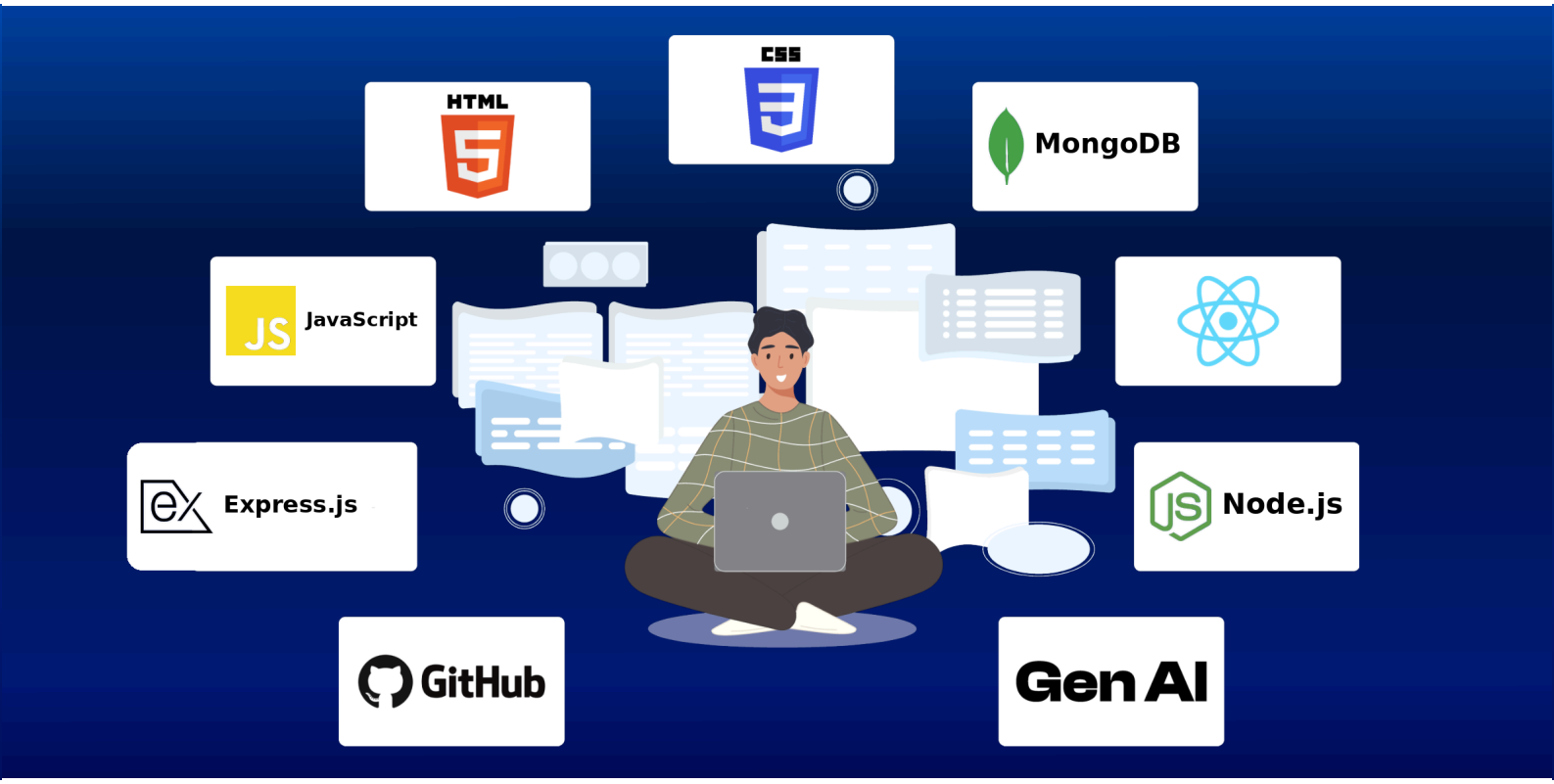

MERN Stack

Build a strong understanding of JavaScript programming and web development technologies to become a MERN-Stack Developer with React. Get hands-on experience with back-end and front-end development, and create a portfolio of projects by developing end-to-end web applications using React frameworks.

