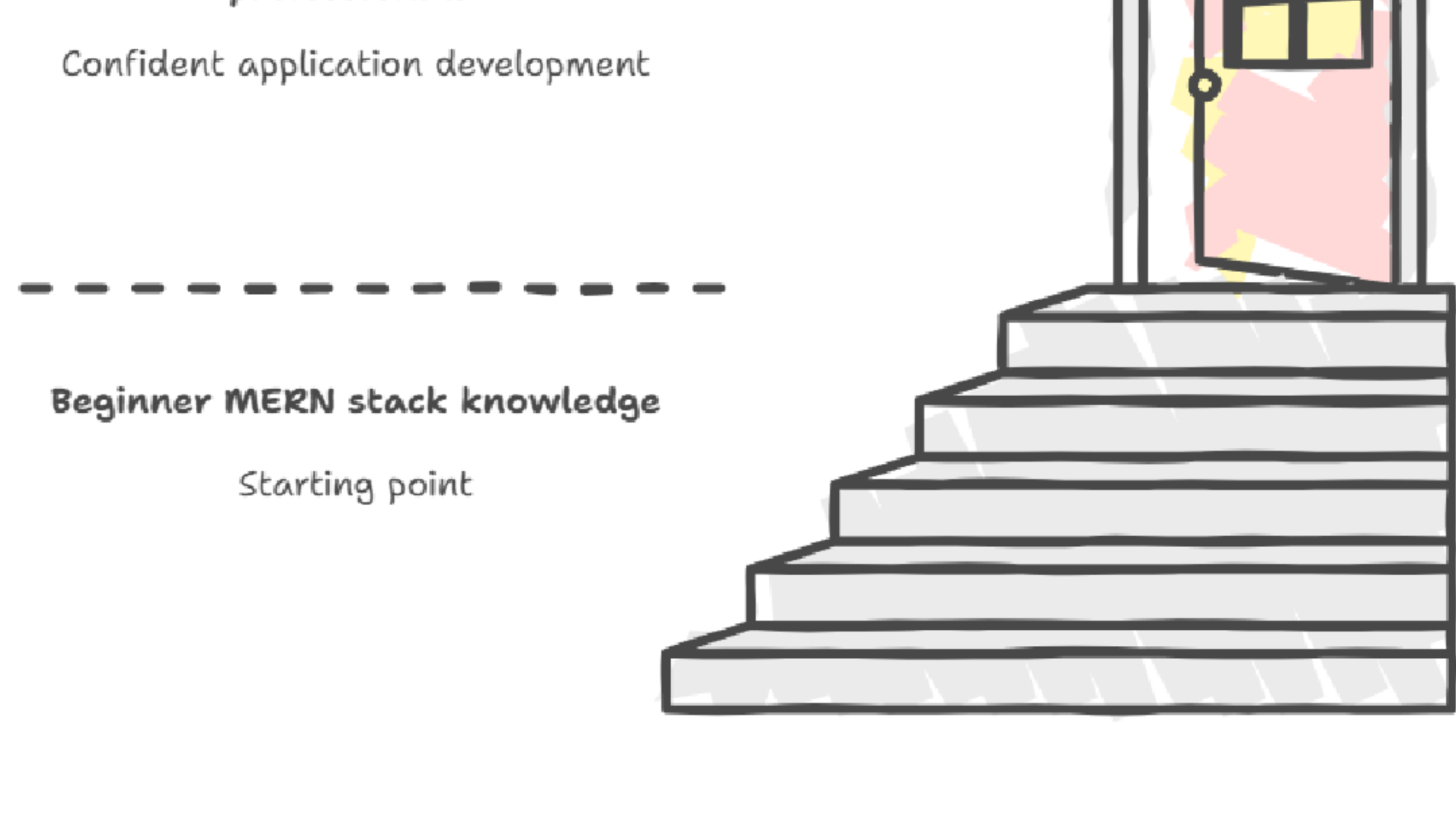


Duration: 3 Months (12 Weeks)

Goal: Enable students to confidently develop, deploy, and maintain real-world MERN (MongoDB, Express.js, React, Node.js) applications and be job-ready.

Transform students into job-ready MERN stack developers.



