

## Academic Year 2022-2023 Odd Semester

**Degree, Semester & Branch:** B.Tech INFORMATION TECHNOLOGY

**Subject code & Name :** JIT1019 Free and Open Source Software

**Name of the Faculty member (s):** Ms.K.Pushpavalli

### Innovative Practice Description

- **Unit / Topic:** Unit III / Shell Programing
- **Course Outcome:** CO3
- **Topic Learning Outcome:** TLO3
- **Activity Chosen:** Learning by Teaching
- **Justification:**
  - Learning by teaching helps to improve understanding of shell scripting, develop practical skills, and can apply these skills in real-world scenarios
  - The combination of lectures, hands-on practice, and continuous assessment helps solidify their learning and prepares them for careers in system administration, development, and beyond..
- **Time Allotted for the Activity:** 30 Minutes
- **Details of the Implementation:**

#### **: Introduction to Shell and Basic Commands**

- **Topics:** Overview of shell, types of shells (Bash, Zsh, etc.), basic shell commands (ls, cd, pwd, etc.)
- **Activities:**
  - **Lecture:** Introduction to the shell environment, basic commands, and navigation.
  - **Hands-On Practice:** Students practice using basic commands in the terminal.
- **Assignments:**
  - **Exercise:** Write a script to navigate the file system and list directory contents.
  - **Quiz:** Basic shell command quiz.

#### **Shell Scripting Basics**

- **Topics:** Creating and running shell scripts, script structure, variables, comments
- **Activities:**
  - **Lecture:** Basics of writing shell scripts, declaring and using variables, adding comments.
  - **Lab Exercises:** Write simple scripts to perform tasks like displaying messages and arithmetic operations.
- **Assignments:**
  - **Script:** Write a script to automate a basic task, such as file backup.
  - **Quiz:** Basic scripting elements quiz.

## Control Structures

- **Topics:** Conditional statements (if, else, elif), loops (for, while, until)
- **Activities:**
  - **Lecture:** Overview of control structures and their syntax.
  - **Practice Exercises:** Implementing conditional statements and loops in scripts.
- **Assignments:**
  - **Script:** Write a script using loops and conditionals to process a list of files.
  - **Quiz:** Control structures quiz.

## Functions and Error Handling

- **Topics:** Defining and using functions, passing arguments, error handling, and debugging
- **Activities:**
  - **Lecture:** Creating and using functions in scripts, passing arguments to functions, basic error handling techniques.
  - **Lab Exercises:** Write scripts with functions and implement error handling.
- **Assignments:**
  - **Script:** Write a script with functions to perform a complex task, such as user management.
  - **Quiz:** Functions and error handling quiz.

## Advanced Scripting Techniques

- **Topics:** String manipulation, arrays, regular expressions, file I/O
- **Activities:**
  - **Lecture:** Techniques for manipulating strings, using arrays, regular expressions for pattern matching, and file input/output operations.
  - **Hands-On Practice:** Implement advanced techniques in scripts.
- **Assignments:**
  - **Script:** Write a script that processes and analyzes log files using regular expressions.
  - **Quiz:** Advanced scripting techniques quiz.

## Working with External Commands and Utilities

- **Topics:** Using external commands (grep, awk, sed), piping and redirection
- **Activities:**
  - **Lecture:** Integrating external commands and utilities into scripts, using pipes and redirection.
  - **Lab Exercises:** Practice using commands like grep, awk, and sed in scripts.
- **Assignments:**
  - **Script:** Write a script that combines multiple utilities to perform data extraction and reporting.
  - **Quiz:** External commands and utilities quiz.

## Scripting for System Administration

- **Topics:** Automating system tasks, cron jobs, system monitoring scripts
- **Activities:**
  - **Lecture:** Techniques for automating system administration tasks, scheduling jobs with cron, writing system monitoring scripts.
  - **Practice Exercises:** Develop scripts for system administration tasks.
- **Assignments:**
  - **Script:** Write a script to monitor system performance and send alerts.
  - **Quiz:** System administration scripting quiz.

## Final Project and Presentation

- **Activities:**
  - **Project Work:** Students work on a comprehensive scripting project that solves a real-world problem.
  - **Presentations:** Prepare and deliver a presentation on the project.

- **Assignments:**
  - **Final Project:** Develop and document a comprehensive script, submit code and documentation.
  - **Presentation:** Present the project to the class and participate in peer reviews.

