MENTORLABS SM
KNOWLEDGE IMPRINTS

SL No	Course Topics	Duration in Hrs.	Days
1	Fundamentals of Programming	8	1
2	SDLC	8	2
3	OOAD	16	3 & 4
4	C/C++ (Revision of Concepts)	4	5
5	RDBMS Concepts	8	6
6	SQL and PL/SQL Fundamentals	40	7 – 11
7	Core Java / Java SE	80	12 – 21
8	Data Structures	16	22 & 23
9	Introduction Java Design Patterns and its uses	16	24 & 25
10	Front End Application Development Using HTML5 and CSS3	24	26 – 28
11	Java EE	40	29 – 33
12	Application Development Using Webservices [SOAP and Restful]	40	34 – 38
13	JavaScript Basic, Intermediate and Advanced Level	24	39 – 41
14	TypeScript	16	42 – 43
15	Node JS	16	44 – 45
16	JS Framework (React JS)	16	46 – 47
17	Material UI	16	48 – 49
18	MongoDB (NO SQL)	16	50 – 51
19	Front End Application Development Using (React), axis , TS, CSS3:-	24	52 – 54
20	Spring Framework	32	55 – 58
21	Spring Boot and Microservices	32	59 – 62
22	Backend application development using SpringBoot and Microservices :-	24	63 – 65
23	Code version control using GIT/Gitlab	4	66
24	Maven/Gradle build knowledge	4	66
25	Junit Testing	4	67
26	Code quality check sonar	4	67
27	Docker	8	68
28	Devops: CI/CD	4	69
29	Capstone Project	80	70 – 80

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SL No	Duration	Course Topics	Course Contents	Day wise
1	8 Hrs	Fundamentals of Programming	Introduction	Day 1
			How Programming Languages Work	Quiz
			Data and Types	
			Structured	
			Modular	
			Object Oriented	
2	8 Hrs	Software Development Life Cycle (SDLC)	Introduction to Software Engineering.	Day 2
			Software Process	Quiz
			Software Development Life Cycle	
			Different Phase of Software development.	
			Software Life Cycle Models	
			What and Why?	
			Waterfall	
			Spiral Models.	
			Prototype model	
			Evolutionary models	
			Project Management	
			Activities involved	
			Requirement Management.	
			Activities	
			Risk Management	
			Risk Types	
			Software Configuration Management	
			About SCM	
			SCM Process	
			Version and Release Control	
3	16 Hrs	OOAD With UML	Defining Software and Software Engineering	Day 3
			Fundamentals of Object Oriented Analysis	Quiz
			Differentiating Analysis from Design	
			Understanding the importance of Modelling	
			Use Case Analysis	
			User Stories and Use Case Matrix	
			Introducing UML and Enterprise Architect	

			Use Case Diagrams	
			Identifying Objects and classes	**Day 4**
			Identifying state, relations and behaviour	Quiz
			Class Diagrams	
			Modelling behaviour with Activity Diagrams	
			Modelling behaviour with State Chart Diagrams	
			Modelling behavior with Sequence Diagrams	
			Grouping classes with Package Diagrams	
			Architecting using Component Diagrams	
4	**4 Hrs**	**C/C++**	Importance of C/C++ concepts	**Day 5**
			Differences	Assessment
5	**8 Hrs**	**RDBMS Concepts**	Introduction to Database Systems	**Day 6**
			DBMS Architecture	Quiz
			Types of Databases	
			Overview of Data Model	
			Stages of Data Model	
			Logical Data Model Contents	
			Entity	
			Attribute	
			Relationship	
			Notation	
			Keys-PK, FK,AK etc	
			Converting Logical to Physical Model	
			Steps for logical to physical data model conversion	
			Physical Model -Primary Keys & Constraints	
			Normalization and De-Normalization	
			Why Normalization?	
			Normalization Forms - First Normal Form (1NF)	
			Second Normal Form (2NF)	
			Third Normal Form (3NF)	
			Boyce-Codd Normal Form (BCNF)	
			Why do we need to de-normalize?	
			Pros & Cons of de-normalization	
6	**40 Hrs**	**SQL and PL/SQL Fundametals**	Retrieving Data Using the SQL SELECT Statement	**Day 7**

