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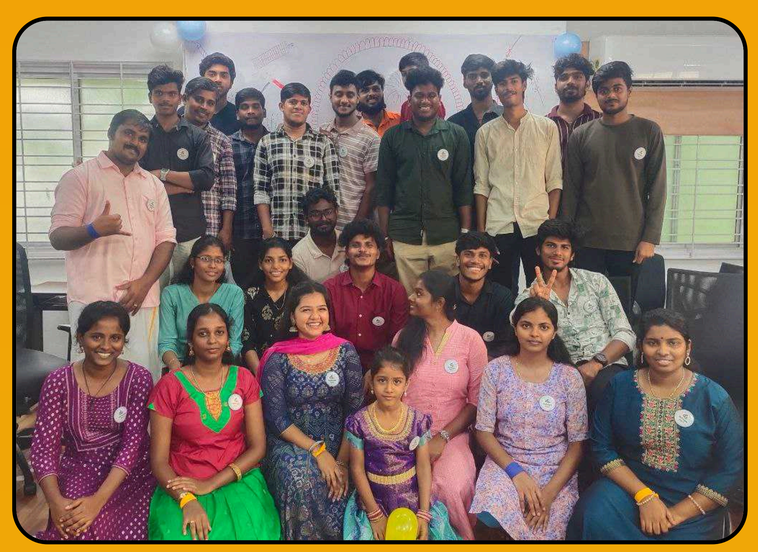

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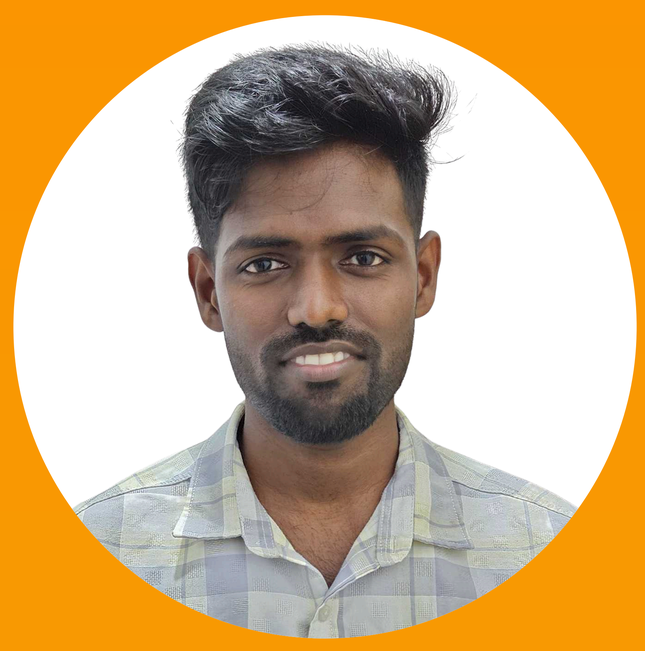

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OPTIONCIRCLE

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Manikandan **B.Sc (2025)**

DATA ANALYST

Valeo

Vigneshwaralingam
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Technology in the Right Way

Swetha.P **B.Sc CS (2025)**

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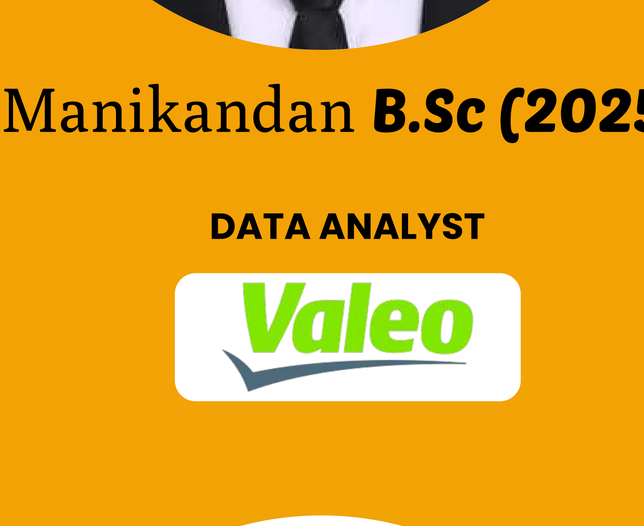

Kavya S **BE CSE (2025)**

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HTML & CSS

Project 1: Facebook / Instagram Login Page

- Introduction To HTML Syntax, Introduction To CSS
- Block-Level Vs Inline Elements
- Common Elements: , , <p>, <a>,
, <hr> & So On
- Flex Properties, Input Types, Nesting Elements Correctly
- Basic Selectors: Element, Class, ID
- Grouping And Combining Selectors, Attribute Selectors
- Combinators:Descendant, Child (>), Adjacent Sibling (+), Sibling (~)