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HTML & CSS

In this course, you will learn how to design and implement layouts that adapt seamlessly across different screen sizes using techniques like CSS Flexbox, media queries, and Tailwind CSS. The course will guide you through structuring HTML pages and applying styles to make websites responsive and user-friendly.

Software Development Fundamentals

- Importance of Frontend
- Fundamentals
- Syntax
- Debugging
- Tweaking Code

HTML Basics

- Getting Started
- HTML Elements
- HTML Headings
- HTML Paragraphs
- HTML Button
- HTML Attributes
- HTML Images
- HTML Hyperlinks
- HTML Containers
- HTML Lists
- HTML Tables

CSS Basics

- CSS Rulesets
- CSS Properties
- CSS Colors
- CSS Units
- CSS Box Model
- CSS Margins
- CSS Paddings
- CSS Borders

Intermediate CSS

- Block vs inline elements
- CSS Selectors
- Class Selector
- Id Selector
- Type Selector
- CSS Specificity
- CSS Inheritance
- CSS Cascading

CSS Layouting

CSS Flexbox

- Display
- Flex-direction
- Justify-content
- Align-items
- Flex-wrap
- Flex-row
- Align-content
- Align-self
- Flex-grow
- Flex-shrink
- Order

Sizing Elements

- Overflow
- Box Sizing
- Content Box
- Border Box

CSS Media Queries

- Media Query
- Media Types
- Media Features
- Width, min-width, max-width
- Height, min-height, max-height
- Orientation
- Combining Multiple Media Queries
  - Logical Operators

CSS Grid

- Implicit and Explicit Grid
- Grid rows and columns
- Grid Positioning and Alignment

CSS Positioning

- Position Property
  - Static, fixed, relative, absolute
- Changing Element's Position
  - Relative Positioning
  - Absolute Positioning
  - Fixed vs Absolute
- Positioned Ancestors

CSS Visual Effects

- CSS Transitions
- CSS Transforms

Tailwind CSS

- Introduction to Tailwind CSS
  - Why Tailwind CSS?
  - Advantages
  - Setting up Tailwind CSS
  - Common Utility Classes
- Tailwind Display & Responsive Utilities
  - Flex properties
  - Grid Utilities
  - Responsive Utilities

Course Project **E-commerce Website**	Build a responsive e-commerce website using HTML and CSS

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JavaScript

In this course, you will learn JavaScript concepts and programming techniques to build dynamic web applications. You'll master the core features of JavaScript, including DOM manipulation, event handling, arrays, functions, and working with real-time data through HTTP requests. By the end of this course, you'll be able to create interactive and responsive websites that respond to user actions and integrate with real-world data.

Introduction to JavaScript

- JavaScript Introduction
- ECMAScript
- Browser Console

Variables & Data Types in JavaScript

- Declaring Variables
- Understanding Primitive Types and the `typeof` Operator
- Variable Assignment and Naming Rules

Type Conversion

- Implicit and Explicit Conversion
- Converting Strings to Numbers and Booleans

Sequence of Instructions & Operators

- Understanding the Sequence of Instructions and Expressions
- Working with Modulus, Exponentiation, Increment, and Decrement Operators
- BODMAS Rule in JavaScript

Operators

- Relational Operators
- Loose vs Strict Equality and Type Coercion
- Logical Operators
- Conditional Statements
- Nested Conditions and the `Switch` Statement
- Using the Ternary Operator

String Basics & Methods

- String Concatenation, Template Literals, and Indexing
- String Methods

Introduction to Loops

- `while` and `do-while` Loop Syntax
- The `for` Loop and Nested Loops
- Loop Control: `break`, `continue`

Functions

- Function Declaration, Parameters, and Arguments
- Understanding Return Statements and Default Parameters
- Named Function Expressions vs Function Declarations
- Callback Functions

Arrow Functions, Scope & Hoisting

- Arrow Function Syntax and Implicit Return
- Understanding Scope: Global, Function, and Block Scope
- Hoisting with `var`, `let`, `const`, and Functions

Arrays

- Creating Arrays and Accessing Array Elements
- Array Methods

Objects

- Working with Objects: Creating, Accessing, and Modifying Properties
- Iterating Over Objects
- Creating and Iterating Over Arrays of Objects
- Filtering, Mapping, and Sorting Arrays of Objects

