Code: BCT01105	OPERATING SYSTEM 4 Credits [LTP: 4-0-0]

COURSE OVERVIEW AND OBJECTIVES:

The course provides an overview of the Linux Operating System, geared toward new users as an exploration tour and getting started guide. This unit provides examples to help the learners get a better understanding of the Linux system. The unit also provides the guidelines for the learners to take up vendor certifications.

The unit explores the basics of Linux, the underlying management of the Linux operating system and its network configuration. The complete system services of Linux is explained along with the troubleshooting.
.

A.   OUTLINE OF THE COURSE

Unit No.	Title of the unit	Time required for the Unit (Hours)
1.	Introduction to Operating System	10
2.	Process Management – Processes and Threads	12
3.	Process Management – Synchronization and Deadlocks	10
4.	Storage Management	6
5.	Protection and Security	10

B. DETAILED SYLLABUS

Unit	Unit Details
1.	**Introduction to Operating System**
	• Objectives and Functions of OS, Evolution of OS, OS Structures, OS Components, OS Services, System calls, System programs, Virtual Machines. • History of UNIX, Features & Benefits, Versions of UNIX, Features of UNIX File System,, Commonly Used Commands and getting Started (Login/Logout) . • Creating and viewing files using cat, file comparisons, View files, disk related commands, checking disk free spaces
2.	**Process Management – Processes and Threads**
	• Processes: Process concept, Process scheduling, Co-operating processes, Inter process Communication • Threads: Introduction to Threads, Single and Multi-threaded processes • CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling Algorithms, Multiple Processor Scheduling, Real-time Scheduling, • **UnixProcessManagement** The Structure of Processes: Process States and Transitions - Layout of system memory - Context of a process. • Process Control: Process Creation – Signals – Process Termination – Invoking other programs – PID & PPID – Shell on a Shell.
3.	**Process Management – Synchronization and Deadlocks**
	• Process Synchronization: Mutual Exclusion, Critical – section problem, Synchronization hardware, Semaphores, Classic problems of synchronization, Critical Regions, • Monitors, OS Synchronization, Atomic Transactions. Deadlocks: System Model, • Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock Avoidance,

	Deadlock Detection, Recovery from Deadlock.
4.	**Storage Management**
	- Memory Management: Logical and physical Address Space, Swapping, Contiguous Memory Allocation, Paging, Segmentation with Paging. - Virtual Memory Management: Demand paging, Process creation, Page Replacement Algorithms, Allocation of Frames, Thrashing, - File-System Interface: File concept, Access Methods, Directory structure, File- system Mounting, File sharing, Protection and consistency semantics. - File-System Implementation: File-System structure. Directory Implementation, Allocation Methods, Free-space Management, Efficiency and Performance, Recovery. - Disk Management: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Attachment, stable-storage Implementation **The Unix File System** - Inodes - Structure of a regular file – Directories - Conversion of a path name to an inode - Super block - Inode assignment to a new file - Allocation of disk blocks. - System calls for the file System: Open – Read - Write - Lseek – Close - File creation - Creation of special files - Changing directory and root - changing owner and mode – stat and fstat - pipes - Dup - Mounting and Un mounting file systems - Link and Un link.
5.	**Protection and Security**
	- Protection: Goals of Protection, Domain of Protection, Security: Security Problem, - User Authentication, One – Time Password, Program Threats, System Threats, - UNIX SYSTEM ADMINISTRATION Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, - Creating and managing groups, modifying group attributes, temporary disabling of user's accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. - Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command

C. RECOMMENDED STUDY MATERIAL:

Sr. o	Book	Author	Publication
1.	Operating System Concepts and design	Milan Milonkovic,	II Edition, McGraw Hill 1992.
2.	Operation System Concepts	Tanenbaum	2nd Edition, Pearson Education.
3.	Operating System	William Stallings	4th Edition, Pearson Education.
4.	Guide to UNIX Using LINUX	Jack Dent Tony Gaddis, Vikas	Thomson Pub. House Pvt. Ltd. 2010