Suggested Teaching Guidelines for

Linux Shell Scripting & Python PG-DVLSI March-2024

Duration: 24 class room hours + 36 Lab hours

Objective: To introduce Linux environment and hands-on Shell programming

Prerequisites: Knowledge of Computer Fundamentals

Evaluation method: CCEE Theory exam– 40% weightage
Lab exam – 40% weightage
Internal exam – 20% weightage

List of Books / Other training material

1. Unix Concept and Application – Sumitabha Das 4th Edition

Reference:
1. Beginning Unix – Joe Marilino (Wrox Publication)
2. Linux Command Line And Shell Scripting Bible – Blum (Wiley – India)
3. Programming and Problem solving with Python- Ashok Namdev Kamthane and Amit Ashok Kamthane (Mc Graw Hill Education)

Session 1
Lecture: Linux Basics
- Introduction to Linux
  - History
  - Overview
  - Additional Features of Linux
- Getting Started to Linux
  - **Basic Commands**
  (ls, cp, mv, sort, grep, cat,head,tail, man, locate, find, diff, file, rm, mkdir, rmdir, cd, pwd, ln and ln –s, gzip and gunzip, zip and unzip, tar an its variants, touch, echo, who, whoami, ps, kill,makefile,etc.)

Assignment – Lab:
Getting Acquainted with the Linux Environment
Use various commands in Linux system.

Session 2
Lecture: Gaining confidence with Linux
- Access control list and chmod command
- chown and chgrp commands
- Commands like telnet, ftp, ssh, and sftp
- Basic of I/O system with ***mount*** *and* ***unmount.***
 vi editior
- Features and different modes of vi editor
- Editing using vi editor
- Find and replace commands
- cut-copy-paste commands
- The set command

- Other related commands of vi

Assignment – Lab:
Review Exercises

Session 3
Lecture: Linux shell programming - 1
- Introduction to Shells
  a. What is shell?
  b. Different types of Linux shells
  c. Bourne Again Shell (BASH)
  d. Shell variables (environment and user defined)
  e. Shell files (.bashrc, .profile, .bash_profile, .bash_logout)
  f. Positional parameters
- Get start with simple scripts (User variable, expr, multiple command)
- Wild cards (* and ?)
- Command line arguments
- Arithmetic in shell scripts

Assignment – Lab:
Review Exercises

Session 4
Lecture: Linux shell programming - 2
- Read and echo commands in shell scripts
- The tput command
- Taking decisions:
  o if-then-fi
  o if-then-else-fi
  o The test command (file tests, string tests)
  o Nested if-elses
  o The case control structure

Assignment – Lab:
Review Exercises

Session 5 & 6
Lecture: Linux shell programming - 3
- The loop control structure
  o The while, until and for loop structures
  o The break and continue statements
- Shell metacharacters
- Command line expansion
- Directory stacks manipulation
- Job control, history and processes
- Builtins and functions
- Shell Files

Assignment – Lab:
Review Exercises

Session 7
Lecture: Tool Command Language (TCL)

- TCL basics
    - Scripts,command and words
    - Evaluating a command
    - Variable,command and backslash substitutions
    - Quoting and comments
- Variables
- Expressions
    - Operators
    - Substitutions
- Control flow
- Control structure

Assignment – Lab:

- Write a TCL script to display "Hello World" on console.
- Use TCL commands to
    - Find the length of a string
    - return a list comprising of all the arguments specified.
    - change the value of a global variable from inside a procedure's scope
    - Replaces a value with a given value
- Create a TCL script to check whether the given string is a palindrome or not.
- Write TCL script to convert between character and its ASCII value.
- Write TCL script to generate random number.
- Write TCL script to arrange numbers in ascending/descending order.
- Write TCL script to display the given string in reverse order.

Session 8:
Lecture: Introduction to Python

- What is Python?
- Python Scripts
- Print function
- Literals
- Quoting rules in Python (Single, double, triple)
- Arithmetic and Assignment operators
- Comparison and Logical operators
- Identity, membership and Bitwise operators

Assignment – Lab:

- Review Exercises

Session 9:
Lecture: Flow Control

- If, elif, else

- For loop, while loop
- break
- continue
- pass

Assignment – Lab:
- Review Exercises

Session 10:
Lecture: Basics of Python Programming
- Numbers and String
- Lists and Tuples
- Dictionary
- Sets
- Standard I/O operations (file handling)

Assignment – Lab:
Review Exercises

Session 11:
Lecture: Python functions Regular Expression
- Introduction to function
- Parameters and arguments in function
- Introduction to Regex
- Regex module
- Regex functions
- Meta characters
- Special sequences
- SETS
- Pattern matching

Assignment – Lab:
- Review Exercises

Session 12:

Lecture: Object-Oriented Programming: Class, Objects and Inheritance
- Introduction
- Defining class
- Creating an object
- Self-parameters and adding method to a class
- Constructor (__init__) method
- Inheritance

Assignment – Lab:
- Review Exercises