Project 2: Google Landing Page

- Global Attributes: Id, Class, Title, Style, Lang
- Ordered Lists: <Ol>, <Li>, Unordered Lists: <Ul>, <Li>
- Description Lists: <Dl>, <Dt>, <Dd>
- Data Specific Attributes: href, src, alt, type, value, placeholder
- Boolean Attributes: checked, disabled, readonly, required

Project 3: Forms Using HTML & CSS

- <form> Element And Its Attributes (action, method, etc.)
- Input Fields: <input>, <textarea>, <select>, <option>, <button>
- Fieldsets, Legends, And Labels
- Form Validation (required, pattern, minlength, maxlength)
- Understanding Content, Padding, Border, And Margin
- Using Box-Sizing: Border-Box
- Visualizing Box Dimensions With Dev Tools, Margin Collapsing

Project 4: Resume

- Creating Tables With <Table>, <Tr>, <Th>, <Td>
- Table Structure: <Thead>, <Tbody>, <Tfoot>
- Merging Cells With Colspan And Rowspan
- Table Accessibility And Semantics
- Nesting And Styling Lists
- Block, Inline, Inline-Block, None, Flex, Grid
- Visibility: Hidden Vs Display: None

HTML & CSS

Project 5: YouTube

- Introduction To Grid Layout
- Creating Columns And Rows Using Grid-Template-Columns And Grid-Template-Rows
- Placing Items With Grid-Column, Grid-Row
- Grid Gap, Alignment, And Nested Grids

Project 6: Product Card

- Static, Relative, Absolute, Fixed, Sticky
- Using Top, Right, Bottom, Left With Positioning
- Z-Index And Stacking Context
- Media Queries For Responsive Designs

Project 7: ILUGC Website

- Images: <img>, srcset, alt, picture
- Video: <video>, controls, autoplay, loop, muted
- Audio: <audio>, controls, autoplay, loop, preload
- Embedding YouTube And Other Media
- Grid, Navigation Bar, Display Properties
- Mouse Hover Functionalities

Project 8: Portfolio Website

- Importance Of Semantic Elements For SEO & Accessibility
- Elements: <header>, <nav>, <main>, <section>, <article>, <aside>, <footer>
- When And Where To Use Semantic Tags
- Creating A Nav Bar, Internal Linking Multiple HTML Pages, Border Radius

*****Assignments Will Be Given After Each Module*****

JAVASCRIPT

Module 1: Variables And Date Types

- Understand Var, Let, And Const When And Why To Use Each
- Explore JavaScript's Powerful Dynamic Typing System
- Work With Strings, Numbers, Booleans, Null, Undefined, And More

Module 2: Operators & Logic

- Arithmetic, Assignment, Comparison, And Logical Operators
- Master The Building Blocks Of Computation And Condition

Module 3: Conditionals & Control Flow

- Decision-making with if, else, else if
- switch statement
- Ternary Operator
- Write clean, readable branching logic

Module 4: Loops & Iteration

- for, while, and dowhile Loops
- Introduction To forEach() For Working With Arrays

Module 5: Functions

- Function Declarations
- Function Expressions
- Arrow Functions: Cleaner Syntax, Smarter Scopes
- Parameters, Return Values, And Function Composition
- Call Back Function, Closure, Constructor Function

Module 6: Objects & Arrays

- Introduction To Object
- Nested Objects, Object Methods
- Create And Manipulate Object Literals
- Understand This In Different Contexts
- Work With Arrays: push, pop, shift, unshift, splice
- Use Powerful Array Methods: map(), filter(), reduce() for real-world data tasks

JAVASCRIPT

Module 7: Document Object Model (DOM)

- **Selecting Elements:** Use Document.GetElementById, ClassName, TagName, GetElementsByClassName, GetElementsByTagName, QuerySelector & So On
- Change Text, Classes, Styles, Attributes, Creating New Elements, Removing Existing Elements Dynamically
- **Event Handling:** OnClick(), OnMouseHover(), OnDoubleClick(), Add Event Listeners, & So On

Module 8: Asynchronous

- Synchronous
- Asynchronous
- Callback And Callback Hell
- Promise
- Async/Await
- Application Programming Interface (Fetch and Axios API)

PROJECTS

Project 1: Counter App

- Variables, Data Types, Operators
- Interaction With HTML Elements Using DOM

Project 2: Password Hide/Show

- Inputs Types, Interaction With HTML Attributes Using DOM
- Event Handling (onClick())

Project 3: RunAwayButton

- Learn Button And Positions, Interaction With CSS Using DOM
- Event Handling (mouseHover())

Project 4: Typing Speed Checking

- Interaction With HTML Input Box Using DOM
- Event Handling (onInput(), onChange()), Using Arithmetic Operators

JAVASCRIPT

Project 5: To-Do List With Local Storge

- Introduction To Local Storage
- Storing And Retrieving Data
- Creating, Updating, And Deleting HTML Elements Dynamically
- Interaction With CSS (text-decoration)

