

0 □ COMPUTER & WEB FOUNDATION (MANDATORY)

- What is Computer
- Hardware vs Software
- Operating System Basics
- How Internet Works
- Client vs Server
- Request–Response Cycle
- What is a Website
- What is a Web Application
- Static vs Dynamic Websites
- Browser Internals
- How Browsers Render Pages
- HTTP Protocol
- HTTPS & SSL/TLS
- HTTP Methods (GET, POST, PUT, PATCH, DELETE)
- HTTP Status Codes
- DNS
- IP Address
- Ports
- Hosting Basics
- Domain Basics
- CDN Basics
- Cookies vs Sessions
- Local Storage vs Session Storage

- Caching Basics

□ □ 1 □ PROGRAMMING FOUNDATION (JAVASCRIPT CORE)

JavaScript Basics

- What is JavaScript
- JS History & ECMAScript
- How JS Works
- Variables (var, let, const)
- Data Types
- Type Coercion
- Operators
- Control Flow
- Loops
- Functions
- Function Expressions
- Arrow Functions
- Scope
- Hoisting
- Closures

Advanced JavaScript

- Execution Context
- Call Stack
- Memory Heap

- Event Loop
- Synchronous vs Asynchronous
- Callbacks
- Promises
- Async / Await
- Error Handling
- Try / Catch
- Custom Errors
- Timers (setTimeout, setInterval)

JavaScript Objects & Arrays

- Objects
- Arrays
- Array Methods (map, filter, reduce, etc.)
- Object Methods
- Destructuring
- Spread Operator
- Rest Operator
- Optional Chaining
- Nullish Coalescing

Modern JavaScript (ES6+)

- Modules
- Import / Export
- Template Literals
- Default Parameters
- Iterators

- Generators
- Symbols

□ 2 □ MongoDB (DATABASE – NOSQL)

MongoDB Basics

- What is Database
- SQL vs NoSQL
- Why MongoDB
- MongoDB Architecture
- BSON
- Documents
- Collections
- Databases

MongoDB CRUD

- Insert Operations
- Read Operations
- Update Operations
- Delete Operations
- Query Operators
- Projection
- Sorting
- Pagination
- Limit & Skip

MongoDB Advanced

- Indexes
- Types of Indexes
- Compound Indexes
- Text Index
- TTL Index
- Aggregation Framework
- Aggregation Pipeline
- Lookup (Joins)
- Group
- Match
- Facet

Schema Design

- Embedded Documents
- References
- Data Modeling Patterns
- One-to-One
- One-to-Many
- Many-to-Many

MongoDB with Mongoose

- What is Mongoose
- Schemas
- Models
- Validation
- Middleware (pre, post)
- Population

- Virtuals
- Transactions
- Pagination Plugins

MongoDB Production

- Atlas
- Backup & Restore
- Replication
- Sharding
- Performance Optimization
- Security Best Practices

□ 3 □ Node.js (BACKEND RUNTIME)

Node.js Basics

- What is Node.js
- Why Node.js
- Node Architecture
- Single Threaded Model
- Event-Driven Programming
- Non-Blocking I/O

Core Node Concepts

- Modules
- CommonJS vs ES Modules
- File System (fs)
- Path

- OS Module
- Events
- Streams
- Buffers
- Process Object
- Environment Variables

Asynchronous Node

- Callbacks
- Promises
- Async/Await
- Error Handling
- Event Emitters

Node.js Advanced

- Cluster
- Worker Threads
- Memory Management
- Performance Optimization
- Debugging Node Apps
- Logging

□ 4 □ Express.js (BACKEND FRAMEWORK)

Express Basics

- What is Express.js
- Express Architecture

- Setting up Express App
- Routing
- Route Parameters
- Query Parameters
- Request & Response Object

Middleware

- What is Middleware
- Built-in Middleware
- Custom Middleware
- Third-Party Middleware
- Error Handling Middleware

API Development

- REST API Design
- CRUD APIs
- MVC Architecture
- Folder Structure
- API Versioning
- Pagination
- Filtering
- Sorting

Authentication & Security

- Authentication vs Authorization
- JWT
- Access Token

- Refresh Token
- Cookies Auth
- Sessions Auth
- Password Hashing (bcrypt)
- Role-Based Access Control
- OAuth
- Social Login

Express Advanced

- Rate Limiting
- CORS
- Helmet
- CSRF Protection
- Input Validation
- File Uploads
- Email Integration
- Payment Gateway Integration

□ 5 □ React.js (FRONTEND)

React Basics

- What is React
- SPA vs MPA
- Virtual DOM
- JSX
- Components

- Functional Components
- Props
- State
- Events
- Conditional Rendering
- Lists & Keys

React Hooks

- useState
- useEffect
- useContext
- useRef
- useMemo
- useCallback
- Custom Hooks

React Advanced

- Component Lifecycle
- Controlled vs Uncontrolled Components
- Lifting State Up
- Context API
- Prop Drilling
- Performance Optimization
- Memoization

Routing

- React Router

- Dynamic Routes
- Nested Routes
- Protected Routes
- Lazy Loading

State Management

- Redux Basics
- Redux Toolkit
- Store
- Reducers
- Actions
- Middleware
- RTK Query
- Zustand
- Recoil

API Integration

- Fetch API
- Axios
- Error Handling
- Loading States
- Pagination
- Infinite Scroll

UI & Styling

- CSS
- SCSS

- Tailwind CSS
- Material UI
- Ant Design
- Styled Components
- Responsive Design

□ 6 □ TESTING (COMPANY MUST-HAVE)

- Unit Testing
- Integration Testing
- Jest
- Supertest
- React Testing Library
- API Testing
- Postman
- Swagger

□ 7 □ DEVOPS & DEPLOYMENT

- Git
- GitHub
- Git Flow
- CI/CD Basics
- Docker
- Docker Compose
- Environment Configurations
- Nginx

- PM2
- Deployment on: AWS Vercel Render Railway
- AWS
- Vercel
- Render
- Railway
- Domain & SSL Setup

□ 8 □ SECURITY (VERY IMPORTANT)

- OWASP Top 10
- SQL / NoSQL Injection
- XSS
- CSRF
- Rate Limiting
- Secure Headers
- Data Encryption
- Secrets Management

□ 9 □ NEW & FUTURE TOPICS (2025–2026 READY)

- Server Components (React)
- React Server Actions
- Next.js (App Router)
- Edge Functions
- WebSockets

- Socket.io
- Real-Time Apps
- Microservices
- API Gateway
- GraphQL
- Prisma
- AI Integration (OpenAI APIs)
- Background Jobs
- Message Queues (Redis, BullMQ)
- Web Performance Optimization
- System Design Basics
- Scalable Architecture
- Monorepos
- Turborepo
- Nx