

## MERN Stack Development

<https://ipacademy.in/>

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### Introduction to Websites

What is a Webpage

Introduction to HTML

Creating a simple HTML Document

Viewing HTML Document with Browsers

Introduction to different Web Browsers – IE, Chrome, Mozilla, Safari, UC Browser

Webpage Vs Website

URLs / Domains

Web Servers and Web Hosting

### HTML

Elements of a HTML Document

Understanding HTML Tags

HTML Editors

Creating a Simple HTML Document

Adding Attributes to Tags

Handling Texts in HTML

Headings

Paragraphs

Formatting Texts

Managing Blocks with <Div> Tag

<Div> - Id's and Class

Line Breaks

Managing Lists

HTML Styles

Controlling Fonts and Size

Alignment

Applying Colors

Foreground and background colors

HTML Tables

Creating a Table

Managing Columns

Table Borders

Border Spacing

## **Handling Images**

- Adding Image
- Formatting Image
- Handling Size of an Image
- Aligning Images
- Adding Animated Images
- Background Images

Handling Layouts

HTML Forms

Introduction to HTML Forms

Form Elements

Form Input and Attributes

## **Introducing HTML 5**

HTML Vs HTML 5

New Elements in HTML 5

New Form Elements in HTML 5

Handling Audio & Video

Handling Graphics

Canvas

Handling SVG

Handling Events

HTML 5 APIs

Geolocation

Drag / Drop

Web Storage

Advantage of Web Storage over Cookies

Session based Web Storage

## **Introducing CSS and CSS 3**

What is a Style Sheet

Cascading Effect of a Style Sheet

Text Properties

Border Properties

Position properties

Display properties

Inline and External CSS

CSS Selectors – IDs and Classes  
Understanding Layouts  
Absolute, Relative and Fixed Positioning  
Advanced CSS  
Transformations

### **Responsive Layouts and Media Queries**

Simplifying CSS with BootStrap  
Introducing Boot Strap Framework  
Advantages of Bootstrap Framework over CSS  
Responsiveness with Bootstrap  
Bootstrap Grids  
Bootstrap UI Components  
Buttons, Tables, Menus, Carousels, Dropdowns, Alerts

### **Javascript**

Introduction to Javascript  
Necessity for Javascript  
Javascript Structure and Elements  
Operators and Functions  
Control Structures  
The Document Object Model (DOM), Objects and Nodes  
Arrays and Objects.  
Handling DOM using Javascript  
Javascript Events  
OOPS in JavaScript  
JSON and uses  
Animating UI Elements

## **ReactJs:**

React Overview

Introduction

What are SPA apps

What is React

How react works internally

What are the alternatives

What problem does it solve

When to use React

Component based architecture

## **JSX**

Introduction

Write your first jsx code

How to compile jsx to Javascript

Write class based components with jsx

Renderig jsx to DOM using react DOM

## **Dom manipulation**

Introduction

Select elements using ref

Other ways to select elements

## **Props vs States**

Introduction

What are Props

What are states

Proptypes validation

## **Style React Components**

Introduction

Using css in react

Inline styles

Impoting external styles

## **Event Handling in React**

Introduction

How events work in react world

What are synthetic events

Mouse events

Keyboard events

## **Redux and State management**

Introduction

What is state management

Flux architecture

Redux Introduction

How to manage state in large applications with redux

## **Routing**

Introduction

Navigating between components

React Router

Creating and managing routes

How componentDidUpdate works

How componentWillUnmount works

Understanding When to use which life cycle method

## **Lifecycle Methods in React**

Introduction

How componentWillMount works

How componentDidMount works

How componentWillReceiveProps works

How shouldComponentUpdate works

How componentWillUpdate works

Integrating redux with react router

## **Forms & validations using Reactjs**

Introduction

How to get input from users using Forms

Form validations

## **MongoDB**

Introduction to MongoDB

What is NoSQL

Types of NoSQL DBs  
Necessity for NoSQL DBs  
Relational Databases Vs NoSQL Databases  
Advantages of NoSQL Databases  
Introducing MongoDB

### **Installation and Configuration of MongoDB**

Downloading and Installing MongoDB  
Command Line Mode - Shell  
GUI mode with MongoDB Compass  
Starting and Stopping MongoDB  
Getting Help

### **Fundamentals of MongoDB**

Understanding MongoDB model  
SQL Terms Vs MongoDB Terms  
Understanding Database  
Understanding Collections  
Collections Vs Tables  
Understanding Schemas and Documents  
Creating and Dropping a Database