Project 6: Image Slider

- Functions
- Conditional Statements, Looping
- CSS Positioning
- Event Handling, Basic Animations

Project 7: Calculator

- Use Inbuilt Functions
- Creating Attractive Calculator UI
- Operators, Conditional Statements, Mouse Hover Animations

Project 8: Form Validation

- Conditional Statements, Form Attributes, Event Handling
- Interaction With CSS Using DOM
- Validating Inputs Using Conditional Statements

Project 9: Weather Application

- Fetching Weather Data Using API
- Learn Asynchronous Functions
- Getting Data From JSON as Key And Value
- Using Array Methods: map, forEach
- Sending HTTP Requests

Project 10: Product Card

- Fetching Product Data Using API, Learn Asynchronous Functions
- Adding Features Like Add To Cart Button
- Looping Through Array Methods
- Event Handling (onClick(), onMouseHover())

*****Assignments Will Be Given After Each Module*****

REACT JS

Module 1: React Fundamentals

- What Is React? Why React?
- SPA Vs MPA
- Setup Using Vite Or Create React App
- JSX Syntax And Rules
- Functional Components
- Props And Component Reusability
- Conditional Rendering
- Lists And Keys

Module 2: State Management With Hooks

- useState, useEffect, useRef, useContext
- State Lifting
- Form Handling With Controlled Components

Projects: *Counter Application, Password Hide/Show, Typing Speed Check*

Module 3: React Router (V6+)

- BrowserRouter, Routes, Route
- Link And NavLink
- Nested Routing
- Dynamic Routing With URL Params
- UseNavigate And Programmatic Routing

Projects: *Multi Page Web App, Toggle Theme*

Module 4: Working With APIs

- HTTP Methods And REST Principles
- Using Fetch And Axios, API Calls With UseEffect
- Handling Loading, Error, And Empty States
- Search And Filtering From API Data

Projects: *Weather App, E-Commerce Web App*

PRP COURSE

JAVA

Module 1: Introduction

- Fundamentals Of OOP Concepts
- Benefits Of OOP Programming
- OOPs VS Other Programming Paradigms

Module 2: Introduction To Java

- What Is Java?
- Features Of Java
- Advantages Of Java
- JDK, JVM, JRE Architecture

Module 3: Java Installation

- Java Installation
- Eclipse IDE Installation
- My First Java Program
- Sample Java Program

Module 4: Data Types, Variables And Operators

- Java Tokens, Alphabets (Character Set)
- Primitive VS Non-Primitive Data Types
- Keywords, Java Reserved Keywords, Identifiers, Constants, Data Types, Operators.

Module 5: Control-Flow Statements

- Control-Flow Statements
- Decision-Making Statements
- Switch, IF Else, Nested if
- Ternary Operators
- Break, Continue

Module 6: Conditional Statements

- Looping Statements
  - while, for, doWhile
  - Break, Continue

JAVA

Module 8: Exploring Methods

- Method Calling From Main() Method
- Return Values From Called Method
- Significance Of Void, Return Keywords
- Argument Passing, Local Variable, Global Variable
- Static, Non-Static Variables And Methods

Module 9: Polymorphism

- Introduction To Polymorphism
- Methods With Different No. And Type Of Arguments
- Method Overloading – Compile Time Polymorphism

Module 10: Encapsulation

- Create One More Class In Same Package– Class 2
- Call Methods Present In Class 1 From Class 2
- Significance Of Access Modifiers – Private, Public And Default

Module 11: Encapsulation Part 2

- Create One More Class In Another Package – Class 2
- Try To Call Methods Present In Class 1 From Class 2
- Significance Of Access Modifier – Protected.

Module 12: Inheritance

- Need For Inheritance
- IS-A Relationship
- Usage Of Extends Keyword
- Simple, Multilevel And Hierarchical Inheritance
- Create Child Class In Another Package– Class 2
- Significance Of Access Modifier – Protected.

Module 13: Polymorphism Method Overriding

- Method Overriding
- Type Casting
- super() And this() Keywords

JAVA

Module 14: Constructor

- What Is Constructor
- How Constructor Is Being Called
- Rules For Constructor
- Constructor Overloading

Module 15: Getting Inputs At Runtime

- Scanner Class And Its Methods
- Converting All Their Previous Programs With Scanner Class

Module 16: Arrays

- Need For Array
- Types Of Arrays
- Array Declaration – Two Ways
- 2D, 3 Dimensional Arrays
- Int Array, Char Array, String Array
- Converting All Their Previous Programs With Scanner Class

Module 17: String

- String Class
- String Declaration – Two Ways
- String Immutability Explanation
- Heap Memory, String Constant Pool Memory
- Difference Between String Literal And String Object
- Difference Between == Operator And Equals Method
- ToString() Method, HashCode() Method

Module 18: Abstraction – Introduction

- Details About Abstract Keyword
- Abstract Class
- Abstract Method
- Creating Object For Abstract Class Not Possible – Why
- Dynamic Binding / Late Binding
- Final Abstract Class Not Possible – How

JAVA

Module 19: Inheritance – Interface

- What Is Interface
- Difference Between Abstract Class And Interface
- Usage Of Implements Keyword
- Interface, Sub Interface
- Dynamic Binding / Late Binding

Module 20: Exception Handling

- What Is Exception
- Difference Between Exception And Error
- Syntax For Exception Handling Mechanism.
- Try Block, Catch Block, Exception , Checked Exceptions
- Catch Block (Or) Multiple Catch.
- Throw, Throws, The Finally Block
- User Defined Exceptions.