			Restricting and Sorting Data	
			Using Single-Row Functions to Customize Output	
			Using Conversion Functions and Conditional Expressions	**Day 8**
			Reporting Aggregated Data Using the Group Functions	Quiz
			Displaying Data from Multiple Tables Using Joins	
			Using Subqueries to Solve Queries	**Day 9**
			Using Set Operators	Quiz
			Managing Tables Using DML Statements	
			Introduction to Data Definition Language	
			Introduction to PL/SQL	**Day 10**
			Declaring PL/SQL Variables	
			Writing Executable Statements	
			Using SQL Statements Within a PL/SQL Block	
			Writing Control Structures	**Day 11**
			Working with Composite Data Types	Quiz
			Using Explicit Cursors	&
			Handling Exceptions	Assessment
			Introducing Stored Procedures and Function	
7	**80 Hrs**	**Core Java / Java SE**	Introduction to Java	**Day 12**
			Object Oriented Programming	
			Basic Java Syntax and Coding Conventions	
			Exploring Primitive Data Types and Operators	**Day 13**
			Controlling Program Flow	Quiz
			Building Java Applications Using IDE	
			Working with Classes and Objects	**Day 14**
			Object lifecycle and Inner Classes	
			Using Strings, String Buffer, Wrapper, and Text-Formatting Classes	**Day 15**
			Reusing Code	Quiz
			Using Arrays and Collections	**Day 16**
			Structuring code using Abstract Classes and Interface	

			Throwing and Catching Exceptions	**Day 17**
			Java I/O Fundamentals	
			Java File I/O (NIO.2)	Quiz
			Accessing the Database with JDBC	**Day 18**
			Multi Threading	**Day 19**
			Using the Date/Time API: Working with Local Dates and Times	
			Lambda Expressions	**Day 20** Quiz
			The New Features of Java SE 11	**Day 21**
			Modular JDK	Assessment
8	**16 Hrs**	**Data Structures**	Introduction	**Day 22**
			Objects	**Day 23** Quiz
			An Example: Collections	
			Constructors and destructors	
			Data Structure	
			Data Structures	
			Arrays	
			Lists	
			Stacks	
			Stack Frames	
			Recursion	
			Singly Linked List, Circular Linked List, Doubly LL	
			Example: Factorial	
			Searching	
			Linear Searches	
			Binary Search, Exponential Search	
			Trees	
			Queues	
			Priority Queues	
			Heaps	
			Sorting	
			Bubble , Insertion Sort	

			Heap Quick Merge Graphs Performance and Complexity	
9	**16 Hrs**	**Java Design Patterns**	Introduction to Design Pattern	**Day 24**
			Introduction to Software Design Patterns	
			Model-View-Controller Design	
			Creational Design Patterns	
			Structural Design Patterns	**Day 25**
			Behavioural Design Patterns	Quiz & Assessment
10	**24 Hrs**	**Front End Application Development Using HTML5 and CSS3**	Web Application Essentials	**Day 26**
			HTML5 Overview	
			HTML5 Markup	
			HTML5 and CSS3	**Day 27**
			HTML5 Forms	Quiz
			Web Application Data	**Day 28**
			HTML5 Audio and Video	
			Overview of the HTML5 APIs	
			HTML5 Canvas and SVG	
			HTML5 Geo-location	
			HTML5 Storage	Assessment
11	**40 Hrs**	**Java EE**	Overview of Servers	**Day 29**
			Fundamentals of Java EE 7 Technology An Overview	
			Designing Java EE Applications	
			Developing a Web-Application Using Servlets	**Day 30**
			Developing a Web Application Using JavaServer Pages (JSP)	**Day 31**
			Accessing Resources with JNDI and Dependency Injection	Quiz

