CSC104:IT FUNDAMENTALS

L:2 T:0 P:2 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: Understand core components and architecture of Windows OS for effective system navigation, monitoring, and configuration.

CO2 :: Apply user and network management with Windows security tools and native enumeration techniques.

CO3 :: Develop and debug Bash scripts for automation, system administration, and cloud-related tasks.

CO4 :: Apply advanced Bash scripting to automate real-world cybersecurity operations and DevOps workflows.

CO5 :: Create PowerShell scripts for managing Windows environments, system tasks, and administrative automation

CO6 :: Utilize advanced PowerShell features for secure automation, user management, Active Directory tasks, and system monitoring

Unit I

Windows Operating System Fundamentals and Architecture : Introduction to the Windows operating system,, Windows editions and versions, user interface and system navigation,, file system hierarchy (NTFS, FAT32), system folders, and environment variables., Overview of Windows architecture: kernel, services, and drivers, Task Manager and Resource Monitor usage,, managing processes, threads, and memory., Understanding Windows Registry structure, hives, and keys., Introduction to command-line tools (CMD, PowerShell),, system information commands, and system logs via Event Viewer.

Unit II

Windows Security, User Management, and Networking: : User accounts and group management, authentication methods, permissions and access control (ACLs, NTFS permissions), built-in security tools (Windows Defender, UAC, Firewall)., Windows networking basics: IP configuration, DNS, DHCP, NetBIOS, SMB protocol. Shared resources management, remote access tools (RDP, PsExec), and Windows administrative tools (MMC, Services.msc, Group Policy Editor)., Introduction to Windows Event Logs for incident analysis, basic audit policies, scheduled tasks, and startup items. Basic enumeration and reconnaissance using native tools (whoami, netstat, ipconfig, tasklist).

Unit III

Bash Scripting Fundamentals: : Introduction to Bash scripting, structure, Hello World, variables, user input, comments, arguments, arrays, string slicing, Conditional expressions (file, string, arithmetic), exit status, if-else, switch-case, loops (for, while, until), break, continue, functions, debugging, shortcuts, custom commands, persistent changes, aliases, and basic script creation.

Unit IV

Advanced Bash Scripting & Automation: : Multi-function scripting, interactive menu with colors, remote script execution, working with JSON via jq, Cloudflare API integration,, access log summarizer, sending emails with SSMTP, password generator, pipes vs redirection, and automated WordPress setup on LAMP stack.

Unit V

PowerShell Basics and Core Concepts: : Introduction to PowerShell, console and ISE usage, writing scripts, variables, user input, comments, cmdlets, pipelines, operators,, conditional statements (if, else, switch), loops (for, foreach, while, do),, arrays, hashtables, functions, scoping, basic error handling, working with help, profiles, and script files.

Unit VI

Advanced PowerShell and Automation: : Modules, file handling (CSV, JSON, XML), menus, prompts, system tasks (services, processes, registry, tasks),, Active Directory, PowerShell Remoting, jobs, scheduled tasks, advanced functions with validation,, GUI scripting, automation scripts for user management, logs, system monitoring, and deployment tasks.

List of Practicals / Experiments:

Practical's

- 1.Explore Windows OS Structure and Navigation
- 2. Monitor System Resources and Work with the Registry
- 3.Use Command-Line Tools and Event Viewer for System Analysis
- 4.Manage Users, Groups, and Permissions
- 5.Configure Windows Firewall and Defender
- 6.Perform Network Configuration and Reconnaissance
- 7.Create a Basic Bash Script
- 8.Automate Disk Usage Monitoring with Bash
- 9.Integrate Bash with Public APIs and JSON
- 10.Automate WordPress Setup Using Bash
- 11.Write a PowerShell Script for System Information
- 12.Automate User Management and Task Scheduling in PowerShell

References:

1. MICROSOFT WINDOWS SECURITY ESSENTIALS by MICROSOFT WINDOWS SECURITY ESSENTIALS, SYBEX

2. THE LINUX COMMAND LINE (2ND EDITION) by WILLIAM E. SHOTTS, NO STARCH PRESS

3. POWERSHELL IN DEPTH (2ND EDITION) by DON JONES, RICHARD SIDDAWAY, JEFFREY HICKS, Manning Publication

4. LEARN WINDOWS POWERSHELL IN A MONTH OF LUNCHES by DON JONES & JEFFREY HICKS, Manning Publication