



**PREMIUM**  
COURSE

# Full Stack Web development



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## Course Curriculum



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## **Introduction to Programming**

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Learn the absolute basics of most popular programming languages (C++ / Java / Python) online and become an expert in the core fundamentals of programming.

## **Data Structures and Algorithms**

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Data structures and algorithms is all about organizing the information and finding the most efficient approach to solve a problem. Learning these concepts will in turn help you to improve your problem solving skills and solve any real-world problems using technology.

## **Front End Development with React**

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Learn how to use React, Redux, and modern JavaScript to build powerful and fast React applications from the ground up using Webpack, Babel, Redux and more.

## **Backend Development**

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Learn how to build APIs highly functional server programs on web servers.

## **Aptitude Preparation**

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Enhance your Quantitative Aptitude, Logical Reasoning, Verbal Ability and Data Interpretation skills and conquer the aptitude round of the interviews .

## **OS, DBMS and System Design**

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Learn OS / DBMS and System Design to crack tech interviews with ease.



# Introduction to Programming

## TOPIC- Basics of Programming

### SUB-TOPICS

### DETAILS

Flowcharts

Introduction to flowcharts, Decision making using flowcharts, Loops, Example problems

Variables and Data types

First program, Variables and data types, Taking input, How data is stored in memory, Arithmetic Operators

Conditional statements

Introduction to If else, Relational and logical operators, Nested conditionals

## TOPIC- Loops and Functions

### SUB-TOPICS

### DETAILS

While loops

While loops, Flow of execution of statements in while loop, Example problems using while loop

Patterns

Introduction to patterns, Basic Patterns, Square Patterns, Triangular Patterns, Character Patterns, Reverse-



Patterns	Triangle, Inverted patterns, Isosceles triangles
For loops	For loops, Break and Continue, increment - decrement operators
Functions	Introduction to functions, Working of function calling, Variables and its scope, Pass by value

## TOPIC- Arrays

SUB-TOPICS	DETAILS
Introduction to arrays	Introduction to arrays, How arrays are stored in memory, Passing arrays to functions
Searching and Sorting	Understanding Binary Search, Selection sort, Bubble sort, Insertion sort, Merging two sorted arrays

## TOPIC- Strings and 2D Arrays

SUB-TOPICS	DETAILS
Strings	Introduction to strings, storage of strings and their inbuilt functions
2D Arrays	2D arrays, Storage of 2D arrays, Example problems using 2D Arrays



# Data Structures

## TOPIC- Problem Solving Techniques

SUB-TOPICS	DETAILS
Recursion	Introduction to recursion, Principle of mathematical induction, Fibonacci numbers, Recursion using arrays, Recursion using strings, Recursion using 2D arrays
Time and space complexity	Order complexity analysis, Theoretical complexity analysis, Time complexity analysis of searching and recursive algorithms, Theoretical space complexity, Space complexity analysis of merge sort

## TOPIC- Object oriented programming

SUB-TOPICS	DETAILS
Basics of OOP	Introduction to oops, Creating objects, Getters and setters, Constructors and related concepts, Inbuilt constructor and destructor, Example classes
Advance concepts of OOP	Static members, Function overloading and related concepts, Abstraction, Encapsulation, Inheritance, Polymorphism, Virtual functions, Abstract classes, Exception handling



## TOPIC- Linear Data Structures

### SUB-TOPICS

### DETAILS

Linkedlists

Introduction to linked list, Inserting node in linked list, Deleting node from linked list, Midpoint of linked list, Merge two sorted linked lists, merge sort of a linked list, Reversing a linked list

Stacks and Queues

Introduction to stacks, Stack using arrays, Dynamic Stack class, Stack using linked list, Inbuilt stack, Queue using arrays, Dynamic queue class, Queue using linked list, Inbuilt queue

## TOPIC- Trees

### SUB-TOPICS

### DETAILS

Generic Trees

Introduction to Trees, Making a tree node class, Taking a tree as input and printing, Tree traversals, Destructor for tree node class

Binary Trees

Introduction to Binary Trees, Taking a binary tree as input and printing, Binary Tree traversals, Diameter of binary tree

Binary Search Trees

Introduction to Binary Search Trees, Searching a node in BST, BST class, Inserting and Deleting nodes in BST, Types of balanced BSTs



