Mern Stack Web Development

"Great web design without functionality is like a sports car with no engine."

~Paul Cookson

Frontend Module

Topics	Sub-topics	Details
Getting started with Basics	History of Web	Understanding how and who built the web
	Client server architecture	General architecture used by websites
	What happens when you visit a website	Learning what happens behind the scenes while opening a website
Introduction to HTML	HTML structure	How to create the structure of a web page
	Tags in HTML	Learning about various tags in HTML like <a>, etc
More on HTML	More tags	Practice creating HTML with more tags
	Block v/s Inline elements	Understand the difference between inline and block HTML elements
	Table	Learn to create tables in HTML
Forms	Form	How to create the structure of a web page
	Form fields	What is an HTML form
Intro to CSS	CSS Introduction	What is CSS and how to use it in HTML
	Blog page	Building and styling the blog project

Topics	Sub-topics	Details
Styling with CSS	CSS units	Learning about various CSS units used to style HTML elements
	CSS box model	Understanding the CSS box model
Starting with Resume project	Starting the project	Start building the Resume project by creating the HTML structure
Flex	Intro to Flex	Introducing SASS, setting up SASS for our project
	Flex properties	Explaining 1:1, 1:M and M:M DB relations
	Using flex in Resume	Utilising flex to style the Resume project
Responsive designs	Media queries	Learning storage in SQL databases
Completing Resume	Pseudo elements	What are pseudo elements and where to use them
	Finishing up	Finish building the Resume project
Animations and 3D space	Animation properties	Basics of CSS animation and how to animate HTML elements using animate.css
Bootstrap	Frontend frameworks	What are frontend frameworks and how to use one
	Grid system	Learning about grid system of bootstrap
	Bootstrap components	Using various other bootstrap elements like Navbar, Jumbotron etc
Major Project	Assignment	Build a music player project with your newly gained skill set

Topics	Sub-topics	Details
Getting started with JavaScript	Intro and History of JS (ECMA)	What is JS and history of JS
	First JavaScript Code Various IDEs available	Various IDES available.
Fundamentals of JS	Variables, Data Types	Learning the basics of the language
	Operators & Conditional Statements	Working with operators and conditional statements
Loops, Arrays, Function & Objects	loops	Working with various loops
	Functions expressions v/s Function declaration.	Difference between a function expression and declaration
	Arrays and its usage and Intro to Objects	What are arrays and using array functions like splice, slice, etc. Introduction to objects in JS.
Working of JS	Execution Context, Hoisting, Call Stack	Learning the internal working of the language.
	Scope	Understanding scope in JS
	Closures	What are closures and its application
	JS Runtime Environment	Introduction to JRE and its components.
Functions in JS	Arrow, IIFE, Pure/ Impure	Different types of functions
	Callback Functions	What are Callback functions, and when they are used
	Higher Order Functions	What are Higher Order Functions and its application

Topics	Sub-topics	Details
Functions in JS	Map, reduce, and filter	Working of map() reduce() and filter() functions
OOP in JS	Object, Constructor Function	Understanding creation and access of objects, 'this' keyword, Constructor function, and its usage
	Prototype	Understanding Prototype and its chain in objects and Array
	Destructuring	Learning Object and Array destructuring
ES6 Classes	Class in JS	Understanding classes and its usage
	Encapsulation, Inheritance	What is Encapsulation and Inheritance
	Built-In classes in JS, JSON, Shallow, and Deep copy	Learning built-in JS classes, introduction to JSON and Copy in JS
DOM Manipulation	API, DOM	What is DOM, and how to access it?
	DOM Selectors	Different types of selectors
	Event Listeners and Event Propagation	Creating and removing Events and different event listeners available
Mini-Project: Quiz Game	Assignment	Project setup, Displaying question and correct option
	Shuffle Options, Using JSON	Working for the completion of Project
JS ASYNCHRONOUS	Callback, Promises	What are promises and callbacks in Javascript, Why to use
	Async Await	What are Async-Await in Javascript, Why that is important.
Modules in js	What are modules?	Introduction to Modules.
	Import/Export	Named and default Import/Export

