

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

COURSE CONTENT

LINUX INTERNALS LABORATORY **IV Semester: DS Course Code** Category Hours / Week Credits Maximum Marks SEE L Т Р С CIA Total ACDD13 Core 0 0 2 1 40 60 100 **Tutorial Classes: Nil Practical Classes: 45 Total Classes: 45 Contact Classes: Nil** Prerequisite: Programming for Problem Solving Laboratory

I. COURSE OVERVIEW:

This course aims to provide a well-rounded introduction to Linux, operating systems, and software development in a Linux environment. Linux is the blend of innovative concepts required by its unique environment involving kernel concepts, basic commands, shell scripting, file processing, socket programming, processes and Inter process communication (IPC). This course equip individuals with the knowledge and skills needed to work effectively in a Linux-based environment, software development, system administration and security awareness.

II. COURSES OBJECTIVES:

The students will try to learn

- I. The fundamental concepts of operating system including bourne shell (bash) with the Linux command line environment.
- II. The shell programming using arithmetic operations, control structures and functions in shell scripts in vi editor.
- III. The process management and inter-process communication used for exchanging data between multiple threads in one or more processes.

III.COURSE OUTCOMES:

At the end of the course students should be able to:

- CO 1 Demonstrate text processing utilities, file handling utilities, security by file permissions, process utilities, disk utilities and networking commands with different options available for solving problems.
- CO 2 Make use of bourne shell constructs, decision structures and loops in designing programs for complex problems.
- CO 3 Interpret to write, compile, debug and run C language program in Linux shell environment for implementing kernel level concepts.
- CO 4 Identify basic methods and techniques used in solving simple programming tasks in the area of execution environment, processes signals and threads.
- CO 5 Experiment with IPC mechanisms such as pipes, named pipes, shared memory, message queues, semaphores and sockets for inter-process communication.
- CO 6 Choose the appropriate protocol such as TCP or UDP for effective communication in client-server applications.

IV. COURSE CONTENT:

WEEK 1: Basic Exercises on Linux:

- 1. Help and man pages
- 2. Useful Commands/Utilities
- 3. Pipe and Input/output Redirection

WEEK 2: Basic Exercises on Files in Linux:

- 1. File Handling Utilities
- 2. File/Directory Ownerships and Permissions
- 3. Disk utilities

WEEK 3: Exercises on Process, Text, network and backup utilities-I

- 1. System and Application Software Directories
- 2. Processes utilities
- 3. Text Processing Utilities head:

WEEK 4: Exercises on Process, Text, network and backup utilities-II

- 1. Hard Links and Symbolic Links
- 2. Network Utilities
- 3. Tape Archive (tar) and ZIP Compression (gzip, bzip2)

WEEK 5: Exercises on Shell Programming-I

- 1. Displaying files
- 2. moving files
- 3. displaying logged in users

WEEK 6: Exercises on Shell Programming-I

- 1. Wishing user based on time
- 2. Searching for specified word
- 3. Displaying between lines

WEEK 7: Exercises on Shell Programming (Input, Decision and Loop)-I

- 1. Add2Integer (Input)
- 2. SumProductMinMax3 (Arithmetic & Min/Max)
- 3. Income Tax Calculator (Decision)
- 4. Pension Contribution Calculator with Sentinel (Decision & Loop)

WEEK 8: Exercises on Shell Programming (Input, Decision and Loop)-II

- 1. Sales Tax Calculator (Decision & Loop)
- 2. Reverse Int (Loop with Modulus/Divide)
- 3. Amicable Numbers
- 4. Capricorn Number

WEEK 9: Exercises on Simulating commands - I

- 1. Simulating CAT Command
- 2. Simulating CP Command
- 3. Simulating RM Command
- 4. Simulating LS Command

WEEK 10: Exercises on Simulating commands - II

- 1. Simulating Head Command
- 2. Simulating Tail Command

WEEK 11: Exercises on Simulating commands - III

- 1. Simulation of MV Command
- 2. Simulation of NL Command

WEEK 12: Exercises on Signal Handling

- 1. Signal handler function with SIGINT
- 2. Signal handler function with SIGDFL
- 3. Signal handler function with SIGKILL

WEEK 13: Exercises on Inter Process Communication (IPC)

- 1. One-Way Communication Using Pipe
- 2. One-Way Communication Using FIFO Function

WEEK 14: Exercises on Message Queues

- 1. Storing Messages In Message Queues (Sender)
- 2. Retrieving Messages From Message Queues (Receiver)

Additional Exercises Exercises on Shared Memory

1. Sharing Memory Segment Between Processes

Additional Exercises on Socket Programming

- 1. Echo Client Server Program using TCP elementary functions
- 2. Client Server Program using UDP elementary functions

V. TEXT BOOKS:

- 1. Sumitabha Das, "Your Unix The Ultimate Guide", Tata McGraw-Hill, New Delhi, India, 2007.
- 2. B. A. Forouzan and R. F. Gilberg, "Unix and Shell Programming", Cengage Learning.

VI. REFERENCE BOOKS:

- 1. Robert Love, "Linux System Programming", O'Reilly, SPD.
- 2. Stephen G. Kochan, Patrick Wood, "*Unix Shell Programming*", Sams publications, 3rd Edition, 2007.
- 3. T. Chan, "Unix System Programming using C++", Prentice Hall India, 1999.

VII.WEB REFERENCES:

- 1. http://spoken-tutorial.org/tutorialsearch/?search_foss=Linux&search_language=English
- 2. https://www.redhat.com/en/files/resources/en-rhel-whats-new-in-rhel-712030417.pdf
- 3. http:// www.tutorialspoint.com/unix/
- 4. http://cse09-iiith.virtual-labs.ac.in

VIII. MATERIALS ONLINE

- 1. Course Template
- 2. Lab Manual