Devi Ahilya University, Indore, India Institute of Engineering & Technology				**III Year B.E. (Information Technology)**			
Subject Code & Name	**Instructions Hours per Week**			**Credits**			
ITR5E2	**L**	**T**	**P**	**L**	**T**	**P**	**Total**
Unix and Shell Programming	**3**	**1**	**2**	**3**	**1**	**1**	**5**
Duration of Theory Paper: 3 Hours							

Learning Objectives:
The student will have ability to:

- Understand the UNIX operating system and its memory management, input/output processing, internal and external commands.
- Learn the File Systems and Process Management of UNIX.
- Learn and explore the use of operating system utilities such as text editors.
- Understand Shell Scripting and Shell Programming.

Prerequisites: Basic knowledge of Operating System concepts along with DOS (Disk Operating System) is essential. Fundamentals of Programming language is helpful.

COURSE CONTENTS

UNIT–I
Overview of UNIX: What is UNIX Operating System? Architecture, Kernel & Shell, Installation Process, Features, Internal And External Commands, Basic Commands: cal, date, echo, bc, script, passwd, PATH, who, uname, pwd, cd, mkdir, rmdir etc. Command Structure, Shell Script & Shell Programming, UNIX Server.

UNIT–II
File System: Definition of File System, Boot Block, Super Block, Inode. File creations and its related commands cat, cp, rm, mv, more, file, ls, wc, pg, cmp, comm, diff. Zipping & unzipping files, gzip, tar, zip, df, du, mount, umount, etc. The vi editor. File Permissions with chgrp & chmod. **Process Control:** Viewing a Process, Command to display Process, Process Attributes, Process States, Process Fields, ps Commands options, Handling Jobs, Foreground & Background Jobs.

UNIT–III
Redirection & Pipes: Standard I/O Streams, Redirection & Pipes, Command Execution, Command-Line Editing, Quotes. **Filters:** Filters, Concatenating, Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Ordering a File. **Regular Expressions:** Atoms, operators, grep, sed, awk etc.

UNIT–IV
System Security: Physical Security, Boot level security (GRUB), Controlling System Access, Restricted Shells, File Access Commands, Access Control List(ACLs), Restricting Root Access, Monitoring & Securing Super User Access.

UNIT–V

Shell Scripting: Introduction to Shell, Types of Shell, C shell features, **writing first script writing script, Executing & Debugging script. Shell Programming:** Shell variables, Output, Input, exit Status of a Command, Branching Control Structures, Loop-Control Structure, and Continue and break Statements, Expressions, Command Substitution, Command Line Arguments and Functions.

Learning Outcomes:

Upon completion of the subject, students will be able to:

1. Identify and use UNIX utilities to create and manage simple file processing operations,
2. Organize directory structures with appropriate security.
3. Effectively use the UNIX system.
4. Monitor system performance and lean the shell scripts.
5. Use the shell scripts in designing a programs for engineering problems.

Books Recommended:

1. Yashavant P. Kanetkar "**Unix Shell Programming",** BPB Publications.
2. Venkatesh Murthy, "Introduction to Unix &Shell", Pearson Edu.
3. Forouzan, "Unix & Shell Programming", Cengage Learning.
4. Sumitab Das,"Unix Concept & Application", TMH.
5. Venkateshwavle,"Linux Programming Tools Unveil`ed", BS Publication.
6. Richard Peterson,"Unix Complete Reference",TMH.

List of Practical Assignments:

1. Execution of various file/directory handling commands.
2. Simple shell script for basic arithmetic and logical calculations.
3. Shell scripts to check various attributes of files and directories.
4. Shell scripts to perform various operations on given strings.
5. Shell scripts to explore system variables such as PATH, HOME etc.
6. Shell scripts to check and list attributes of processes.
7. Execution of various system administrative commands.
8. Use seed instruction to process /etc/password file.
9. Write a shell script to display list of users currently logged in.
10. Write a shell script to delete all the temporary files.
11. Write a shell script to search an element from an array using binary searching.
12. Write script to print the message "Hello" on the Console.
13. Write script to perform following basic math operation as :
    i) Take input from keyboard
    ii) Take input as command line parameter
14. Write script to display current date, time, username and current directory.
15. Write shell script to show various system configurations like:
    a) Currently logged user and his long name
    b) Current shell
    c) Your home directory
    d) Your operating system type
