Module 3: Backend Development with Node.js and MongoDB

Prerequisite

- Completion of Module 2 (Frontend Development with React).
- Personal Computer with good specifications.
- Proficiency in English.

Course Description

In this module, you'll learn to build powerful backend systems using Node.js and MongoDB. You'll understand how to structure scalable APIs, secure data, and deploy backend applications.

Learning Outcomes

- Build RESTful APIs using Node.js and Express.js.
- Work with NoSQL databases like MongoDB for efficient data storage.
- Implement authentication and data security in backend applications.
- Deploy full-stack applications to production.

Course Outline

Week 1: Introduction to Node.js and Backend Development

- Setting up Node.js and understanding its role in web development.

Week 2: Building RESTful APIs with Express

- Introduction to Express.js and API development.

Week 3: Introduction to MongoDB

- Setting up MongoDB and performing CRUD operations.

Week 4: Data Modeling with MongoDB

- Using Mongoose for schema design and validation.

Week 5: Middleware and Authentication in Express

- Implementing custom middleware and user authentication.

Week 6: Error Handling and Security

- Handling errors and securing API endpoints.

Week 7: File Uploads and Pagination

- Managing file uploads and pagination in APIs.

Week 8: Advanced Queries and Optimization

- MongoDB indexing, aggregation, and query optimization.

Week 9: Caching and Performance Enhancement

- Using caching mechanisms to improve API performance.

Week 10: API Security and Role-based Access Control

- Implementing security best practices, JWT, and role-based access.

Week 11: Project Development

- Creating a complete backend service or API.

Week 12: Finalization and Assessment

- Project presentations and deployment strategies.

Grading Criteria

- Quizzes: 20%
- Class Participation: 15%
- Projects: 25%
- Final Projects: 40%