

PROGRAMMING

Part A: Front-End Development (12 Weeks)

Week 1-2: HTML Fundamentals

- Structure of a webpage
- Basic tags: headings, paragraphs, links, images, lists
- Forms and input types
- Semantic HTML (header, nav, article, footer)
- Mini Project: Build a personal profile webpage

Week 3-4: CSS Styling

- CSS syntax and selectors
- Colors, fonts, backgrounds
- Box model (margins, paddings, borders)
- Positioning (relative, absolute, fixed, sticky)
- Flexbox and Grid layout
- Responsive design (media queries)
- Mini Project: Build a landing page

Week 5-6: JavaScript Basics

- Variables, operators, and data types
- Loops and conditionals
- Functions and scope
- DOM manipulation (getElementById, querySelector, innerHTML)
- Events (onclick, onkeyup, onsubmit)
- Mini Project: To-do list app

Week 7-8: Advanced JavaScript

- Arrays, objects, and JSON
- ES6 features (let/const, arrow functions, template literals)
- Promises and async/await
- Fetch API (getting data from external APIs)
- Local storage & session storage

- Mini Project: Weather app using API

Week 9–10: Front-End Framework (React.js)

- Introduction to React
- Components, props, and state
- Event handling in React
- React hooks (useState, useEffect)
- Fetching APIs in React
- Mini Project: Movie search app

Week 11–12: Advanced Front-End & Capstone

- CSS frameworks (Bootstrap/Tailwind)
- Component libraries (Material UI)
- Routing in React
- Best practices in front-end development
- Capstone Project (Front-End Only): Build a multi-page responsive website (e.g., blog, e-commerce store UI, or portfolio site)

Part B: Back-End Development (12 Weeks)

Week 13–14: Introduction to Back-End & Node.js

- What is back-end development?
- Setting up Node.js and npm
- Basics of Express.js
- Creating a simple server
- Routing (GET, POST)
- Mini Project: Simple REST API

Week 15–16: Working with Databases (SQL & NoSQL)

- Introduction to databases (SQL vs NoSQL)
- CRUD operations in MySQL/PostgreSQL
- MongoDB basics (collections, documents)
- Connecting Node.js with databases
- Mini Project: User registration with database storage

Week 17–18: REST APIs & CRUD Applications

- REST API concepts
- CRUD with Express.js + MongoDB/MySQL
- Error handling and validation
- Using Postman for API testing
- Mini Project: Blog API with CRUD endpoints

Week 19–20: Authentication & Security

- User authentication (Login & Signup)
- Password hashing (bcrypt)
- JWT (JSON Web Tokens)
- Securing routes and APIs
- Preventing common attacks (SQL injection, XSS, CSRF)
- Mini Project: Secure login system

Week 21–22: Advanced Back-End Features

- File uploads (multer)
- Sending emails (nodemailer)
- Integrating third-party APIs
- Real-time apps (intro to WebSockets)
- Mini Project: Chat application (basic)

Week 23–24: Full-Stack Integration & Capstone

- Connecting front-end (React) with back-end (Node.js/Express)
- Fetching and displaying database data in UI
- Deployment (Netlify for front-end, Render/Heroku for back-end)
- Capstone Project (Full-Stack): Build a complete app with authentication, CRUD, and database integration (e.g., task manager, e-commerce app, or blog system)