Course Title: Full Stack Development With MERN (MongoDB, Express, React, Node.js): Zero To Hero

Duration: 4-6 Week
Who it is for: Pursuing B.Tech/B.E./MCA/M.Tech/BCA/M.Sc(IT)/B.Sc(IT)
Mode of Training: Live, Online, Instructor Led
Access to Recording: Yes
Pre-Requisite: No Pre-requisite, Concepts would be built from Scratch
Teaching Methodology: No to Minimum theory, maximum Hands on. Object oriented; problem driven.
Doubt Session: Weekly Doubt Session to ensure no one is left behind
Certificate: Industry Endorsed Certificate (Jointly Signed By Our Primary Industry Partner)

Project:
1) Module Specific 3-4 Mini-Project.
2) Hand On Major Project
3) Sample Project
4) Capstone Project

Course Objectives:
- To equip learners with the skills to build and deploy full-stack web applications using the MERN Stack.

- Gain experience in Frontend, Backend & Database Deployment.

- Understand modern development workflows and tools, making you job-ready for roles in full-stack development.

Teaching Approach:
- **Interactive Lectures**: For concept clarity.

- **Hands-On Labs**: Real World Simulated datasets and exercises.

- **Capstone Project**: Integration of all tools and concepts.

- **Feedback Sessions**: Instructors review and guide project presentations.

Course Structure:

📁 **Module 1: Introduction to Full Stack Development (2 Hours)**
- Understanding Web Development (Frontend, Backend, Database)
- Overview of MERN Stack (MongoDB, Express.js, React.js, Node.js)
- Setting Up the Development Environment (Node.js, npm, VS Code, Git)

📌 **Hands-On: Install and configure Node.js, MongoDB, and VS Code.**

📁 **Module 2: HTML, CSS & JavaScript Basics (4 Hours)**
- HTML5 & CSS3
   - Semantic HTML, Forms, Flexbox, Grid
- JavaScript Basics
   - ES6+ Features: Let/Const, Arrow Functions, Destructuring, Spread Operator
   - Asynchronous JS: Callbacks, Promises, Async/Await

📌 **Assignment: Build a simple responsive landing page.**

📁 **Module 3: Introduction to Node.js & Express.js (6 Hours)**
- What is Node.js? (Event Loop, Non-blocking I/O)
- Creating a Simple Server with Express.js
- Middleware in Express (Logging, Body Parsing, CORS)
- REST API Basics (GET, POST, PUT, DELETE)
- Handling Requests & Responses
- Error Handling in Express

📌 **Assignment: Create a basic CRUD API using Express.js.**

📁 **Module 4: MongoDB & Mongoose (6 Hours)**
- MongoDB Basics
   - NoSQL vs SQL, Collections & Documents
- Mongoose ODM
   - Connecting to MongoDB, Schema & Models
- CRUD Operations with Mongoose
- Introduction to MongoDB Atlas (Cloud Database)

📌 **Project: Create a User Management System with Express & MongoDB.**

📁 Module 5: React.js Basics (6 Hours)

- Introduction to React.js & Virtual DOM
- Setting Up a React Project with Vite
- Components & Props
- State Management with useState
- Handling Events in React
- React Router for Navigation

📌 **Assignment: Build a multi-page React application using React Router.**

📁 Module 6: Advanced React.js & State Management (6 Hours)

- React Hooks
  - useEffect, useRef, useContext
- State Management
  - Context API vs Redux Toolkit
- React Forms
  - Controlled & Uncontrolled Components
- React UI Libraries
  - Material-UI, Tailwind CSS, Ant Design

📌 **Assignment: Build a To-Do App with Context API.**

📁 Module 7: Connecting Frontend with Backend (6 Hours)

- Making API Calls using Axios & Fetch
- Handling Authentication (JWT)
- Using React Query for Data Fetching
- Managing User Authentication in React
- Role-Based Access Control (RBAC)

📌 **Project: Implement User Login & Registration using JWT.**

📁 Module 8: Deployment & Optimization (6 Hours)

- Backend Deployment
  - Deploying Node.js API on Render/Heroku
- Frontend Deployment
  - Hosting React App on Vercel/Netlify
- Database Deployment
  - Connecting to MongoDB Atlas
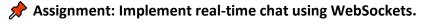- Environment Variables & Security Best Practices

📌 **Project: Deploy a MERN Stack Application.**

📁 **Module 9: Advanced Topics & Best Practices (4 Hours)**
- WebSockets & Real-time Applications
- Authentication with OAuth (Google, GitHub)
- Server-Side Rendering (SSR) with Next.js
- Performance Optimization Techniques

📌 **Assignment: Implement real-time chat using WebSockets.**

📁 **Module 10: Final Project & Capstone (4 Hours)**
- Students work on a Full Stack MERN Project combining all concepts.
- Project Ideas:
  - E-commerce Website
  - Blogging Platform
  - Task Management App
  - Social Media Dashboard

📌 **Final Project Submission & Review** ✅