Complete Git & GitHub Course Notes

A Beginner to Advanced Guide

These notes provide a complete understanding of Git and GitHub, covering concepts, commands, workflows, and best practices. This material is suitable for students, freshers, and professionals.

1. Introduction to Version Control & Git

Version Control System (VCS) helps track changes in files over time.

Git is a distributed version control system created by Linus Torvalds.

Benefits include collaboration, history tracking, rollback, and branching.

Centralized vs Distributed Version Control Systems.

Git is fast, reliable, and widely used in the software industry.

2. Git Architecture & Workflow

Git has three main areas: Working Directory, Staging Area, and Repository.

Working Directory contains current project files.

Staging Area holds files before commit.

Repository stores committed changes.

Git workflow: Modify → Stage → Commit → Push.

3. Installing & Configuring Git

Install Git from official website.

Configure username and email using git config.

Commands: git config --global user.name, git config --global user.email.

Check configuration using git config --list.

Git configuration can be system, global, or local.

4. Basic Git Commands

git init – Initialize a repository.

git status – Check repository status.

git add – Add files to staging area.

git commit – Save changes to repository.

git log – View commit history.

5. Branching & Merging

Branches allow parallel development.

Default branch is main or master.

git branch – Create branch.

git checkout – Switch branches.

git merge – Merge branches.

6. Handling Conflicts

Conflicts occur when same code is modified.

Git marks conflict areas in files.

Manually resolve conflicts.

After resolving, add and commit changes.

Good communication reduces conflicts.

7. GitHub Introduction

GitHub is a cloud-based Git repository hosting service.

Supports collaboration, issue tracking, pull requests.

Repositories can be public or private.

GitHub enhances teamwork and project visibility.

Used widely in open-source and enterprise projects.

8. Working with Remote Repositories

git remote add origin – Add remote repo.

git push – Upload local commits.

git pull – Fetch and merge changes.

git clone – Copy remote repository.

Origin is default remote name.

9. Pull Requests & Collaboration

Pull Request (PR) is a request to merge changes.

Used for code review and collaboration.

PR includes title, description, and code diff.

Reviewers approve or request changes.

PR improves code quality.

10. Best Practices & GitHub Profile Tips

Write clear commit messages.

Commit small and logical changes.

Use meaningful branch names.

Maintain proper README.md file.

Showcase projects on GitHub profile.