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THE GEEK INSTITUTE Regd. By: E-Max India **OF CYBER SECURITY**

Centre Code: EMAX/EK80606 (Recognized By Govt. Of India)

(Building Futures Through Digital Knowledge and Innovation)

BASH Scripting (1 Month)

Syllabus

Cyttabus	
01: Introduction to Linux & Shell	06: Looping Constructs
What is a shell? What is BASH?	✓ for loops (C-style and item-style)
✓ Types of Linux shells (Bash, Zsh, Sh, etc.)	 while and until loops
 Introduction to the Linux terminal 	✓ Loop control: break, continue, exit
\checkmark File system hierarchy and basic navigation	✓ Reading files line-by-line in a loop
✓ Essential Linux commands (ls, cd, cp, mv, rm,	 Nested loops with conditions
mkdir, etc.)	07: Functions in BASH
 File permissions and ownership (chmod, chown, umask) 	✓ Creating and calling functions
02: Getting Started with BASH Scripting	✓ Local vs global variables
✓ What is a shell script?	✓ Returning values from functions
 Creating and running your first script (.sh file) 	✓ Modular script design using functions
✓ chmod +x, #!/bin/bash shebang explained	✓ Recursive functions in BASH
✓ Echoing text and output redirection (>, >>)	08: Working with Files and Directories
 ✓ Script file structure: comments, line endings, 	✓ File testing operators
execution flow	 Reading and writing text files
03: Variables and Data Types	✓ File manipulation and filtering using cut, awk, sed,
 Defining and using variables 	grep
 Environment vs user-defined variables 	 Piping and redirection
 Constants and readonly variables 	✓ Logging script output
 ✓ Command substitution using backticks and \$() 	09: Error Handling and Debugging
✓ Arithmetic operations using \$(())	✓ Exit status and \$?
 String manipulation and operations 	 Using trap for cleanup and signals (INT, EXIT)
04: User Input and Command Line Arguments	✓ Logging errors
✓ Reading user input using read	✓ Debugging scripts with set -x, set -e, set -u
✓ Positional parameters: \$0, \$1, \$2, \$@, \$#, \$*	 Best practices for error management
 Using getopts for flag-based input 	10: Scheduling and Automation
 Handling input validation and defaults 	 Introduction to cron jobs and crontab syntax
05: Conditional Statements	✓ Automating script execution on schedule
 ✓ if, else, elif statements 	 Writing scripts for backups, cleanups, log rotation, etc.

- ✓ [condition] vs [[condition]]
- ✓ String and numeric comparisons ✓ File condition checks (-f, -d, -e, -s, etc.)
- ✓ Nested conditionals

- Using at and sleep for timed execution
- Running scripts at system startup

11: Advanced Scripting Topics

- ✓ Arrays and associative arrays
- ✓ Working with case statements
- ✓ Using regular expressions in BASH
- ✓ File locking mechanisms
- Interacting with external commands and services
- Parallel execution with & and wait

12: System Administration Scripts

- Disk usage monitoring and alerts
- ✓ User and group management automation
- Service monitoring and log watching
- Network information and scanning using BASH
- ✓ Automating updates and software installation

13: Security and Permissions

- ✓ Avoiding common BASH scripting vulnerabilities
- Secure handling of input and variables
- ✓ Using sudo and understanding script privileges
- Restricting script access and usage
- ✓ Environment hardening practices for scripts

14: Practical Projects and Capstone

- **Project 1:** Automated backup script with logging and alerts
- **Project 2:** User management and system audit script
- **Project 3:** Log file monitoring and email alerts
- **Project 4:** Custom shell-based menu UI for Linux operations