## TOPIC- **Advanced Data Structures**

SUB-TOPICS	DETAILS
Priority Queues	Introduction to Priority Queues, Ways to implement priority queues, Introduction to heaps, Introduction to Complete Binary Trees and its implementation, Insert and Delete operations in heaps, Implementing priority queues, Heap sort, Inbuilt Priority Queue
Hashmaps	Introduction to Hashmaps, Inbuilt Hashmap, Hash functions, Collision handling, Insert and Delete operation implementation in hashmap, Load factor, Rehashing
Tries	Introduction to Tries, Making a Trie Node class, Insert, Search and Remove operation implementation in Tries, Types of Tries, Huffman Coding
Graphs	Introduction to Graphs, Graph Terminology, Graph implementation, Graph Traversals (DFS and BFS), Weighted and Directed Graphs, Minimum Spanning Trees, Cycle Detection in Graphs, Kruskal's algorithm, Prim's Algorithm, Dijkstra's algorithm



## TOPIC- **Dynamic Programming**

### SUB-TOPICS

### DETAILS

Introduction to  
Dynamic Programming

Introduction to Memoization, Introduction to Dynamic Programming, Fibonacci numbers using recursion, memoization and dynamic programming

Applications of  
Dynamic Programming

Longest Common Subsequence (LCS) using recursion, memoization and dynamic programming, Edit distance using recursion, memoization and dynamic programming, Knapsack problem using recursion, memoization and dynamic programming





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# Front-end Development with React

## TOPIC- Introduction to HTML

SUB-TOPICS	DETAILS
HTML structure	How to create the structure of a web page
Tags in HTML	Learning about various tags in HTML like <code>&lt;a&gt;</code> , <code>&lt;ul&gt;</code> etc

## TOPIC- Intro to CSS

SUB-TOPICS	DETAILS
CSS Introduction	What is CSS and how to use it in HTML
Blog page	Building and styling the blog project

## TOPIC- JavaScript: Functions and Arrays

SUB-TOPICS	DETAILS
Scope	Understanding scope in JS
Hoisting	What is hoisting and its application



Functions expressions v/s  
Function declaration

Difference between function expression  
and declaration

Arrays and its usage

What are arrays and using array  
functions like splice, slice etc

## TOPIC- Objects and Timing Events

### SUB-TOPICS

### DETAILS

Intro to Objects

What are objects, how to create  
them and using different notations  
to access object's data

Object functions

Learn to iterate over objects, delete  
object properties, creating nested  
objects

## TOPIC- Understanding DOM

### SUB-TOPICS

### DETAILS

DOM

Understanding DOM, what it is, how to  
access elements from the DOM

Events

How to manipulate DOM events in JS



## TOPIC- Closures

SUB-TOPICS	DETAILS
Revision	Revising some old concepts like Scope, window object etc
IIFE	What are immediately invoked function expressions
Closures	What are closures and its application
Arrow functions	Learning about arrow functions and bindings in arrow functions

## TOPIC- Constructors and Prototypes

SUB-TOPICS	DETAILS
“this” keyword	How does the “this” keyword works in JS
Prototypes	Discussing what are prototypes in JS, why do we use them and its application
Class	Learning about using classes in JS and how to deal with class inheritance in JS



## TOPIC- Intro to React

### SUB-TOPICS

### DETAILS

SPAs v/s MPAs

Difference between Single page apps and Multi page apps

React philosophy

What is React's philosophy?

React v/s others

Why React stands out from other JS libraries and frameworks

## TOPIC- Intro to Redux

### SUB-TOPICS

### DETAILS

All about Redux

What is redux, why and when do we use it

Setting up the project

Setting up the Movie search project

Adding UI

Start adding components to the project



## TOPIC- Redux: Actions, Reducers, Store

SUB-TOPICS	DETAILS
Reducers	What are reducers and creating reducers for the app
Actions	What are actions, dispatching actions, creating actions for the app
Store	What is store, subscribing to the store and adding store to the project

## TOPIC- Major Project: Routing and Auth

SUB-TOPICS	DETAILS
React router	Adding react router to the project to handle different routes
Auth in SPA	Understanding how auth works for SPAs
Form handling	Ways to handle form in React
User login	Building the user login functionality



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## TOPIC- **React Hooks**

### SUB-TOPICS

useEffect, useState and other hooks

### DETAILS

What are hooks, why do we use them and various React hooks out there



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# Back-end Development

## TOPIC- Node.js : The Beginning

SUB-TOPICS	DETAILS
Intro to Node	Introduction to the course, hello world with nodejs
Setting up	Setting up tools and the project

## TOPIC- Node.js : Writing Our First Server

SUB-TOPICS	DETAILS
Intro to servers	What are servers and how one can use them
Setting up node server	Beginning the project by setting up the very first node server
nodemon	Introducing nodemon to monitor changes made to the server