MERN Stack Developer – From Beginner to Pro

This document outlines a comprehensive 3-month curriculum designed to transform individuals into proficient MERN (MongoDB, Express.js, React, Node.js) stack developers. The program focuses on practical application, real-world use cases, and the development of a job-ready portfolio, ensuring graduates are well-equipped to confidently build, deploy, and maintain modern web applications.

Month 1: Foundations of MERN & Frontend with React

Week 1: Web & JavaScript Essentials

- Study Topics:**
- HTML5, CSS3, modern JavaScript (ES6+ features)
 - DOM manipulation, Fetch API, Promises, async/await
 - Git & GitHub basics
- Real-Time Use Case:**
- Build a personal portfolio landing page
- Outcome:** Solid grounding in JavaScript & web basics.

Week 2: React Basics

- Study Topics:**
- React introduction, JSX, components (functional & class)
 - Props & state
 - Event handling, conditional rendering, lists & keys
- Real-Time Use Case:**
- Product catalog UI for an e-commerce app
- Outcome:** Students can build reusable UI components.

Week 3: React Advanced Concepts

- Study Topics:**
- React hooks (useState, useEffect, useRef)
 - Forms & validation
 - React Router (SPA navigation)
- Real-Time Use Case:**
- Multi-page blog application with navigation
- Outcome:** Students can create small SPAs with routing.

Week 4: State Management & UI

- Study Topics:**
- Context API, Redux (actions, reducers, store)
 - Material UI / Tailwind CSS integration
- Real-Time Use Case:**
- Shopping cart functionality in an e-commerce app
- Outcome:** Build scalable apps with global state management.

Month 2: Backend Development with Node.js & Express

Week 5: Node.js Fundamentals

- Study Topics:**
- Node.js architecture & event loop
 - npm, modules, environment variables
 - File system & basic server with http
- Real-Time Use Case:**
- Simple REST API for user profiles
- Outcome:** Able to set up Node.js server & serve APIs.

Week 6: Express.js Essentials

- Study Topics:**
- Express.js setup, routes, middleware
 - REST API design principles
 - Error handling, Postman testing
- Real-Time Use Case:**
- RESTful API for a to-do list application
- Outcome:** Students can build structured REST APIs.

Week 7: MongoDB Database

- Study Topics:**
- MongoDB CRUD operations
 - Mongoose schema & models
 - Query operators, indexing, validation
- Real-Time Use Case:**
- Storing users, products, and orders in MongoDB
- Outcome:** Students can model and manage application data.

Week 8: Authentication & Security

- Study Topics:**
- JWT (JSON Web Tokens) authentication
 - User registration & login flow
 - Security best practices (password hashing, helmet, CORS)
- Real-Time Use Case:**
- Secure login system for an employee portal
- Outcome:** Students can implement secure user auth in apps.

Month 3: Full-Stack Integration, Deployment & Capstone

Week 9: Connecting Frontend & Backend

- Study Topics:**
- Consuming REST APIs in React
 - Axios / Fetch for API calls
 - Handling auth tokens in frontend
- Real-Time Use Case:**
- Login & protected dashboard with user-specific data
- Outcome:** Full-stack app with frontend-backend communication.

Week 10: Advanced Features

- Study Topics:**
- File upload (Multer, Cloudinary)
 - Real-time updates with WebSockets/Socket.IO
 - Role-based access control
- Real-Time Use Case:**
- Chat feature in a team collaboration app
- Outcome:** Ability to handle advanced real-world app needs.

Week 11: Deployment & DevOps Basics

- Study Topics:**
- Environment setup (dev vs prod)
 - Deployment to Heroku / Render / Vercel / Netlify
 - CI/CD basics, GitHub Actions
- Real-Time Use Case:**
- Deploying a working MERN project online
- Outcome:** Students can confidently deploy production apps.

Week 12: Capstone Project & Review

- Capstone Project:** Full MERN E-commerce Web App
- Features:** User auth, product catalog, cart, checkout, orders, admin dashboard
- Activities:**
- Peer review of projects
 - Mock interview questions & coding challenges
- Outcome:** Students graduate with a job-ready portfolio project.