Error Handling

- Using `try-catch` for Error Handling
- The `finally` Block

JavaScript Functions

- Creating Objects Using Factory Functions and Constructor Functions
- Understanding Object Property Value Shorthand Notations

JavaScript Classes

- Introduction to JS Classes and Constructor Methods
- Inheritance using `extends` and `super()`

JavaScript Promises

- Understanding Asynchronous vs Synchronous Code
- Promise States: Pending, Fulfilled, Rejected
- Consuming Promises and Promise Chaining
- Creating and Consuming Promises
- Using `async` and `await` for Simplified Asynchronous Code

Object-Oriented Programming (OOP)

- Encapsulation
- Abstraction
- Inheritance
- Polymorphism

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Dynamic JavaScript

In this course, you'll learn essential JavaScript concepts to build dynamic web applications. Focus areas include DOM manipulation, event handling, schedulers, and HTTP requests. By the end, you'll be able to create responsive websites that interact with users and real-time data.

DOM and Events

- DOM Manipulation
- Event Handling

Callbacks & Schedulers

- **Callbacks**: Functions as arguments
- **Schedulers**: `setInterval()`, `setTimeout()`
- **Event Loop**: Call Stack, Callback Queue, Microtask Queue

Event Listeners

- **Event Types**: `keydown`, `keyup`
- **Event Object**: `event.type`, `event.target`

Event Propagation

- **Event Flow**: Capturing Phase, Target Phase, Bubbling Phase
- **Stopping Propagation**: `event.stopPropagation()`
- **Preventing Default Behavior**: `event.preventDefault()`

Event Delegation

- Parent-Level Event Handling
- Using Event Bubbling for Delegation
- Dynamic Element Event Handling

HTTP Basics

- **Protocols**: HTTP, HTTPS
- **Request/Response**: Start Line, Headers, Body

HTTP Requests in JS

- **Methods**: GET, POST, PUT, DELETE
- JSON Stringify and Parsing

Forms

- Form Elements
- Form Events

JS Modules

- CommonJS Module Exports
- ES6 Module Exports

Node Packages

- **Core Modules**: Path, Package
- **NPM**: Creating Projects, Third-Party Packages

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ReactJS

In this course, you will learn how to build stateful web applications with the ReactJS library. Upon completion, you will be comfortable creating an application in ReactJS from scratch.

Introduction to ReactJS

- Why React?
- Introducing JSX
- Rendering Elements, Components, and Props

State and Effect Hooks

- `useState()`, `useEffect()`
- Handling Events
- Component Life Cycle

Advanced React Hooks

- `useMemo()` & `useCallback()`
- `useRef()` & `useReducer()`

Routing

- `useParams()`, `useNavigate()`
- Protected Route with JWT Authentication

React Performance & Optimisation

- Lazy Loading & Suspense

React Design Patterns

- Logic Reuse Patterns

React Context

- Context API
- Provider Component

ReactJS Vite Mini-projects

- Mini-project Walkthrough
- ReactJS Vite Mini-projects

Production-Ready Practices

- Approach to Real-World Projects
- Understanding the Requirement & Choosing the Right Design
- GitHub Best Practices & Clean Code Guidelines
- Deploying Real-World Projects

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Generative AI Fundamentals

In this course, you will learn the core concepts of AI and Large Language Models, how they work, and how to use them as a developer. By the end, you will build a frontend application using AI coding agents.

AI & LLM Basics

- What is AI? AI vs ML vs GenAI
- What are LLMs? Tokens, Context Window, Hallucinations
- Popular Models: GPT, Claude, Gemini

Prompt Engineering

- System vs User Prompts
- Prompting Techniques
- Structured Outputs

RAG & Embeddings

- Embeddings and Semantic Search
- Vector Databases
- RAG Architecture and Use Cases

Tool Calling & AI Agents

- Tool/Function Calling
- AI Agents and Agent Loop
- Introduction to MCP

AI-Assisted Development

- AI Coding Agents: Cursor, Copilot, Claude Code
- Prompting for Code
- Reviewing AI-Generated Code

Course Project **AI-Powered Frontend Application**	Build a frontend app using AI coding agents and explain the code and design decisions

Front-end Interview Kit

- Prepare for the concept-based questions asked in interviews with a comprehensive question list created following the latest interviews happening in the Front-end domain.