			Asynchronous Communication with JMS	**Day 32**
			Managing Transactions using JTA	
			Securing Java EE Applications with JAAS Packaging and Deploying Java EE Applications	**Day 33** Quiz & Assessment
12	**40 Hrs**	**Application Development Using Webservices [SOAP and Restful]**	Introduction to Web Services	**Day 34**
			XML Document Structure	
			XML Parsing with JAXB	
			SOAP Web Service: Overview	**Day 35**
			Creating JAX-WS Clients	Quiz
			RESTful Web Service: Overview	
			Creating REST Clients	**Day 36**
			Creating RESTFul Web Services	
			Bottom-up JAX-WS Web Services	**Day 37**
			Top-down JAX-WS Web Services	
			Implementing JAX-RS Web Services	
			Web Service Error Handling	**Day 38**
			Web Service Security	Quiz & Assessment
13	**24 Hrs**	**JavaScript Basic, Intermediate and Advanced Level**	JavaScript Fundamentals	**Day 39**
			Arrays and Singleton Objects	
			JavaScript Objects	
			Functions	
			BOM and DOM	**Day 40**
			JavaScript Events	Quiz
			JavaScript OOP	
			Closures and Prototypes	
			JavaScript Advanced Concepts	**Day 41**
			JavaScript Predefined Classes [Maps and Sets]	
			ES6 enhancements	Assessment

14	**16 Hrs**	**TypeScript**	Introduction to Typescript	**Day 42**
			Data Types and Variables	
			Typescript Operators and Control Flow Statements	
			Array Destructuring & Spread	
			Functions	
			Working With Classes	
			Interfaces	**Day 43**
			Generics	Quiz &
			Modules and Namespaces	Assessment
15	**16 Hrs**	**Node JS**	Introduction to Node.js	**Day 44**
			Node Core API Basics	
			Using Buffers	
			Using Event Emitter	
			Working with Files	
			Creating and Controlling External Processes	
			Working with Streams of Data	**Day 45**
			Building TCP Servers	
			Building HTTP Servers	
			Communication with Database	
			Using HTTP Middleware	Quiz &
			Web Application with Express.js	Assessment
16	**16 Hrs**	**React JS**	React Fundamentals	**Day 46**
			Transpiling ES6 using Babel	
			Setting up the React development environment	
			React features	
			Promises and Components	
			JSX	
			Passing data with Props	
			Working with Events	
			Working with State	

			React Styles	
			Forms	**Day 47**
			Component Lifecycle	Quiz
			Redux	
			React Router	
17	**16 Hrs**	**Material UI**	Introduction Material UI	**Day 48**
			Style React Components Using Material Design System	
			Images and Menus	**Day 49**
			Components	
			Forms	Assessment
			Grids	
18	**16 Hrs**	**Document Database - Mongo**	NoSQL Databases Fundamentals	**Day 50**
			Introduction to MongoDB	
			MongoDB core elements	
			Hands-on Lab: Installing and starting MongoDB	
			Installing and starting MongoDB	
			Mongo tools	
			Introduction to the MongoDB shell	
			Getting Started with Java Driver for MongoDB	
			Getting the Mongo JDBC driver	**Day 51**
			Using the MongoDB Java driver version 3	
			Using indexes in your applications	
			Coding bulk operations	Quiz &
			Hands-On Lab: Performing MongoDB CRUD Operations Using Java	Assessment
19	**24 Hrs**	**Front End Application Development Using (React), axis , TS, CSS3:-Part2 (Project)**		**Day 52,53,54**
20	**32 Hrs**	**Spring Framework**	Overview of Spring	**Day 55**
			The Spring Framework: Foundations	
			Spring Core Capabilities	
			Aspect-Oriented Programming (AOP) with Spring	**Day 56**

