

Student will able to

1. Describe the important computer system resources and the role of operating system in their management policies and algorithms.
2. Understand process management policies and scheduling of processes by CPU.
3. Evaluate the requirement of process synchronization and co-ordination handled by operating system.
4. Describe and analyze the memory management and its allocation policies.
5. Identify the need to create the special purpose operating system.

## Course Contents

### Unit I: Introduction[5]

Evolution of OS, Operating System as system software,Operating System Services, Functions of Operating System. System calls,Types of system calls

### Unit II: Process Management[10]

Process, Process States, process control block,
Threads, Thread lifecycle, Multithreading Model,
process control system calls.
Process Scheduling: Uni-processor Scheduling,
Scheduling: Preemptive, Non-preemptive, Longterm, Medium-term, Short term scheduling.
Scheduling Algorithms: FCFS, SJF, RR, and Priority
Concept of Mutiple queue scheduling and Multilevel feedback queue scheduling

**Unit III: Process Synchronisation[10]**

Introduction
Co-operating Process
Race Condition
Critical section or critical region
Semaphore implementation
Classical process synchronization problems
Reader writer problem,
producer Consumer problem,
Dining Philosopher problem.

**Unit IV: Deadlocks[10]**

Principle of deadlock
Deadlock Characterization:-Necessary conditions,Resource allocation graph
Methods for Handling Deadlocks
Deadlock Prevention
Deadlock Avoidance
Deadlock Detection
Recovery from Deadlock

**Unit V: Memory Management[10]**

**Main Memory**

Background
Swapping
Contiguous Memory Allocation
Non Contiguous Memory Allocation
Segmentation
Paging
Structure of the Page Table

**Virtual Memory**

Background
Demand Paging
Page Replacement
Allocation of Frames
Page replacement algorithms:-FIFO,LRU,OPT
Thrashing

**Learning Resources:**

**Text Books:**

- Modern Operating System, Fourth Edition, Andrew S. Tanenbaum, Herbert BOS.
- Operating System Principles,Silberschatz, Galvin

**Reference Books:**

- Operating System Concepts - Siberchatz, Galvin, Gagne (8th Edition).
- Systems Programming and Operating Systems by D. M. Dhamdhere (Second Revised Edition)

- Operating Systems : Principles and Design – Pabitra Pal Choudhary (PHI Learning Private Limited)

**Web Resources:**

- https://www.javatpoint.com/operating-system

https://www.tutorialspoint.com/operating_system/os_overview.htm

**Pedagogy:**

Participative learning,
discussions,
algorithm,
programming concepts,
experiential learning through practical problem solving,
assignments,
Tutorial