

Full MERN Stack Developer Syllabus

by Sudo24 Learning Private Limited

Month 1: Fundamentals and Frontend Development

Week 1: Introduction to Web Development & HTML/CSS Basics

- Overview of MERN Stack (MongoDB, Express.js, React.js, Node.js)
- Web development fundamentals (HTTP, DNS, Client/Server model)
- HTML5 Essentials: Structure, semantic tags, forms, multimedia
- CSS3 Basics: Selectors, properties, box model, Flexbox, Grid
- Responsive Design with CSS and Media Queries

Week 2: JavaScript Basics and ES6+ Features

- JavaScript fundamentals (variables, data types, operators)
- Control Structures: loops, conditionals, functions, scope
- ES6+ features: arrow functions, template literals, destructuring, modules
- Arrays, Objects, Sets, and Maps
- DOM Manipulation and Event Handling

Week 3: Advanced JavaScript and Introduction to TypeScript

- JavaScript Concepts: Closures, Hoisting, Prototypes, 'this' keyword
- Async JavaScript: Callbacks, Promises, Async/Await
- Introduction to TypeScript: Setting up TypeScript, types and interfaces
- Using TypeScript with JavaScript for better code quality
- Basic TypeScript concepts: types, enums, classes, modules

Week 4: React Basics with TypeScript

- Introduction to React: JSX, Components, Props, and State
- Functional and Class Components
- Event handling and Conditional Rendering
- Lists and Keys in React
- State and Props with TypeScript
- Integrating Tailwind CSS in React for styling

Month 2: Advanced Frontend with React & MUI

Week 5: Advanced React Concepts

- Component Lifecycle and React Hooks (useState, useEffect, useContext)
- Context API for state management
- Controlled and Uncontrolled Components
- Handling Forms in React with TypeScript

Week 6: UI Design with Material-UI (MUI)

- Introduction to MUI and installation
- Creating Responsive Layouts with MUI
- Using MUI Components: AppBar, Buttons, Cards, Dialogs, and Forms
- Customizing MUI Themes and Styles
- Accessibility and Dark Mode with MUI

Week 7: React Router and State Management with Redux

- Introduction to React Router: setting up, linking, and routing
- Dynamic routing and nested routes
- Introduction to Redux for global state management
- Setting up Redux Store, Actions, and Reducers
- Integrating Redux with TypeScript for type-safe state management

Week 8: API Integration and Advanced Tailwind CSS

- RESTful API concepts and Axios library
- Fetching data from API, error handling, and caching
- Advanced Tailwind CSS customization (configuring theme, responsive styles)
- Animations with Tailwind CSS
- Project 1: Building a Full-featured Frontend with API integration

Month 3: Backend Development with Node.js and Express.js

Week 9: Node.js Basics

- Introduction to Node.js: Environment setup, REPL
- Modules, NPM, and Package Management
- File System, Streams, and Event Emitter in Node.js
- Creating and running a basic Node.js server

Week 10: Express.js and REST API Development

- Setting up Express.js and creating a server
- Building RESTful APIs: routes, requests, and responses
- Middleware in Express.js (body-parser, custom middlewares)

- CRUD operations (Create, Read, Update, Delete)
- Authentication with JWT

Week 11: MongoDB Basics

- MongoDB Basics: Document-based storage, MongoDB Shell
- Setting up MongoDB Atlas and connecting it to Node.js
- Mongoose ORM: Defining schemas and models
- CRUD Operations with Mongoose
- Data validation and Error handling

Week 12: Backend Project

- Project 2: Building a REST API with Express.js, MongoDB, and TypeScript
- Integrating security features: data validation, sanitization, and rate limiting
- Testing API endpoints with Postman

Month 4: Full Stack Integration and Advanced Topics

Week 13: Full Stack Development and Connecting Frontend with Backend

- Creating a MERN stack project structure
- Integrating React frontend with Node.js/Express backend
- Handling API requests and responses with TypeScript
- Managing authentication and authorization (JWT, cookies)
- Project 3: Full Stack MERN application - User Authentication

Week 14: Deployment and Production Optimization

- Introduction to Git and GitHub for version control
- Preparing a full-stack application for production
- Deploying frontend on Vercel/Netlify
- Deploying backend on Heroku or Digital Ocean
- Environment variables, HTTPS, and production security

Week 15: Testing and Debugging

- Debugging JavaScript, Node, and React code
- Writing unit tests with Jest and integration tests with Cypress
- Testing API endpoints with Mocha and Chai for backend
- Project 4: Implementing end-to-end testing on the MERN stack project

Week 16: Capstone Project & Final Review

- Capstone Project: Building a complete MERN Stack application

- User authentication, CRUD operations, responsive design
- Advanced styling with MUI and Tailwind CSS
- Full API integration and testing
- TypeScript for type safety across the stack
- Code review, best practices, and project documentation
- Final presentation and feedback session