Topics	Sub-topics	Details
jQuery	Intro to jQuery	What is jQuery and what is the need for it
	Event handling in jQuery	Handling various JS events with jQuery and exploring the library
Git	Intro to Git	What is git and why it's helpful
	Branches	Exploring branches in Git. How to create branches.
	Git workflow	Understanding push, commits, pull requests and using git for teams and individual

Backend Module

Topics	Sub-topics	Details
Getting Started With NodeJS	What is NodeJS	Understanding Runtime environments and its role, why NodeJS is popular
	How NodeJS works	Eventloop , Libuv
	Creating server	Creating server using HTTP , returning HTML Content.
Modules in NodeJS	Types of Modules	List of Core modules in NodeJS.
	FilesSystem , Path Modules	CRUD operations using File System , Parsing and Joining Path using path module
	npm, nvm , nodemon	Using npm init , using nvm for version management , Using nodemon
Exploring More Modules	Nodemailer	Sending emails in NodeJS.
	Events in NodeJS	How events works, Creating custom events

Topics	Sub-topics	Details
Getting Started with Express	Testing APIs	Installing Postman and testing Post request.
	Understanding Express.js	Installing and creating server using Express.js.
	Understanding middleware	Understanding app.use, order of middlewares
	Types of requests	How to handle a specific request types and send responses
Model-View-Controller - I	Understanding MVC	Understanding Model , View and Controller
	View engines	Understanding EJS - View engine.
	Creating Layouts	Creating layout files and embedding products into layout.
Model-View-Controller - II	Working with Forms	Creating a form view to post new data and controller to receive data
	Validation Middleware	SRP Violation
	Express validator	Installing Express validator, creating validator middleware
File Upload, Session and Cookies	File Uploading	Using Multer, storage configuration.
	Understanding Sessions	Creating session on login, storing & retriving data in session, express-session
	Understanding Cookies	Cookie vs session, creating cookie, storing data in cookie, deleting cookie
Getting started with API	Understanding REST APIs	Why REST, how it works , applications of REST.
	Setting up routes	Understanding and setting up routes
	Query params	Reading Router params , filter Products using query params

Topics	Sub-topics	Details
Securing APIs	Basic Authentication	Authentication Vs Authorization
	Understanding JWT	How JWT works and How to use in REST APIs.
Adding More features to E-Com App	Using Swagger	Swagger Implementation for NodeJS APIs, Testing Swagger
	CORS	what is CORS, Calling APIs from JS App.
Handling Errors	Creating Loggers Middleware	Creating middleware to log requests in files, and applying it at the controller and route level
	Custom error handling middleware	Customising error handling middleware
Getting Started with Databases	Types of Databases	SQL vs NOSql
	Documents and Collections	Creating collections and documents
	CRUD in MongoDB	Create, retrieve, update and delete document
MongoDB with NodeJS - I	Understanding Repository Patterns	Understanding Repository pattern and its advantages
	Hash Passwords	Using hash to store passwords
MongoDB with NodeJS - II	Understanding Index	What is an index and its advantages, type of index, creating an index
	MongoDB Operators	Comparison, Logical, projection and aggregation operators
Working with Mongoose - I	Understanding Mongoose	What is ORM, connecting using Mongoose.
	Creating schemas	Creating various schemas
Working with Mongoose - II	Validations in Mongoose	Implementing Validation in mongoose
	References and relationships	Understanding relationships with examples, Multiple references
Socket Programming	Setting up server using Socket.io	What is Socket Programming and its application, How it works, Storing chats in Databases
Task Runners in NodeJS	Grunt	Setup gruntfile, minifying JS and CSS using grunt

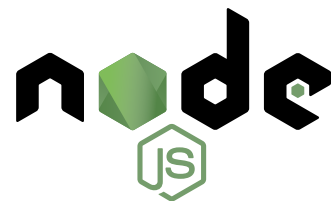| Topics	Sub-topics	Details
Deployment	Gulp	Setup gulp, file transformation and image optimization using Gulp
	AWS EC2	What is deployment and its need, Understanding EC2
	Creating Databases	Setting Up mongoDB on AWS and creating Databases.
	Deploying NodeJS on AWS	Building NodeJS files and deploying NodeJS on AWS.