### 3. Tools and Resources

- **Development Environment:** Unix/Linux-based systems, virtual machines, or WSL (Windows Subsystem for Linux)
- **Text Editors:** Vim, Nano, VS Code, or any preferred text editor
- **Reference Materials:** Shell scripting books, online tutorials, man pages, and official documentation
- **Version Control:** Git for version control and collaboration

### 4. Evaluation and Feedback

- **Continuous Assessment:** Weekly quizzes, lab exercises, and assignments
- **Peer Reviews:** Students review each other's scripts to provide feedback and suggestions
- **Final Project:** Comprehensive scripting project with documentation and presentation
- **Instructor Feedback:** Regular feedback on assignments and project progress

### 5. Support and Collaboration

- **Discussion Forums:** Online forums for students to discuss topics and collaborate on assignments
- **Office Hours:** Regular office hours for one-on-one support with the instructor
- **Group Activities:** Encourage teamwork and collaboration through group projects and pair programming exercises

## Conclusion

Implementing a course on shell programming with this structured approach ensures that students gain a thorough understanding of shell scripting, develop practical skills, and can apply these skills in real-world scenarios. The combination of lectures, hands-on practice, and continuous assessment helps solidify their learning and prepares them for careers in system administration, development, and beyond.

40

- **CO – PO / PSO mapping:**

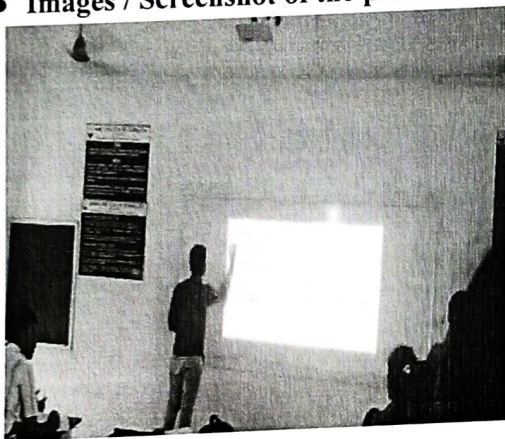
| CO  | PO1 | PO2 | PO3 | PO9 | PO10 | PO12 |
|-----|-----|-----|-----|-----|------|------|
| CO2 | 2   | 1   | 1   | 1   | 1    | 1    |

- **PO / PSO mapped:**

(1 – Low      2 – Moderate      3 – High)

| Innovative practice                  | PO1   | PO2  | PO3   | PO9  | PO10   | PO12  |
|--------------------------------------|---|--|---|--|--|---|
| <b>Justification for correlation</b> | It makes the student to learn beyond the class room delivery and helps to explore a lot | Students will be able to design an attractive webpage using Background and Borders | Students will be able to provide solutions to the complex problem by dividing into sub problems using | As the student is taking the class, her/his individuality can be improved. It leads to peer- | Students communication skill will be improved as they are facing the audience and teaching the | The teaching and self learning skill earned through this activity helps the students in |
|                                      |   | according to the problem   | function concept  | to-peer learning   | concepts   | knowing and solving various problems  |

● **Images / Screenshot of the practice:**



**Fig 1: Learning by teaching activity**

● **Reflective Critique:**

❖ **Feedback of practice from students and other stakeholders:**

- Easy to understand the topic as it was taught by their classmate.
- Very comfortable to ask doubts while teaching.
- The student who took the class said it helps in improving self learning skills.

❖ **Benefit of the practice:**

- As the student involves in teaching the new topic, it improves the technical knowledge, confidence, communication.
- Peer to peer learning activity makes the students to get good wrapo
- The students can share their gained knowledge.

❖ **Challenges faced in implementation:**

- As the activity involves only one student, unable to persuade all students to engage in self learning.
- As it involves oral communication, unable to test the writing capacity of the students
- Team activity and team assessment was difficult.

● **References:**

- [https://en.wikipedia.org/wiki/Learning\\_by\\_teaching](https://en.wikipedia.org/wiki/Learning_by_teaching)
- <https://digest.bps.org.uk/2018/05/04/learning-by-teaching-others-is-extremely-effective-a-new-study-tested-a-key-reason-why/>
- <https://vikaspedia.in/education/teachers-corner/teaching-and-learning>

**Signature of Faculty Member**

  
HOD

**Dr. K. SUNDARAMOORTHY**  
Professor & HOD  
Department of Information Technology  
Jerusalem College of Engineering (Autonomous)  
Pallikaranai, Chennai-600 100.

