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THE GEEK INSTITUTE OF CYBER SECURITY

Regd. By: E-Max India
Centre Code: EMAX/EK80606
(Recognized By Govt. Of India)

(Building Futures Through Digital Knowledge and Innovation)

Git & GitHub (1 Week)

Syllabus

01: Introduction to Version Control Systems

- ✓ What is Version Control?
- ✓ Centralized vs Distributed VCS
- ✓ Git vs GitHub vs GitLab vs Bitbucket
- ✓ Importance of Git in SDLC
- ✓ Installing Git (Windows, Linux, macOS)
- ✓ Git CLI vs GUI Clients

02: Git Configuration and Initialization

- ✓ Global Git Configuration
- ✓ git config --global user.name "Your Name"
- ✓ git config --global user.email "your@email.com"
- ✓ git config --global --list
- ✓ git config --global --unset-all user.name
- ✓ git config --global --unset-all user.email
- ✓ Initializing a Local Repository (git init)
- ✓ Connecting to Remote Repository
- ✓ git remote add origin <repo-url>
- ✓ git remote -v
- ✓ Renaming Default Branch (git branch -M main)

03: Cloning & Git Status

- ✓ Cloning Repositories from GitHub (git clone <repo-url>)
- ✓ Understanding File States: Untracked, Modified, Staged, Unmodified
- ✓ Viewing Status: git status, git status -s

04: Add, Commit & Remove Files

- ✓ Adding Files to Staging Area (git add filename, git add .)
- ✓ Committing Changes (git commit -m, git commit -a -m, git commit -A)
- ✓ Removing Files from Staging (git rm --cached filename)

05: Pushing and Pulling from Remote

- ✓ Pushing Code to GitHub (git push origin main)
- ✓ Pulling Changes from Remote (git pull origin main)
- ✓ Changing Remote URL (git remote set-url origin <new-url>)

06: Branching and Merging

- ✓ Creating, Switching & Renaming Branches
- ✓ git branch, git checkout <branch-name>, git checkout -b <new-branch>
- ✓ git branch -M main, git branch -d <branch-name>
- ✓ Merging Branches (git merge <branch-name>)
- ✓ Viewing Differences (git diff <branch-name>)

07: Undoing Changes and Reset

- ✓ Unstaging Files (git reset filename)
- ✓ Reset Staging Area (git reset)
- ✓ Undoing Commits (git reset HEAD~1, git reset <commit-hash>, git reset --hard <commit-hash>)

08: Git Logs and History

- ✓ Viewing Logs (git log, git log -p -2, git show <commit-hash>)
- ✓ Comparing Commits (git diff <commit1> <commit2>)
- ✓ Git Blame (git blame <filename>)

09: SSH Key Setup for GitHub

- ✓ Generating SSH Keys (ssh-keygen -t rsa -b 4096 -C "your@email.com")
- ✓ Copying Public Key to GitHub (platform specific commands)
- ✓ Adding SSH Key to GitHub Account
- ✓ Testing Connection (ssh -T git@github.com)
- ✓ Updating Remote URL to SSH (git remote set-url origin ...)
- ✓ Add SSH Key to Agent (ssh-add ~/.ssh/id_rsa)

10: Advanced Git Operations

- ✓ Creating & Using .gitignore
- ✓ Stashing Changes (git stash, git stash list, git stash pop)
- ✓ Cherry-picking Commits (git cherry-pick <commit-hash>)
- ✓ Rebasing vs Merging (git rebase)
- ✓ Tagging Releases (git tag, git tag -a, git push --tags)

11: Collaboration & Team Workflows

- ✓ Forking Repositories
- ✓ Creating Pull Requests
- ✓ Reviewing Code on GitHub
- ✓ Conflict Resolution Strategies
- ✓ GitHub Issues, Projects & Discussions
- ✓ Project Boards & CI/CD Basics

Capstone Project: Version-Controlled Application

- ✓ Initialize and push a collaborative app
- ✓ Use branching, merging, PRs, and conflict resolution
- ✓ Apply .gitignore, tag releases, and handle rebasing
- ✓ Document full history using git log, blame, show

Tools & Platforms Covered

- ✓ Git CLI (Command Line Interface)
- ✓ GitHub Web Interface
- ✓ Git Bash / Terminal / PowerShell
- ✓ Visual Studio Code (with Git integration)
- ✓ GitHub Desktop (optional)