## TOPIC- Manual Authentication

SUB-TOPICS	DETAILS
User schema	Setting up user schema for our app
Cookies	What are cookies and how to use them in the app
User sign up and sign in	Build user sign in and sign up flow and learn how to authenticate users manually

## TOPIC- Authentication Using Passport js

SUB-TOPICS	DETAILS
Intro to passportjs	What is passportjs, setting up passportjs for the project
MongoStore setup	Setting up MongoStore for session cookies

## TOPIC- Database Relations (Posts, Comments)

SUB-TOPICS	DETAILS
DB relations	Explaining 1:1, 1:M and M:M DB relations
Relationship for Post and Comments	Understanding the relationship between Post and Comments, creating schemas for both





SQL storage

Learning storage in SQL databases

## TOPIC- Deleting and Updating Objects in Database + Distributing Views

### SUB-TOPICS

### DETAILS

Deleting Posts/Comments/Users

Understanding how deletion works with Posts and Comments

User profile

Working on user profile and updating SCSS for other pages

## TOPIC- Async Await + Error Handling

### SUB-TOPICS

### DETAILS

Async await

What is async await and converting our code to async await

Flash messages

How to create flash messages, using Noty to show flash messages



## TOPIC- File upload

SUB-TOPICS	DETAILS
Intro to file upload	Learning how to handle file uploads
Multer	Using multer to handle profile picture upload in the project

## TOPIC- APIs (making APIs and JWT authentication)

SUB-TOPICS	DETAILS
Intro to APIs	What are APIs and why do we use them
JWT	Understand what is JWT, how does authentication and authorization works, build some APIs for the same,

## TOPIC- Social Authentication (Mini Lecture)

SUB-TOPICS	DETAILS
Social auth with Google	What is social authentication and how does it actually works
Using passport for Google auth	Setting up passport for google social auth



## TOPIC- **Parallel Jobs + Mailer**

SUB-TOPICS	DETAILS
Nodemailer	Intro to mailers, setting up Node-mailer for sending emails
Sending mails	Learn how to setup and send emails for your project
Delayed jobs	Understand what are delayed jobs and how they can be helpful using the Kue library



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# Aptitude Preparation

## TOPIC- Numbers

SUB-TOPICS	DETAILS
Introduction to Number System	Number System, Remainder theorem, Unit Digit
Progressions	Arithmetic progression, Geometric progression
HCF and LCM	Finding factors of a number, Shortcuts for finding prime number, Concept of HCF, Problem Solving on HCF, Concept of LCM, Problem Solving on LCM

## TOPIC- Averages and Mixtures

SUB-TOPICS	DETAILS
Averages	Introduction to Averages, Assumed average approach, Standard Situation in Averages, Concept of Weighted Averages, Standard Situations involving weighted average
Alligations	Introduction to alligations, Standard problems involving using alligations



## TOPIC- Arithmetic and Word problems

SUB-TOPICS	DETAILS
Percentages	Concept of percentages, Concept of percentage change, Percentage Change Graphic, PCG applied to Product change, PCG Applied to Product Constancy, Product Constancy Table, The fractional view to the product constancy table,
Ratio, Proportion and Variation	Concept of Ratios, Multiplier logic, Concept of proportion, Variation and its types
Profit and loss	Basic concept of Profit and loss, Concept of Simple Interest, Concept of Compound Interest
Time and work	Introduction to Time and Work, Time and work(Man Days), Men, Women and Childre

## TOPIC- Counting

SUB-TOPICS	DETAILS
Probability	Basics of Probability, Problems on Coins, Problems Based on Dice, Problems Based on Cards, Problems Based on Balls from the Box, Word Based prob- lems on Probability
Permutation and Combination	Introduction to Permutation and Com- bination, The selection Formula, Distrib- ution of Identical Objects, Formula for Arrangements, Circular arrangement



## **TOPIC- Time, Speed and distance**

<b>SUB-TOPICS</b>	<b>DETAILS</b>
Introduction to Time, Speed and Distance	Introduction to Time, Speed, Distance The proportionalities in equations Solving problems on TSD
Relative Speed	The concept of Relative Speed Questions based on Relative Speed
Application of TSD	Concept of Circular Motion, Train problems Boats and Stream problems, Races and Games