Module 21: Utility Classes – Introduction

- Collection Framework
- Collection Interfaces
- The List Interface And Its Implementation Classes
- The Set Interface And Its Implementation Classes
- The Queue Interface And Its Implementation Classes
- Map Interface And Its Implementation Classes

Module 22: Utility Classes – List Interface

- ArrayList And Its Methods
- LinkedList And Its Methods
- Difference Between ArrayList And LinkedList
- Iterator Methods

Module 23: Utility Classes – List Interface – Logical Programs

- Getting Input From User And Sorting The ArrayList
- Searching In ArrayList
- Replacing Element In ArrayList

JAVA

Module 24: Utility Classes – Map Interface – Logical Programs

- Find Duplicate Character In A Given String Using HashMap
- Find Unique Characters In A Given String Using HashMap
- Find Count Of Characters In A Given String Using HashMap

Module 25: Generics

- Need For Generics
- Simple Generics
- Sub Typing In Generics

Module 26: Packages

- Predefined Packages
- User Defined Packages

Module 27: Multi Threading

- Threaded Application
- Thread States
- Runnable Interface And Thread Class
- Thread Priority
- Interrupting Threads (Sleep(), Join())
- Synchronization
- Intro. About Inter Thread Communication

Module 28: File IO

- File Class
- How To Read A File – FileReader, BufferedReader
- How To Write In A File – FileWriter, BufferedWriter

Module 29: Java New Features

- What Is Functional Interface?
- Lambda Expression

*****Assignments Will Be Given After Each Module*****

POSTGRESQL

Module 1: Introduction To Databases And PostgreSQL

- What Is A Database? Types Of Databases
- RDBMS Vs NoSQL (With Examples)
- Why PostgreSQL?, Installing PostgreSQL And PgAdmin
- Introduction To PostgreSQL Ecosystem (CLI Tools, GUI, Drivers)

Module 2: SQL Basics – Table Operations & CRUD

- Filtering With WHERE, AND, OR, IN, BETWEEN, LIKE
- Sorting Results: ORDER BY
- Limiting Data: LIMIT, OFFSET
- Aggregate Functions: COUNT, SUM, AVG, MIN, MAX
- Grouping Data: GROUP BY, HAVING

Module 3: Advanced Joins And Subqueries

- Types Of Joins:
  - INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL OUTER JOIN
- Writing Nested Queries And Subqueries
- Using Subqueries In SELECT, WHERE, FROM
- Use Cases In Reporting And Data Analysis

Module 4: Views, Indexes, And Query Optimization

- Creating And Using VIEWs
- Materialized Views: Use Cases And Refreshing
- Creating Indexes: B-Tree
- Expression-Based Indexes
- Query Optimization Basics With EXPLAIN ANALYZE
- When And How Indexes Improve Performance

Module 5: Transactions And Data Integrity

- Transactions: BEGIN, COMMIT, ROLLBACK
- Ensuring ACID Properties
- Save Points And Nested Transactions
- Handling Transaction Errors
- Use Cases: Banking Systems, Form Submissions

POSTGRESQL

Module 6: Functions, Stored Procedures, And Triggers

- Defining SQL & PL/PgSQL Functions
- Returning Values, Variables, And Conditional Logic
- Stored Procedures
- Triggers:
  - BEFORE And AFTER Triggers For INSERT, UPDATE, DELETE

Module 7: Relational Modeling And Database Design

- **Normalization:**
  - 1NF, 2NF, 3NF With Examples
- Entity Relationship Diagrams (ERD)
- **Implementing:**
  - One-To-One
  - One-To-Many
  - Many-To-Many (Junction Tables)
- Using UUID As Primary Keys

Module 8: Access Control And Security

- Creating Database Users And Roles
- **Granting And Revoking Permissions:**
  - GRANT, REVOKE
- Role-Based Access Control (RBAC)
- Best Practices For Securing PostgreSQL In Production
- Schema-Level And Table-Level Permissions

*****Assignments Will Be Given After Each Module*****

SPRING BOOT

Module 1: Spring MVC Architecture

- What Is A Server, Basic Client-Server Architecture?
- Understanding HTTP Methods.
- What Is Spring And Spring Boot?
- Learning The Architecture Diagram Of Spring MVC, Understanding The Flow Of A Spring Boot.

