Lok Jagruti Kendra University
University with a Difference

Diploma in Computer Science & Engineering

LJ Polytechnic

Course Code:025130301

Operating System

Programme/ Branch Name	Diploma in Computer Science & Engineering					
Course Name	Operating System				**Course Code**	025130301
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				**Evaluation Scheme**			
L	**T**	**P**	**Total Credit**	**CCE**	**SEE (Th)**	**SEE (Pr)**	**TOTAL**
3	0	2	4	50	50	50	150

Legends:
L: Lectures T: Tutorial P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisites

- ✓ Basic knowledge of computer
- ✓ Basic programming

3. Rationale

Operating System is basically a system program that controls the execution of application programs and acts as an interface between applications and the computer hardware. It manages the computer system resources to be used in an efficient manner. This course enables us to learn the internal functioning of operating systems and identify appropriate operating systems for the given application. Students will be able to understand about process, memory and file management of operating system. Linux Operating System is Open source and freely distributed O.S. Linux's functionality, adaptability and robustness make it highly suitable for various scenarios. The course aims at providing knowledge of shell and command-line essentials.

4. Objectives

- ✓ This course aims to help the students to attain the following industry-identified competency through various teaching-learning experiences.
  - To install & configure various Operating Systems.
  - Manage operations of the Operating System.

5. Contents

Unit No.	Unit Name	Topics	Learning Outcomes	% Weightage	Hours
1	**Introduction**	1.1 Basics of Operating System • Definition • Need of Operating System • Functions of Operating System • Operating Services 1.2 Operating systems Types • Batch Operating System • Multi Processing Operating System • Time-Sharing Operating System • Real-Time Operating System • Distributed Operating System • Network Operating System • Mobile Operating System	• To understand what is Operating System, what are the needs of an Operating System, which are the functions of the Operating System and which are the services of the Operating System. • To understand Batch Operating System, Multi Processing Operating System, Time- Sharing Operating System, Real- Time Operating System, Distributed Operating System, Network Operating System and how Mobile Operating System works	20	08
2	**Process Management**	2.1 Process • Process model overview • Programmers view of Process • Process & Program • Process States • Process Control Block 2.2 Scheduling and Scheduler • Scheduling Criteria • First Come First Serve • Round Robin • Shortest Job First • SRTN • Types of Scheduler 2.3 Inter-Process	• To understand the basic concept of process management, how process states work, what is program and process and where the process is executed using process Control Block. • To understand scheduling criteria using different types of scheduling algorithms and types of scheduler. • To understand how processes communicate with	25	10

		Communication & Synchronization • Race condition • Mutual Exclusion. • Semaphore 2.4 Deadlock • Deadlock Conditions • Prevention • Avoidance	each other, Race condition , Mutual Exclusion and Semaphore. • To understand how deadlock occurs and deadlock conditions. • To learn prevention and avoidance of deadlock.		
3	**Memory Management**	3.1 Memory Management • Memory Management • Logical and Physical address 3.2 Memory Allocation • Contiguous Allocation Fixed & Variable partition • External & Internal Fragmentation • Compacting • Swapping, Relocation, Protection, and Sharing • Non-Contiguous Allocation • Paging • Translate look-aside buffer • Inverse page table • Multi-level pages • Demand paging • Segmentation • Virtual Memory	• To understand the basic concept of memory, how to manage the memory and what is logical and physical address using memory management. • To understand techniques of memory allocation methods along with their examples, fragmentation and how to swap memory between logical address to a physical address, relocation, protection and sharing of memory. • To understand non-contiguous memory methods.	20	08
4	**File Management**	4.1 File Management • File concept, Access methods • File types • File operations • Directory structure • File System 4.2 File Allocation methods • (Contiguous, Linked, Indexed) • Security and Protection mechanism	• To understand the basic concept of file, methods used in file, file types, file opertions, file system and what is directory structure and how it works in file. • To understand file allocation methods along with example.	15	08

5	**Linux Operating System Basics**	5.1 Linux Basics • Overview of Linux • Installation 5.2 Introduction to shell commands • pwd, cd, mkdir, rmdir, ls, cat, cp, rm, mv, wc, split, cmp, diff, head, tail, grep, sort, apt-get install, apt-get remove; • Introduction to Editor "vi/vim/gedit" 5.3 Shell Script 5.4 Commands for administrations	• To understand what is Linux and installation of the Operating System. • To learn how to use shell commands in scripting. • To learn the use of some of the standard commands like vi, vim, gedit etc.	20	08
				Total Hours	**42**

6. List of Practicals / Exercises

The practical/exercises should be properly designed and implemented in an attempt to develop different types of skills so that students can acquire the competencies/program outcomes. Following is the list of practical exercises for guidance.

Sr. No.	Practicals / Exercises	Key Competency	Hours
1	Install & Configure Linux Operating System.	Configuration of Linux operating system	2
2	Test and Execute File Manipulation Linux commands.	File Manipulation commands of Linux	2
3	Test and Execute Directory Manipulation Linux commands.	Directory Manipulation commands of Linux	2
4	Test and Execute Filter Commands of Linux Commands	Filter Manipulation commands of Linux	2
5	Test and Execute Text Processing Linux Commands.	Processing commands of Linx	2
6	Test and Execute General Purpose Linux Commands.	General Purpose commands of Linux	2
7	Test commands related to File editing using Vi Editor.	Basics of Vi Editor	2
8	Create a shell script to print" Welcome".	The fundamental concept of shell script	
9	Create a shell script to read and display the content of a file.	File operation using shell script	2
10	Create a shell script to read from the command line.	Command-line using shell script	2
11	Create a shell script to append the content of one file to another.	File operation using shell script	2

12	Create a shell script to accept a string in lower case letters from a user, & convert it to upper case letters.	String operations using shell script	2
13	Create a shell script to find the numbers of characters, words & lines of a given input file. Create a Script to reverse a string and display it.	String operations using shell script	2
14	Create a Script to check a string is a palindrome.	Generate palindrome using shell script	2
15	Create a shell script using Administrator commands.	Implementation of Administrator commands	2

Total Hours 28

7. Suggested Specification Table for Evaluation Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	U %	App %	C %	E %	An %
1	Introduction	50	50	-	-	-	-
2	Process Management	25	25	35	-	5	10
3	Memory Management	25	25	40	-	5	5
4	File Management	25	25	40	-	5	5
5	Linux Operating System Basics	20	25	40	5	5	5

Legends: R: Remembering U: Understanding
App: Applying C: Creating
E: Evaluating An: Analyzing

8. Textbooks

1) Operating Systems: A Concept Based Approach, Dhananjay M. Dhamdhere, Latest Edition, McGraw Hill Education.
2) Operating System Concepts, by Avi Silberschatz, Peter Baer Galvin, Latest Edition, JOHN WILEY & SONS. INC.
3) Unix Concepts and Application, Sumitabha Das, Latest Edition,McGraw Hill Education.

9. Reference Books

1) Operating System Concepts, Silberschatz, Galvin, Latest Edition , JOHN WILEY & SONS. INC.
2) Modern Operating System, Andrew Tanenbaum, Latest Edition, Pearson Publication.
3) AS Tanenbaum, AS Woodhull, Operating Systems Design and Implementation, Latest Edition, Prentice Hall.

10.Open Sources (Website, Video, Movie)

1) https://nptel.ac.in/courses/106/108/106108101/
2) www.freeos.com/guides/lsst
3) https://www.guru99.com/os-tutorial.html
4) https://www.geeksforgeeks.org/operating-systems/