## **TOPIC- Reasoning**

<b>SUB-TOPICS</b>	<b>DETAILS</b>
Recognising Patterns	Recognising alphabetical patterns, Recognising numerical patterns, Coding Decoding Question Patterns
Syllogisms	Introduction to Syllogisms, Problems on Syllogisms
Blood relation and calendars	Solving problems on Blood Relations, Concept of Calendar, Problems on Calendar



## TOPIC- English

### SUB-TOPICS

### DETAILS

Reading Comprehension

Reading effectively reading comprehension, How to find main idea, Solving reading comprehension

Sentence completion/  
Fill ups

Theory of Fill Ups/ sentence completion, Questions on sentence completion

Vocab, Antonym and  
Synonyms

Introduction to English,  
Vocab-Root Words,  
Synonyms and Antonyms

## TOPIC- Data Interpretation

### SUB-TOPICS

### DETAILS

Basic Concept of Data  
interpretation

Introduction to Data interpretation,  
Problems on Data interpretation

Charts

Reading Pie charts,  
Reading Bar Charts,  
Reading tables and X-Y Charts,  
Problems on Charts



## TOPIC- **Miscellaneous topics**

SUB-TOPICS	DETAILS
Set theory	Introduction to Set Theory, Problems on Set theory
Log	Introduction to logs, Problems on logs
Mensuration	Cubes and Cuboids, Spheres and Cylinders, Cones, Prisms and Pyramids





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# OS, DBMS and System Design

## TOPIC- DBMS

SUB-TOPICS	DETAILS
Introduction to DBMS	What is Database, Architecture of DBMS, Data Abstraction & Data Independence, Data Models, ER Model - 1, ER Model - 2, Relational Model
SQL	What is SQL, DDL Commands - 1, Constraints on DDL Commands, DDL Commands - 2, Alter Command, DML Commands, Aggregate Functions, DRL/DSL Commands, Group By, Distinct Keyword, IN Operator, BETWEEN Operator, LIKE Operator, DCL Commands
Normalization	Normalization, Functional Dependency, Axioms, Closure, 1NF, 2NF, Example : 2NF, 3NF, Example : 3NF, BCNF

## TOPIC- Operating System

SUB-TOPICS	DETAILS
Introduction to OS	What is Operating System?, Process And Process States, Modes Of Operating System, Process Control Block, Process Scheduling Queues, Schedulers Of Operating System, Process Sched-



## Introduction to OS

ulating Algorithms, Priority & Round Robin Scheduling, Preemptive Shortest Job First Scheduling, Process Synchronization And Race Condition, Critical Section, Peterson's Solution, Semaphores, Producer Consumer Problem, Solution To Producer Consumer Problem

## Deadlock

Introduction To Deadlock, Methods For Handling Deadlock, Deadlock Prevention, Deadlock Avoidance - Banker's Algorithm, Distribution Of Banker's Algorithm, Safety Algorithm, Resource Request Algorithm

## Memory Management

Process Address Space, Static Vs Dynamic Loading, Swapping, Fragmentation, Paging, Associative Memory, Segmentation, Virtual Memory, Demand Paging, Page Replacement, Page Replacement Algorithms

## Threads

Introduction To Thread, Difference Between Process And Thread, Types Of Thread, Multithreading Models

# TOPIC-System Design

## SUB-TOPICS

Fundamentals of System Design

## DETAILS

Components of system design discussions, Example problems



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# Tools and Technologies taught in course:

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# Projects Covered



## Mini Calculator

Build a calculator web app with Javascript as the core and style it with CSS



## Shopping Cart

Build the basic functionality of shopping cart as you see in Amazon and Flipkart



## Chatting Engine

Build a basic chat engine using sockets, which enables the users to chat with each other on the website



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## Social Media website

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Create a social media website with popular features like post, comment etc using Node.js, Mongo DB and more



## Music Player

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Build and style a music player like Spotify /Youtube Music using HTML and CSS



## Mini Contact List

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Understand how the backend works and create a contact list by storing the data in a DB



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## iPod

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Build a clone of iPod nano 5th gen



## Movies App

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Search any movie and store it as your favourite



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# Testimonials



VAIBHAV MEHRA



*I took the Full Stack Web Development course that helped me a lot during interviews. We were asked to make many projects that proved to be fruitful.*

”



DHARNEESH GUPTA



*My experience at Coding Ninjas was exceptional. The outstanding course content helped me to enhance my logic and made me aware about how to approach a hard coding problem*

”



NAMAN MITTAL



*I liked Coding Ninjas' course structure as it covered all topics. The faculty helped me in building a strong base. I would recommend all to connect with CN.*

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