Module 2: Maven Key Concepts

- How To Build A Maven Project?, Maven Life Cycle.
- Building Jar And War, Difference Between Jar And War.

PROJECTS

Project 1: Registration Form Using Spring Boot

- Understanding The Basic Annotations Used For Building A Monolithic Enterprise Application.
- Creating Pojo, Using Lombok Dependency.
- Learn The Basics Of Thymeleaf
- Connecting Controller To View In MVC Model
- Validation Of Incoming Request.

Project 2: Color Picker Using Spring Boot

- Getting Inputs From Thymeleaf View
- Passing It To Controller , Learn The Basics Of Thymeleaf
- Passing List Of String Objects To View

Project 3: Simple Calculator With Spring Boot

- Getting Inputs From View
- Passing Inputs To Controller
- Processing Inputs At Controller Side

Project 4: Product Catalogue For E-Commerce Site

- Adding Entity Class, Passing Model Values To Controller
- Transforming Objects To View From Controller

SPRING BOOT

Project 5: Quiz Application Using Spring Boot

- Creating Quiz Application Using Thymeleaf / React And Springboot And Publishing The Results

Project 6: To Do List

- Learning About HTTP Session Maintenance
- Creating To Do List With Thymeleaf / React
- Add To Do Item, Delete To Do Item
- Delete All To Do Items

Project 7: REST API Integration With SpringBoot

- What Is REST API?, How To Access API Response?
- Accessing REST Results Through PostMan
- Open Weather Map API Integration, Getting Weather Details

_____

Module 3: REST API Integration With SpringBoot

- Swagger UI, Open API

Module 4: Spring Exception Handling

- Inbuilt Exception Handling In Spring Boot.
- Handling Default Exception And User Defined Exception.
- Presenting Proper Error Messages As Per The Exception Occurred.

Module 5: Usage Of Log4j

- Usage Of Log4j, Adding Log4j In The Project
- Generation Of Log For All The Necessary Services

Module 6: Spring JPA

- What Is A Repository And Its Types?
- Difference Between CRUD And JPA Repository.
- User-Defined Query.
- Joining Tables And Do Operations On The Data.

SPRING BOOT

Module 7: Spring Connectivity With PostgreSQL

- Usage Of JDBC Driver.
- Setting Path In Application.Properties File.

Module 8: Spring Security

- How Spring Security Works.
- Explaining Spring Default Authentication.
- Exploring Basic Auth Methods.
- Create Our Own Authentication Credentials.
- Creating Various Roles For Users.
- Authorization And Authentication As Per Roles

Final Project: E-Commerce Project

- Creating JSON
- Product List Page
- Add To Cart Page
- Cart To Database
- Delete From Cart
- View Cart

Module 30: AI Integration For Full Stack

- AI Chatbot Integration (React + Spring Boot)
- ChatGPT API Integration In Web Apps
- AI Text Generator (Blog / Product Description)
- AI-Based Search Feature (Smart Search)
- AI Recommendation System (Basic Logic)
- AI Form Assistance (Auto-Fill Suggestions)
- AI Resume Analyzer Web App Logic
- AI API Integration Using Spring Boot & React
- Handling AI Responses In UI
- Prompt Writing For Developers
- AI Error Handling & API Limits
- AI Features In REST APIs
- Using AI With JSON Data

SPRING BOOT

Module 31: AI-Based Full Stack Projects

- AI Chatbot Web Application
- AI Resume Analyzer (Upload → Feedback)
- AI Blog Generator Website
- AI E-Commerce Recommendation System
- AI Customer Support Chat System

*****Assignments Will Be Given After Each Module*****

NODE JS

Modules 1 - 4: Node JS Core Concepts

Topics:

- What Is Node.Js — V8 Engine, Event Loop, Non-Blocking I/O
- Global Objects: Process, __dirname, __filename
- CommonJS Modules: Require() And Module.Exports
- ES Modules In Node: Import/Export Syntax
- Built-In Modules: Fs (ReadFile, WriteFile, AppendFile), Path, Os
- Npm Init, Package.Json, DevDependencies, Scripts, Nodemon

Class Activities:

- Run First Node.Js Script From Terminal
- Read/Write/Delete Files Using The Fs Module
- Build A Custom Helper Module And Require It In Another File

Week Project:

- CLI Notes Manager-Add, List, Read, Delete Notes
- Stored As JSON Via Process.Argv Arguments

Modules 5 - 7: HTTP Module, Streams & Environment

Topics:

- Creating An HTTP Server With The Built-In HTTP Module
- Req And Res Objects - Routing Manually By URL And Method
- Serving HTML, JSON Responses; Status Codes & Headers
- EventEmitter Class - Emit() And On() Pattern
- Readable & Writable Streams; Piping Streams
- Dotenv Package - Environment Variables For Dev Vs Production

