

1. Introduction to Full Stack Development

- A. Overview of full stack web applications
- B. Client–server architecture
- C. Introduction to MERN stack components
- D. Role of frontend, backend, and database
- E. Development workflow and tools

2. Web Fundamentals & JavaScript Essentials

- A. HTML5 and CSS3 overview
- B. Responsive web design principles
- C. JavaScript fundamentals
- D. ES6+ features (let/const, arrow functions, modules)
- E. Asynchronous JavaScript basics

3. Frontend Development with React

- A. Introduction to React and JSX
- B. Functional components and props
- C. State management with hooks
- D. Handling events and forms
- E. Component lifecycle and rendering

4. Advanced React Concepts

- A. Hooks: useState, useEffect, useContext
- B. React Router for navigation
- C. API integration using Axios / Fetch
- D. Conditional rendering and lists
- E. Performance optimization basics

5. Backend Development with Node.js

- A. Introduction to Node.js runtime
- B. Node.js architecture and event loop
- C. Creating server using Node.js
- D. NPM and package management
- E. Environment configuration

6. Express.js Framework

- A. Introduction to Express.js
- B. Routing and middleware
- C. RESTful API design principles
- D. Request and response handling
- E. Error handling and validation

7. Database Management with MongoDB

- A. Introduction to NoSQL databases
- B. MongoDB architecture and collections
- C. CRUD operations
- D. Schema design with Mongoose
- E. Indexes and data validation

8. Full Stack Integration

- A. Connecting React frontend with Node backend
- B. API consumption and data flow
- C. Handling authentication requests
- D. State management across application
- E. Error handling between client and server

9. Authentication & Authorization

- A. User authentication concepts
- B. JWT-based authentication
- C. Role-based access control
- D. Session vs token-based security
- E. Password hashing and security

10. Deployment & DevOps Basics

- A. Environment variables and configuration
- B. Deploying MERN apps on cloud platforms
- C. Using Git and GitHub for version control
- D. CI/CD overview
- E. Application monitoring basics

11. Testing & Performance

- A. API testing with Postman
- B. Basic unit testing concepts
- C. Debugging full stack applications
- D. Performance optimization techniques

Mini Projects:

- CRUD-based MERN application
- User authentication system
- Dashboard-based web application
- Complete full stack MERN project
- Live deployment of project



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