

COMMON POOL OF GENERIC ELECTIVES (GE) COURSES

(For all the Generic Elective courses offered by your department, please put it in the format provided below)

GENERIC ELECTIVES (GE-5a): Operating Systems

Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
GE-5a Operating Systems	4	3	0	1	Pass in Class XII	Knowledge of Programming in C/C++/Java/Python at class XII level or above

Learning Objectives

The course introduces Operating System and its importance in computer systems. The focus is to explain the common services provided by an operating system like process management, memory (primary, secondary & virtual) management, I/O management, file management. The course talks about the various functional components of the operating and their design.

Learning outcomes

On successful completion of the course, students will be able to gain knowledge of different concepts of the operating System and its components. They would learn about shell scripts and would be able to use the system in an efficient manner.

SYLLABUS OF GE-5a

Unit 1 (5 hours)

Introduction: Operating Systems (OS) definition and its purpose, Multiprogrammed and Time-Sharing Systems, OS Structure, OS Operations: Dual and Multi-mode, OS as resource manager.

Unit 2 (6 hours)

Operating System Structures: OS Services, System Calls: Process Control, File Management, Device Management, and Information Maintenance, Inter-process Communication, and Protection, System programs, OS structure- Simple, Layered, Microkernel, and Modular.

Unit 3 (10 hours)

Process Management: Process Concept, States. Process Control Block, Context Switch, Process scheduling, Schedulers, Overview of threads and Scheduling Algorithms: First Come First Served, Shortest-Job-First, Priority & Round-Robin.

Unit 4 (10 hours)

Memory Management: Physical and Logical address space, Swapping Contiguous memory allocation strategies - fixed and variable partitions, Segmentation, Paging, virtual memory: Demand Paging.

Unit 5 (8 hours)

File and Input / Output Device Management: File Concepts, File Attributes, File Access Methods, Directory Structure: Single-Level, Two-Level, Tree-Structured, and Acyclic-Graph Directories, Magnetic Disks, Solid-State Disks, Magnetic Tapes.

Unit 6 (6 hours)

Shell Scripting: Shell variables, parameter passing conditional statements, iterative statements, writing and executing shell scripts, utility programs (cut, paste, grep, echo, pipe, filter etc.)

Essential/recommended readings

1. Galvin, S. P. B., Gagne, G., *Operating System Concepts*, 9th edition, John Wiley Publications, 2016.
2. G. Nutt, *Operating Systems*, Pearson, 2009

Additional References

1. Dhamdhere, D. M., *Operating Systems: A Concept-based Approach*, 2nd edition, Tata McGraw-Hill Education, 2017.
2. Kernighan, B. W., Pike, R., *The Unix Programming Environment*, Englewood Cliffs, NJ: Prentice-Hall, 1984.
3. Stallings, W., *Operating Systems: Internals and Design Principles*, 9th edition, Pearson Education, 2018.
4. Tanenbaum, A. S., *Modern Operating Systems*. 3rd edition. Pearson Education, 2007.

Suggested Practical List : (30 Hours)

Practical exercises such as

1. Usage of following commands: ls, pwd, cat, who, rm, mkdir, rmdir, cd.

2. Usage of following commands: cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands: chmod, grep, bc.
4. Write a shell script to display date in the mm/dd/yy format.
5. Write a shell script to display the multiplication table any number.
6. Write a shell script to find the factorial of a given number.
7. Program to show the pyramid of special character “*”.
8. Write a shell script to find the sum of digits of a given number.
9. Write a shell script to perform the tasks of basic calculator.
10. Write a shell script to find the power of a given number.
11. Write a shell script to check whether the number is Armstrong or not.
12. Write a shell script to find the GCD (greatest common divisor) of two numbers.
13. Write a shell script to check if the number entered at the command line is prime or not.
14. Write a shell script to display on the screen sorted output of “who” command along with the total number of users.
15. Write a shell script to accept a login name. If not a valid login name display message – “Entered login name is invalid”.
16. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
17. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
18. Write a shell script to check whether the file have all the permissions or not.
19. Write a shell script to modify “cal” command to display calendars of the specified months.
20. Write a shell script to modify “cal” command to display calendars of the specified range of months.

GENERIC ELECTIVES (GE-5b): Advanced Web Programming

Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
GE5b: Advanced Web Programming	4	3	0	1	Pass in Class XII	Knowledge of HTML, CSS

Learning Objectives

The course aims to familiarize the students with the concepts and techniques of server side web programming. This will enable the students to create dynamically generated web pages using HTML, PHP, MySQL and JQuery.