Class Activities:

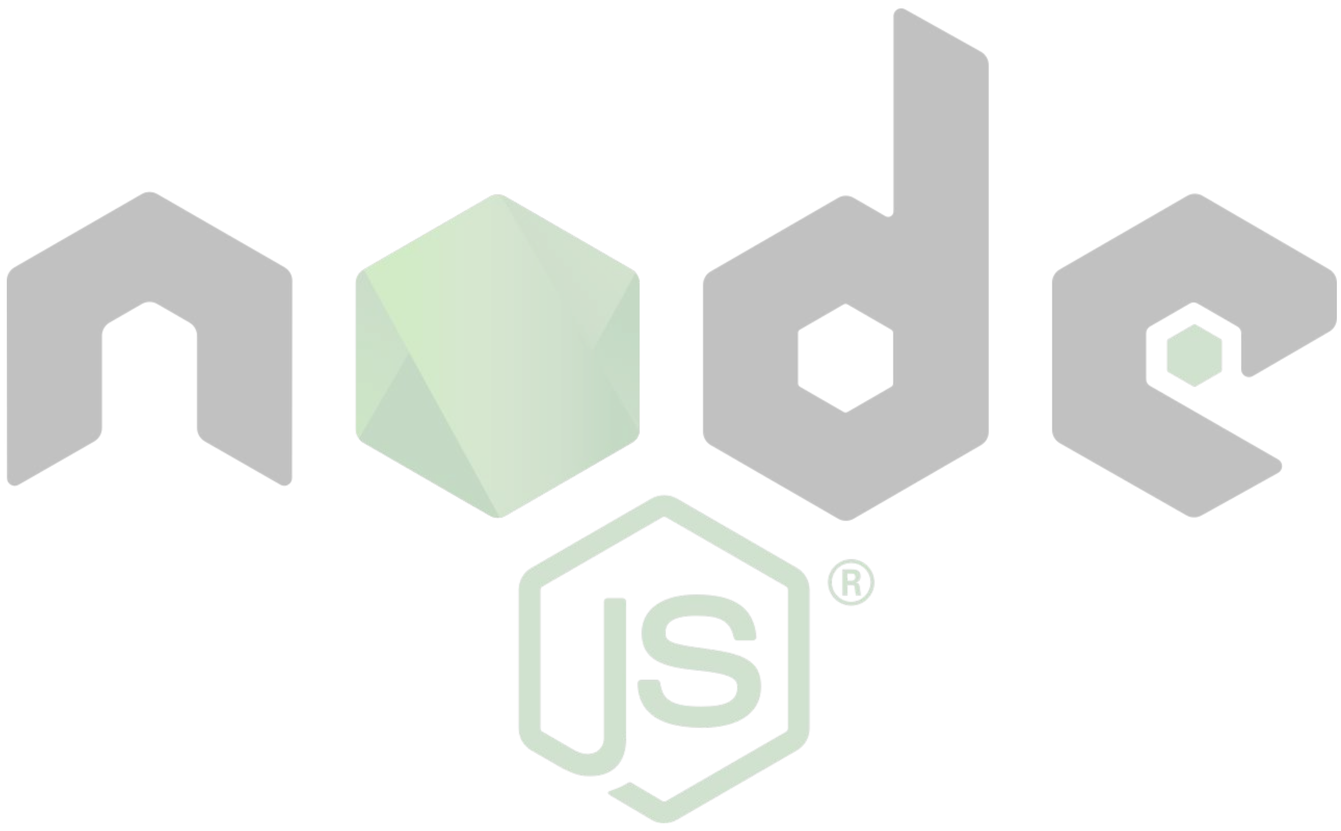
- Build A Manual File Server Serving Static Assets
- Custom Event Logger Using EventEmitter
- Stream A Large File To HTTP Response Using Pipe

NODE JS

Week Project:

- Projects 2 & 3: Static File Server
- HTML/CSS/Images, 404 Handling
- Event-Driven App Logger Writing Timestamped Logs To File

*****Assignments Will Be Given After Each Module*****



EXPRESS JS

Modules 1 - 4: Express Routing & Middleware

Topics:

- Installing Express, Project Folder Structure (MVC)
- App.Listen(); Res.Send(), Res.Json(), Res.Status()
- Route Parameters (Req.Params), Query Strings (Req.Query)
- Request Body Parsing: Req.Body With Express.Json()
- Express.Router() For Modular, Grouped Routes
- Middleware Chain: Custom, Morgan (Logging), Helmet (Security)
- Error-Handling Middleware: 4-Parameter Signature

Class Activities:

- Build A Basic Express Server And Test In Postman
- Create Modular Routes With Express.Router For Different Resources
- Add Morgan + Custom Request Logger Middleware

Week Project:

- API For Notes — Full CRUD
- (GET All, GET By ID, POST, PUT, DELETE)
- With In-Memory Array, Tested In Postman