React Module

Topics	Sub-topics	Details
Introduction to React	What is React?	Features of React
	SPAs vs. MPAs	Difference between Single page and Multi page applications
	How React works?	How Virtual DOM and Babel are working under the hood?
	Creating First React Element	VS Code Basics, What is JSX?
	React Components	Functional Component, React Fragments, React dev tools,
Learning JSX	JSX Expressions	Rendering Javascript inside JSX (Variables, data types, functions)
	Rendering Arrays and Objects	How to render list of items from an array (using map function) and objects rendering in React
	Conditional Rendering	Conditional rendering using Ternary, AND and OR operators

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Score-Keeper App	Event Handling	How to handle events in JSX?
	Forms in JSX	How to take input and display form data in JSX?
	Accessing Input Values	Using refs to access React elements
Create-React-App	CDNs and Webpack	Drawbacks of CDNs, Using Module Bundler in React Project
	Tools Installation	Installing required tools for creating a React Project
	Folder Structure	Understanding the folder and files structure
	Import/Export	How to import and export components in files?
React Components - I	Class Based Components	How to create class based components?
	Movie-App Project	Creating and adding functionalities to Movie App
	State in React	Adding state to components
React Components - II	Props	What are props, passing data through props from one component to another, Default props

Topics	Sub-topics	Details
Styling in React	Drawbacks of global scope of styling file (CSS)	Understanding CSS Scope to avoid colashes in classNames
	Limiting the scope of styling using inLine styling	Creating inline styles for the elements, styling objects in the component.
	Styled Components	Writing styled components to limit the scope of styling
	Dynamic Styling	Styling Application based on a condition using styled-components
	CSS Modules	Modern styling techniques used by developers
Component Lifecycle Methods	Component Lifecycle	Different Phases of Component lifecycle like mounting, umounting, etc.
	Mounting Phase	Lifecycle methods involved during execution and their order
	Side Effects	How and where to perform side effects
	Updating Phase	Methods involved in the updating phase
	Un-mounting Phase	Performing clean-ups during un-mounting
	Error-handling	Creating Error-Boundary
React Hooks	Use Effect, use State and other	What are hooks, why do we use them and various React hooks out there

Topics	Sub-topics	Details
Firebase 9	Introduction to Firebase	Understanding what is firebase and how it actually works
	Firebase Setup	Setting up firebase and adding it to the project
	CRUD with Firebase	Learning how to create, read, update and delete data from firebase
	Querying Data	Querying data from firebase
React Router v6	Routing	Building navigation and showing different pages for different routes.
Context API	Context API	Passing Arguments to the component tree without passing props at every level.
Redux in React	What is Redux?	Why Redux is used? What is the Data Flow?
	Store, Action, Reducers	Fundamental Principles of Redux, applying them practically
	Thunk Middleware	Allows you to write action creators that return a function instead of an action.
Redux Toolkit	Redux Toolkit	Set of tools that helps simplify Redux development

Tools and Techniques

Projects

Music Player
Build and style a music player like Spotify/Youtube Music using HTML, CSS and JS.

Stock Market Analysis
A project which allows users to add different stocks to their portfolio and get real-time data on their stocks using API, which automatically updates after a few sec.

Easily
A job portal based on MVC architecture, enabling recruiters to post and manage job listings, while also providing a user-friendly platform for job seekers to discover and apply for suitable roles.

Postaway
A social media application based on REST API with a user-friendly interface to register and authenticate users, create a post, and to like and comment on that post.

ChatterUp
A real-time chatting application powered by the Socket.io library.

iPod
Build a clone of iPod nano 5th gen

PhotoFolio
An online photo album app that allows users to upload, organise, and share their digital photos.

BusyBuy
A web-based application that allows users to browse and purchase products online