BCSC 0068: OPERATING SYSTEMS

Objective: *This course aims to introducing the concept of computer organization. In particular, it focuses on basic hardware architectural issues that affect the nature and performance of software.*

Credits: 03 **L–T–P-J: 3–0–0-0**

Module No.	Content	Theory Hours
I	*Introduction:* Operating System and its Classification - Batch, Interactive, Multiprogramming, Time sharing, Real Time System, Multiprocessor Systems, Multithreaded Systems, System Protection, System Calls, Reentrant Kernels, Operating System Structure- Layered structure, Monolithic and Microkernel Systems, Operating System Components, Operating System Functions and Services. *Processes:* Process Concept, Process States, Process State Transition Diagram, Process Control Block (PCB), Process Scheduling Concepts, Threads and their management. *CPU Scheduling:* Scheduling Concepts, Performance Criteria, Scheduling Algorithms, Multiprocessor Scheduling. *Process Synchronization:* Principle of Concurrency, Implementation of concurrency through fork/join and parbegin/parend, Inter Process Communication models and Schemes, Producer / Consumer Problem, Critical Section Problem, Dekker's solution, Peterson's solution, Semaphores, Synchronization Hardware. *Classical Problem in Concurrency:* Dining Philosopher Problem, Readers Writers Problem.	21
II	*Deadlock:* System model, Deadlock characterization, Prevention, Avoidance and detection, Recovery from deadlock, Combined Approach. *Memory Management:* Multiprogramming with fixed partitions, Multiprogramming with variable partitions, Paging, Segmentation, Paged segmentation. *Virtual memory concepts:* Demand paging, Performance of demand paging, Page replacement algorithms, Thrashing, Locality of reference. *I/O Management and Disk Scheduling:* I/O devices, I/O subsystems, I/O buffering, Disk storage and disk scheduling. *File System:* File concept, File organization and access mechanism, File directories, File allocation methods, Free space management	19

Text Books:

- Silberschatz, Galvin and Gagne, "Operating Systems Concepts", 9th Edition, Wiley, 2012.

Reference Books:

- Sibsankar Halder and Alex a Aravind, " Operating Systems", 6th Edition, Pearson Education, 2009.
- Harvey M Dietel, "An Introduction to Operating System", 2nd Edition, Pearson Education, 2002.
- D M Dhamdhere, "Operating Systems: A Concept Based Approach", 2nd Edition, 2006.
- M. J. Bach, "Design of the Unix Operating System", PHI, 1986.

Outcome: After completion of course, the student will be able to:

- CO1: Understand the classification of operating system environment.

- CO2: Understand the basic of process management.
- CO3: Apply the concept of CPU process scheduling for the given scenarios.
- CO4: Illustrate the process synchronization and concurrency process in operating system.
- CO5: Analyze the occurrence of deadlock in operating system.
- CO6: Describe and analyze the memory management and its allocation policies.
- CO7: Understand the concepts of disk scheduling.