			The Persistence Tier	Quiz
			Transaction Management	**Day 57**
			Spring Integration	
			Spring Security	**Day 58**
			Mongo Repositories	Quiz &
				Assessment
21	**32 Hrs**	**SpringBoot and Microservices**	Introduction to Spring Boot	**Day 59**
			Spring Boot Fundamentals	
			Data Access with Spring Boot	
			Thymeleaf in Spring Boot	**Day 60**
			Interceptors	Quiz
			Internationalization in Spring Boot	
			Spring Boot Web/REST	
			Validation in Spring Boot	
			An Overview on Spring Boot Actuator, Lombok and MapStruct	
			Deep Dive in Monolithic	**Day 61**
			Microservices	
			Spring Boot Micro Services	
			Load Balancing	**Day 62**
			RabbitMQ	
			Zuul and Hystrix	Quiz &
			Caching	Assessment
22	**24 Hrs**	**Backend application development using SpringBoot Microservices**		**Day 63,64,65**
23	**4 Hrs**	**GIT**	Introduction to GIT	**Day 66**
			Learning the Basics of GIT	
			Configuring and Initializing a Repository	
			Tracking Files	
			Viewing Changes	
			Committing Your Changes	

			Setup Git Ignore Files	
			Browsing Project History	
			Cloning Repositories	
			Using Remote Repositories	
			Using Tags in Git	Quiz
24	**4 hrs**	**Build Management with Maven and Gradle**	An Introduction to Maven	
			Installing Maven	
			Core Concepts	
			The Project Object Model (POM)	
			Custom Builds	
			Gradle	
			Introduction to Gradle	
			Build files in Groovy	
			Gradle Command Line	
			Gradle Tasks - Actions, Configuration, Methods, Properties, Dynamic Properties	
			Gradle Task Types	Quiz
25	**4 hrs**	**JUnit**	Overview	**Day 67**
			Basic Usage	
			API	
			Executing Tests	
			Extensions	
			Plug with Ant and Eclipse	Quiz
26	**4 Hrs**	**Code Quality with Sonar**	Introduction to Sonar and its Features	
			Sonar Architecture	
			Using Java runner	
			Analysis with the Sonar Maven plugin	
			Browsing the Sonar web interface	
			Sonar components	
			Overview of coding standards and conventions	Assessment

			Sonar profiles, rules, and violations	
27	**8 Hrs**	**Docker**	Introduction Docker concepts and terms	
			Containerization vs Virtualization	
			Docker Containers	
			Running containers	
			Images and Containers	**Day 68**
			Docker Run	
			Introducing the Dockerfile	Quiz
			Creating a Dockerfile	
28	**4 Hrs**	**DevOps CI/CD**	Introduction to DevOps	**Day 69**
			Version Control Systems	
			Continuous Integration, Continuous Deployment, and Build Tools	
			Configuration Management Tools	
			Containerization with Docker	
			Continuous Monitoring	
			Need of Cloud in DevOps	
			Introduction to DevOps	Assessment
29	**80 Hrs**	**Capstone Project**		**Day 70-80**

Assignments for all participants will be provided at the end of each module (SL NO: 3, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21)

Please Note:

1. Quiz: will be in Multiple Choice Questions around 5 to 10 Questions depending on the scope of topics, Time Duration: 10 Minutes
   After completion of topic, the quizzes will be conducted during the next consecutive day (it will help the participants to prepare and attend the Quiz successfully)

2. Assessment: Will be a Combination of MCQ, Predict the output, Practical / Problem Solving / Code Creation & descriptive type questions. Maximum Marks: 25 , Time Duration: 40 ~ 50 Minutes.
3. Every Friday, at the end of the class, team members will be given assignments to be completed over the weekend, which will be code reviewed on Monday Mornings. These assignments will as a practice run of the concepts learnt during the prior weeks.