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Introduction to Databases

This course introduces relational database systems, focusing on data modelling, querying, query abstraction, and data integrity through SQL practice. It prepares students to design, implement, and manage relational databases that power real-world applications across Back-end and Full-Stack systems.

Database Systems and SQL Fundamentals

- Database concepts and DBMS architecture
- SQL data types, constraints, and schemas
- Table creation and data manipulation (`INSERT`, `UPDATE`, `DELETE`)

Querying with SQL

- Conditional and logical operators
- Pattern matching and filtering
- Aggregation, grouping, set operations
- Functions, expressions, and query optimisation basics

Database Modelling and Query Operations

- ER modelling and schema design
- SQL joins and subqueries
- Views and query abstraction

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MongoDB

This course provides an introduction to MongoDB, covering basic to advanced operations with MongoDB for modern application development.

Introduction to MongoDB

- Overview of MongoDB
- Setup and configuration
- Basic operations (CRUD)
- Connecting to MongoDB

Querying MongoDB

- Basic querying techniques
- Filtering data
- Advanced query operations
- Sorting and limiting results

Grouping & Aggregations

- Aggregation framework
- Grouping and summarising data

Complex Field Types

- Embedded documents and arrays
- Array queries and operators
- Advanced manipulation of complex fields
- Updates and queries on complex data

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NodeJS

This course covers the core concepts of NodeJS and ExpressJS, focusing on building server-side applications and APIs. Students will learn the fundamentals of NodeJS, understand HTTP protocols, and master ExpressJS for building REST APIs. Emphasis is placed on hands-on experience, debugging techniques, and authentication methods.

Introduction to NodeJS

- Introduction to NodeJS
- NodeJS runtime and modules
- HTTP Protocol basics

ExpressJS

- ExpressJS fundamentals
- Setting up Express server
- Request handling & response handling

REST API Development

- REST API design
- Routing & CRUD operations

Debugging & Authentication

- Common NodeJS errors and debugging techniques
- Authentication strategies
- JWT implementation

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MongoDB Integration with NodeJS

This course introduces students to MongoDB, a widely used NoSQL database. It covers the basics of MongoDB installation, CRUD operations, advanced querying, and aggregation techniques. Students will learn how to design and manage MongoDB databases, query large datasets efficiently, and handle complex data structures using MongoDB's flexible schema.

Connecting MongoDB with NodeJS

- Introduction to MVC and Mongoose models
- Implementing CRUD operations
- Filtering and sorting
- Protected routes with JWT authentication
- Role-based authorisation

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Frontend-Backend Integration & Deployment

Know how to integrate a NodeJS/ExpressJS backend with a React frontend and MongoDB database to build full-stack MERN applications. Students will learn to connect the frontend and backend, work with the database, implement CRUD operations, handle authentication, manage state in React, and deploy the application to production.

React–NodeJS–MongoDB Integration

- Introduction to Full-Stack/MERN Architecture
- Setting Up Express Backend
- Connecting MongoDB with Mongoose
- Setting Up React Frontend
- Handling CORS
- Fetching Data from Express API in React
- CRUD Operations across React, Express, and MongoDB
- JWT Authentication with React and Express
- Basic State Management in React
- Final Integration and Building the Full App

Docker Deployment & CI/CD with Jenkins on AWS

- Introduction to Docker
- Dockerfile Creation
- Docker Compose for Multi-Container Applications (React, Express, and MongoDB)
- Running a MERN App with Docker
- Automating Deployment with Makefile
- Creating and Pushing Docker Images to Docker Hub
- Introduction to Jenkins and CI/CD
- Setting Up Jenkins for Docker Builds
- Automating Docker Builds and Deployments with Jenkins
- Deploying Docker on AWS EC2
- AWS EC2 Security and Networking

Tools

- Git
- Docker
- Makefile
- Jenkins
- AWS
- MongoDB Atlas

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AI Full-Stack Projects

Build real-world AI-powered applications from scratch — combining intelligent backend, dynamic frontend, and cutting-edge AI to solve problems that matter.