Modules 5 - 7: Auth, File Uploads & Error Handling

Topics:

- Password Hashing With Bcrypt - SaltRounds, Hash, Compare
- JWT: Jsonwebtoken - Sign, Verify, Token Expiry
- Auth Middleware - Protect Routes With Token Verification
- HttpOnly Cookies With Cookie-Parser; CORS Configuration
- Rate Limiting With Express-Rate-Limit
- Multer For Multipart/Form-Data File Uploads; Express.Static()
- Centralized Error Handler; Custom Error Classes; Consistent Error

EXPRESS JS

Class Activities:

- Build Register/Login Endpoints With Bcrypt + JWT
- Add Auth Middleware To Protect A User Profile Route
- Upload Image File, Save To Disk, Return Public URL

Week Project:

- User Auth API + Blog API
- With Category Filtering & Pagination + Image
- Upload API With Multer

*****Assignments Will Be Given After Each Module*****

MONGO DB

Modules 1 - 4: MongoDB & Mongoose Fundamentals

Topics:

- SQL Vs NoSQL — Key Differences; When To Use Each
- MongoDB Atlas Cloud Setup; MongoDB Compass GUI
- CRUD: InsertOne/Many, Find, FindOne
- UpdateOne/Many, DeleteOne/Many, Upsert
- Query Operators: $Eq, $Gt, $Lt, $In, $Nin, $And, $Or, $Regex
- Mongoose: Connect, Schema Definition, Model Creation, Validation
- Model Methods: Save(), Find()
- FindById(), FindByIdAndUpdate(), FindByIdAndDelete()

Class Activities:

- Set Up MongoDB Atlas Free Cluster And Connect Compass
- Run All CRUD Operations Directly In Compass
- Connect Mongoose To The Express API From Express JS Module

Week Project:

- Student Records API - Full
- Mongoose CRUD, Filter By Subject Or Grade
- Range Using Query Operators

Modules 5 - 7: Relationships, Aggregation & Indexes

Topics:

- Embedding Vs Referencing Documents - When To Use Each
- Populate() For Referenced Relationships Between Collections
- One-To-Many & Many-To-Many Schema Design Patterns
- Mongoose Virtual Fields, Timestamps (CreatedAt, UpdatedAt)
- Aggregation Pipeline: $Match, $Group, $Sort, $Limit, $Skip
- $Lookup (Join Collections), $Unwind, $Project, $Count, $Sum
- Indexes: Single, Compound, Unique, TTL; Explain() For Performance Analysis

MONGO DB

Class Activities:

- Build Users + Posts Schema And Test Populate() In Postman
- Write An Aggregation To Get Total Orders Per Month
- Use Explain() To Compare Indexed Vs Non-Indexed Query Performance

Week Project:

- Blog API With Populate
- E-Commerce Product Catalog With Search &
- Sort + Analytics Dashboard With Aggregation

*****Assignments Will Be Given After Each Module*****

INTEGRATION WEEK

Modules 1 - 4: Full Stack Integration Week

Topics:

- Connect React Frontend To Express Backend With Axios
- Axios Base URL Configuration And Request Interceptors
- CORS Setup For Development And Production Environments
- JWT Auth Flow End-To-End
- React Form Fi Express Fi MongoDB Fi JWT Fi React State
- Environment Variables In React (.Env With Vite) And Node
- Protected React Routes Using Stored JWT Token
- File Upload: React Form Fi Multer
- Fi Store Path In MongoDB Fi Return URL To React

Class Activities:

- Wire Up React App To Live REST API Endpoints
- Build Complete Login Flow Across All Three Layers
- Upload Image From React Component And Display In UI

Week Project:

- Integration Project: Full Stack App With Auth,
- CRUD, And Image Upload - All Four Layers
- Connected And Working Together

Modules 5 - 7: Capstone Project & Deployment

Topics:

- Plan Schema Design And API Routes Before Writing Code
- Feature Scoping What Is Achievable In One Week
- Deploy Frontend To Vercel Or Netlify With Build Settings
- Deploy Backend To Render Or Railway (Free Tier)
- Connect MongoDB Atlas In Production Via Environment Variables
- GitHub Actions CI/CD: Auto-Deploy On Push To Main
- Portfolio Prep: README, Live URL, Clean Code, Demo Video

INTEGRATION WEEK

Class Activities:

- Students Pitch Their Capstone Project Idea (Day 1)
- Daily Stand-Ups And Mid-Week Code Review Sessions
- Final Demo Day - Live Presentation To Class

Week Project:

- Capstone Project: Student-Choice Full
- MERN App (E-Commerce, Job Board, Chat
- App, Or Project Manager): Deployed With Live URL

PRP COURSE

PYTHON

Module 1: Python Introduction, Installation

- Python Introduction
- Download Python, Installing Python
- Verify The Installation
- Install A Text Editor Or IDE (Optional)

