



Course Syllabus
Gyanmanjari Diploma Engineering College
Semester-4 (Diploma)

Subject: Operating System-DETCE14207

Type of course: Major (Core)

Prerequisite: Working experience of any one structured programming language, Basic knowledge of computer architecture.

Rationale:

An operating system is the core software of any computer system. This is the basic software or platform on which other software work. Every student of computer science and IT must therefore understand basic structure of an operating system. After learning this subject student will be able to discriminate between various types of operating systems, its processor, processes, and memory and file management. The subject also emphasis on Linux utilities and scripting.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
4	0	2	5	60	30	10	20	30	150

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; SEE - Semester End Evaluation; MSE- Mid Semester Examination; LWA - Lab Work Assessment; V – Viva voce; CCE- Continuous and Comprehensive Evaluation; ALA- Active Learning Activities.



Course Content:

Sr. No	Course content	Hrs	% Weightage
1	Operating System Concepts Need of operating system, Evolution of operating system, Types Operating systems: Batch, Multi programming, Time Sharing, Real Time, Multitasking, Multithreading, Operating System Services, Case study: Linux, Windows 7.	09	15%
2	Process & Process Management Process and Process management, Programmers view of process, Process Life Cycle/ Process States, Process Control block, Process Scheduling, Process Scheduling Queues, Schedulers, Context Switch, Scheduling algorithms, First-Come, First-Served (FCFS) Scheduling, Shortest Job First (SJF), Round Robin(RR) Scheduling, Priority Scheduling, Multiple-Level Queues Scheduling, Inter Process Communication, Race Conditions, Critical Section, Mutual Exclusion, Deadlock, Necessary Conditions for Deadlock, Methods of Handling Deadlocks in Operating System.	18	30%
3	Memory Management Memory management, Contiguous allocation, Single contiguous memory management schemes, Multiple Partitioning, Fixed Partitioning, Dynamic Partitioning, Non contiguous allocation, Paging, Segmentation, Virtual Memory.	14	25%
4	File Management File management, User- view Vs. System view, File Naming, File Attributes, File Operations, File Structure, Directory structure, Disk Organization, Physical structure, Logical structure, Security and Protection mechanism.	10	15%
5	Linux Basics Overview of Linux, Installation, Introduction to Linux shell basic and shell commands, Directory Related Commands: pwd , cd, mkdir, rmdir, File related Command : cat, cp, rm, mv, ls, chmod, wc, diff, cmp, shell scripts.	09	15%



Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	Comparative Analysis of Processor Generations: Comparing two CPU generations (for example, AMD Ryzen 3000 vs. 5000 series or Intel i5 8th Gen vs. 11th Gen) based on important factors including clock speed, cores/threads, cache size, power consumption, manufacturing technology, and integrated graphics is an active learning exercise. Make a table of comparisons and write a 300-word analysis that explains which generation is more appropriate for particular uses, such as productivity or gaming. Each student have to submit their comparison table, analysis report, and references on GMIU web portal.	10
2	Exploring CPU Scheduling Algorithms with an Online Simulator: Use an online OS simulator to study CPU scheduling methods such as FCFS, SJF, Priority Scheduling, and Round Robin. Simulate each algorithm, build a process queue with different arrival and burst timings, and compare metrics such as Average Waiting Time (AWT) and Turnaround Time (ATT). Examine the top-performing algorithm, the effect of Round Robin's time quantum, and the variables affecting scheduling decisions to assist students in interactively grasping choices and algorithm efficiency. Each student have to upload screenshots of the simulation results which upload on the GMIU web portal.	10
3	Exploring the Rise of Storage Solutions Students will explore the evolution of storage devices, from early technologies like floppy disks to modern solutions like solid-state drives (SSDs), examining their impact on computing, data management, and the future of data storage. By analyzing the progression of storage technologies, speed, capacity, durability, and reliability, and how these changes have shaped modern computing systems. Each student have to submit their comparison table, analysis report, and references on GMIU web portal.	10
Total		30

Suggested Specification table with Marks (Theory): 60

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage %	35%	45%	20%	0	0	0



Course Outcome:

After learning the course the students should be able to:

CO1	Analyze the structure of OS and basic architectural components involved in OS design.
CO2	Compare and contrast various CPU scheduling algorithms.
CO3	Implement various algorithms for memory management.
CO4	Understand File Management, Disk mechanism and security aspects of operating system.
CO5	Demonstrate and apply different Linux Commands.

List of Practical:

Sr. No	Descriptions	Unit No	Hrs
1	Install & test different types of Operating System & compare its features.	1	2
2	Compare various process scheduling algorithms.	2	2
3	Test and run basic Unix commands.	5	2
4	Test and run Advanced Unix commands.	5	2
5	Test commands related with File editing with Vi, Vim, gedit, gcc.	5	2
6	Create a shell script to print "Hello".	5	2
7	Create a Shell script to read and display content of a file.	5	2
8	Create a Shell script to read from command line.	5	2
9	Create a Shell script to append content of one file to another.	5	2
10	Create a Shell script to accept a string in lower case letters from a user, & convert to upper case letters.	5	2
11	Create a Shell script to find numbers of characters, words & lines of a given input file.	5	2
12	Create a Script to reverse a string and display it.	5	2
13	Create a Script to check a string is palindrome.	5	2
14	Create a Shell script to add two numbers.	5	2
15	Create a shell script to reverse the digits of a given 5-digit number. (For eg. If the no. is 57429 then answer is 92475).	5	2
Total			30



Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory.

The internal evaluation will be done on the basis of Active Learning Assignment.

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

- [1] Modern Operating Systems by Andrew S. Tanenbaum and Herbert Bos.
- [2] Operating System Concepts by Abraham Silberschatz, Peter B. Galvin, and Greg Gagne.
- [3] Operating Systems: Internals and Design Principles by William Stallings.
- [4] Operating Systems: Three Easy Pieces by Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau.



