# Full Stack Web Development

## MERN Stack (48 hours)

## Lecture Breakdown (2 hours/lecture)

### Module 1: Introduction to Web Development (6 hours - 3 lectures)

- Lecture 1.1 (2 hours):
- Recap of client-server model, HTML, CSS basics
- Introduction to modern web development tools (browsers developer tools, code editors)
- Hands-on: Building a simple responsive web page with HTML and CSS
- Lecture 1.2 (2 hours):
- Introduction to transform, transition and animation concepts in CSS
- Hands-on: Building a responsive layout and incorporating accessibility best practices
- Lecture 1.3 (2 hours):
- Version control with Git for code management and collaboration
- Introduction to web development frameworks and libraries
- Hands-on: Git version control basics and exploring popular web frameworks

## Module 2: Advanced JavaScript (10 hours - 5 lectures)

- Lecture 2.1 (2 hours):
- Introduction of variables, datatypes, operators, conditional statements and loop statements.
- Hands-on: Practicing programs based on above concepts.
- Lecture 2.2 (2 hours):
- Introduction to functional programming concepts in JavaScript
- Hands-on: Exploring functional programming paradigms in JavaScript

Lecture 2.3 (2 hours):

- Asynchronous programming with promises and async/await in detail
- Error handling and debugging techniques for asynchronous code
- Hands-on: Building asynchronous applications with promises and async/await

Lecture 2.4 (2 hours):

- Introduction to Document Object Model ( DOM Model )
- Hands-on: Exploring Document Object Model ( DOM Model ) in JavaScript

Lecture 2.5 (2 hours):

- Advanced browser developer tools features for debugging and performance optimization
- Hands-on: Project

## Module 3: Mastering React.js (12 hours - 6 lectures)

- Lecture 3.1 (2 hours):
- Introduction to React Application
- Building Components using Functional Components
- Hands-on: Building reusable and well-structured React components with functional components
- Lecture 3.2 (2 hours):
- Building Components using Class Components
- Hands-on: Building reusable and well-structured React components with class components
- Lecture 3.3 (2 hours):
- React Router for advanced routing functionalities (nested routes, protected routes)
- Hands-on: Implementing complex routing logic with React Router
- Lecture 3.4 (2 hours):
- Data fetching with libraries like Fetch and handling API responses in React
- Hands-on: Building React applications that fetch data from APIs
- Lecture 3.5 (2 hours):
- Building React Application with using all above concepts – Part 1

  Lecture 3.6 (2 hours):
- Building React Application with using all above concepts – Part 2

## Module 4: Building APIs with Node.js and Express.js (8 hours - 4 lectures)

- Lecture 4.1 (2 hours):
- Advanced Express.js features: Middleware for request processing, error handling best practices
- Security considerations for Node.js applications (authentication, authorization)
- Hands-on: Building secure and well-structured APIs with Express.js middleware
- Lecture 4.2 (2 hours):
- Building RESTful APIs with validation and error handling (using libraries like Joi)
- Introduction to GraphQL for building APIs with a flexible query language
- Hands-on: Implementing data validation and error handling in Express.js APIs, exploring basic GraphQL concepts
- Lecture 4.3 (2 hours):
- Introduction to deployment strategies for Node.js applications (Heroku, AWS, Docker)
- Continuous integration and continuous delivery (CI/CD) for automated deployments
- Hands-on: Deploying a Node.js application to a cloud platform
- Lecture 4.4 (2 hours):
- Building Node.js applications with modular design and scalability in mind
- Hands-on: Building a Node.js application with clear separation of concerns and potential for scaling

## Module 5: Advanced MongoDB (6 hours - 3 lectures)

- Lecture 5.1 (2 hours):
- Introduction Of MongoDB Database
- Installation of MongoDB Database Server and Compass
- Hands-on: Successful Installation of MongoDB Database.

Lecture 5.2 (2 hours):

- CRUD Operation
- Hands-on: Designing efficient data models for MongoDB collections
- Lecture 5.3 (2 hours):
- Database security and access control in MongoDB (roles, permissions)
- Introduction to cloud-based MongoDB services (MongoDB Atlas)
- Hands-on: Implementing user access control in MongoDB and exploring MongoDB Atlas features

## Module 6: User Authentication and Authorization (4 hours - 2 lectures)

- Lecture 6.1 (2 hours):
- Implementing user registration and login functionalities with secure password hashing
- Session management for maintaining user state on the server-side (e.g., Express session)
- Hands-on: Building user authentication system with password hashing and session management
- Lecture 6.2 (2 hours):
- JWT (JSON Web Token) for secure user authentication and authorization
- Implementing role-based access control (RBAC) to restrict user actions based on permissions
- Hands-on: Implementing JWT-based authentication and authorization in a MERN stack application

## Module 7: Building a Full-Featured MERN Stack Application (2 hours - 1 lecture)

- Lecture 7.1 (2 hours):
- Integrate all learned technologies to build a complete application with user authentication, data storage and retrieval, dynamic user interface, and deployment considerations
- Hands-on project: Develop a full-fledged MERN stack application showcasing advanced functionalities

## Assessment:

- Regular quizzes and coding exercises throughout the course
- Project presentations and code reviews
- Final assessment: A comprehensive MERN stack application demonstrating user authentication, data management, a polished user interface, and proper deployment strategy