Module 2: Data Types

- Numeric Types
- Text Type
- Boolean Type
- None Type

Module 3: Operators

- Arithmetic Operators
- Comparison Operators
- Logical Operators
- Assignment Operators
- Membership Operators
- Identity Operators

Module 4: Functions

- Function Call
- Return Statement
- Types Of Parameters - Default Parameters, Variable Length Arguments
- Variable-Length Argument Lists, Lambda Functions, Recursion

Module 5: Flow Control Statements

- **Looping Statements:** for, while
- **Conditonal Statements:** if, elif, else
- **Exception Handling:** try, except, finally
- Pass Statement

Project: *Calculator Application*

PYTHON

Module 6: List

- Creating A List
- Accessing Elements
- Slicing
- Modifying Elements
- Adding Elements
- Removing Elements
- Sorting: Bubble Sort, Searching: Binary Search

Project: *Phone Book Application*

Module 7: Tuple

- Creating A Tuple
- Accessing Elements
- Slicing
- Tuple Packing And Unpacking
- Immutable Nature

Project: *Inventory Management Application*

Module 8: Set

- Creating A Set
- Accessing Elements, Adding Elements, Removing Elements
- Set Operations
- Other Set Operations

Project: *Unique Words From A Book*

Module 9: Dictionary

- Creating A Dictionary, Accessing Values, Modifying Values
- Adding New Key-Value Pairs, Removing Key-Value Pairs
- Dictionary Operations, Nested Dictionaries

Project: *Student Management System*

PYTHON

Module 10: Package

- Creating A Package
- Importing Modules From A Package
- Importing The Whole Package
- Subpackages

*****Assignments Will Be Given After Each Module*****

NOTE: EITHER NODE JS WITH EXPRESS JS OR JAVA WITH SPRING BOOT WILL BE TEACHED BASED ON THE JOB MARKET TREND

MANUAL TESTING

Module 1: Software Testing Fundamentals

- What Is Software Testing?, Why Testing Is Important?
- SDLC (Software Development Life Cycle)
- STLC (Software Testing Life Cycle)
- Verification Vs Validation, QA Vs QC Vs Testing

Module 2: Testing Types

- Manual Testing Vs Automation Testing
- Black Box Testing
- White Box Testing
- Gray Box Testing,
- Functional Testing
- Non-Functional Testing

Module 3 : Test Case Design Techniques

- Test Scenario Vs Test Case
- Boundary Value Analysis, Equivalence Partitioning, Decision Table Testing
- State Transition Testing

Module 4: Test Documentation

- Test Plan, Test Strategy, Test Case Writing, Test Execution Report
- Traceability Matrix (RTM)

Module 5: Agile & Scrum Basics

- What Is Agile?
- Scrum Framework
- Roles (Scrum Master, Product Owner, Team)
- Sprint Planning & Daily Standup

Module 6: Real-Time Project

- End-To-End Testing Project
- Test Case Writing, Bug Reporting
- Test Execution

MANUAL TESTING

Module 7: AI For Software Testing

- Test Case Generation Using AI (Requirement → Test Cases)
- Bug Report Writing Using AI
- Test Scenario Creation Using AI
- AI For Test Data Generation
- AI For Regression Testing Support
- ChatGPT For Testing (Daily Work Usage)
- AI For API Testing Support
- AI For Writing Test Documentation
- AI For Exploratory Testing Ideas
- AI For Finding Edge Cases
- Prompt Writing For Testers
- AI Tools For QA (Basic Usage)
- AI For Faster Test Execution Planning
- Using AI In Agile Testing

Module 8: AI-Based Testing Projects

- AI Test Case Generator Project
- AI Bug Report Assistant
- AI Test Scenario Generator
- AI-Based Test Documentation Project
- AI Testing Support For Web Application

*****Assignments Will Be Given After Each Module*****

SEO & WORDPRESS

Module 1: Introduction SEO

- **SEO:** On Page SEO, Off Page SEO, Technical SEO
- **On Page SEO:** Meta Data Optimization, Keyword Research, Content Optimization, Image Optimization, Video Optimization, Audio Optimization, Internal And External Linking, Content Writing...
- **Off Page SEO:** Back Links Strategy, Guest Posting, Blog Writing.....
- **Technical SEO:** Sitemap, Robot.Txt, Site Crawling, Indexing, Retrieving

Module 2: Tools

- Screaming Frog SEO Spider
- Google Search Console
- GA4
- Extensions For Site Audit
- Google Keyword Planner
- WordPress For Site Development & SEO

Module 3: AI For SEO

- What Is AI, GenAI
- AI Tools Overview: ChatGPT, Gemini & So On
- AI For Blog Writing
- AI Keyword Research Methods
- Competitor Analysis Using AI
- Content Gap Analysis
- AI-Based SEO Audits

*****Assignments Will Be Given After Each Module*****

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