### **Working with Data - CRUD Operations**

Creating Collections  
Inserting Single Document and Multiple Documents  
Inserting with `_id` Field  
Inserting Document with Arrays  
Understanding Embedded and Nested Documents  
Updating Single and Multiple Documents  
Using Update Operators – Field Update Operators and Array Update Operators  
Deleting Single and Multiple Documents  
Understanding and Implementing Bulk Write Operations  
Working with Retryable Writes

### **Querying Collections**

Using Query Operator - `find()` to query Documents  
Querying Fields and Nested Fields  
Using Logical Operations in Query  
Querying Nested and Embedded Documents  
How to Query an Array?  
Projecting Fields in a Query  
Using `_id` Field in Query

Querying Null and Missing Fields  
Querying Text in MongoDB  
Indexing Text for Search  
Understanding Text Search Operators  
What is Geospatial Search  
Understanding and using Geospatial data  
Geospatial Indexes and Queries  
Aggregation Operations  
Understanding Aggregation Operations  
Using Aggregation Pipelines  
Pipeline Expressions and Behaviors  
Understanding Map-Reduce Functions in MongoDB  
Understanding Map and Reduce  
Using Map-Reduce  
Using Map-Reduce Javascript Functions  
Map-Reduce results  
Understanding Incremental Map-Reduce  
Understanding and using Map-Reduce Concurrency  
Exploring Aggregation References

Understanding Data Models and Schema  
Introduction to Data Modelling  
Understanding Schema in MongoDB  
Flexible Schema and References  
Understanding Schema Validation  
Create Validation Rules  
Using Query Expression to Validate Data  
Bypassing the Document Validation  
Deep dive into Data Modeling Concepts

Handling Transactions in MongoDB  
Understanding Transactions and Transactions API  
Understanding Atomicity  
Executing Multi-document Transactions or Distributed Transactions  
Transactions Operations and Restricted Operations  
Production Considerations  
Handling Indexes in MongoDB  
What is Indexing and Advantages of Indexes  
Single Field and Compound Indexes  
Multi key Indexes, Text Indexes, Wild-card Indexes  
Hashed Indexes  
Managing Indexes

## Managing Security

Implementing Security in MongoDB

Understanding and Enabling Access Control

Handling Authentications

Understanding and Configuring Encryptions

Configuring and Managing Auditing

## Replication

Importance of Replication for High Data Availability

Implementing Replication in MongoDB with Replica Sets

Understanding Asynchronous Replication

Change Stream

## Sharding in MongoDB

Understanding the purpose of uses of Sharding

Understanding Sharded Cluster Components

Harshed Sharding and Ranged Sharding

Handling Collation in Sharding

Understanding Zones

Introduction to Sharded Cluster Administration

## **Node.js**

Understanding the Web

Architecture of a Web Application

Server Side Scripting

Client Side Scripting

Importance of Performance

### **Introduction to Node.js**

What is Node.js

Advantages of Node.js

Installing Node.js and Configuring Node.js

Architecture of Node.js

Appreciating the Performance of Node.js

Understanding Event Driven code execution and Asynchronous Events in Node.js

Understanding Event Emitters

### **Implementing Node.js**

The Node lifecycle

Creating and running a Node Server



Handling Requests and Responses  
Routing and Redirecting Requests  
Handling Streams, buffers and Events  
Handling Multi-processing in Node.js  
Handling Run time Errors

### **Modules in Node.js**

Understanding Modules in Node.js  
Exploring various built-in Modules  
Third party Modules for Node.js  
Introduction to Node Package Manager - NPM  
Understanding Global and Local NPM Packages  
Installing and Updating a Module  
Deleting a Module  
Introduction to various NPM Modules

### **ExpressJS Framework**

Introduction to ExpressJS Framework  
Why the need for Express Framework  
Overview of ExpressJS framework  
Installing ExpressJS  
Understanding Request and Response Objects  
Exploring ExpressJS  
Configuring ExpressJS  
Understanding Middleware

Understand How Middleware Works in ExpressJS  
Add a Middleware  
Creating Custom Middleware  
Handling Requests and Responses  
Handling Routing  
Using ExpressJS Router  
Path Filtering  
Creating and Serving HTML Pages  
Using Jade Templates  
Navigating Datasets  
Using REST in ExpressJS  
Handling POST  
Handling JSON data  
Handling Errors

**Real Time Project using MERN Stack  
InterView Preparation**

**Previous batches projects:**

[https://github.com/programmerpraveenkumar/careerx\\_mern\\_dec\\_2023](https://github.com/programmerpraveenkumar/careerx_mern_dec_2023)

[https://github.com/programmerpraveenkumar/shopping\\_cart\\_react\\_js](https://github.com/programmerpraveenkumar/shopping_cart_react_js)

[https://github.com/programmerpraveenkumar/spectrum\\_may2024](https://github.com/programmerpraveenkumar/spectrum_may2024)