JAVA FULL-STACK DEVELOPMENT

Module 1: Database

Introduction

- What Is Database?
- What is Database Management System (DBMS)?
- What is Relational Model?
- Introduction to RDBMS
- Brief on E.F CODD

Datatypes and Constraints

- What are Datatypes?
- Types and Examples
- How to use
- What are Constraints?
- Types and Examples
- How to use

Statements in SQL

- Data Definition Language (DDL)
- Data Manipulation Language (DML)
- Transaction Control Language (TCL)
- Data Control Language (DCL)
- Data Query Language (DQL)

Software Installation

- Installing and set up of software
- Working on Oracle 10g

Data Query Language (DQL)

- Select
- From
- Where
- Group By
- Having
- Order By

Operators

- Types and Examples

Functions in SQL

- Single Row Functions
- Multi Row Functions
- Max(), Min(), Sum(), Count()

Sub Query

- Introduction to Sub Query
- Working of Sub Query
- Query Writing and Execution
- Types of Sub Query – Single Row, Multi Row
- Nested Sub Query

Pseudo Columns

- Introduction on Pseudo Columns
- ROWID
- ROWNUM
- Working and Usage

JOINS

- What Is Join?
- Types of Joins
- Cartesian Join
- Inner Join
- Outer Join
- Self-Join
- Queries and Examples

Co-Related Sub Query

- Working and Examples

Data Definition Language (DDL)

- Create, Rename, Alter, Truncate, Drop

Data Manipulation Language (DML)

- Insert, Update, Delete

Transaction Control Language (TCL)

- Commit, Savepoint, Rollback

Data Control Language (DCL)

- Grant, Revoke

Normalization

- Introduction to Normalization
- Types of Normal Forms
- Examples

ER Diagrams

- Introduction to ERD
- Examples

Module 2: Core Java

Introduction to Programming

- Introduction to Java
- JDK installation
- Keywords, Identifiers, Variables
- Operators
- Method/Functions
- Flow Control Statements
- Arrays
- Strings
- Interactive programs in Java using Scanner

Object Oriented Programming System

- Classes and Objects
- Object creation
- Reference variable
- Global and local variables

- Constructors
- Aggregation, Composition
- Inheritance
- Method Overloading and Overriding
- Abstract classes
- Interfaces
- Typecasting
- JVM architecture
- Polymorphism
- Abstraction
- Java packages
- Access Specifiers

Java Built-in Packages and API

- Overview of Java API
- Object class
- String, StringBuffer, StringBuilder
- Exception Handling
- Threads and Multithreading
- Wrapper Classes
- Data Structures
- Java Collection Frameworks
- File Handling
- Serialization
- Garbage Collector
- Encapsulation

Module 3: J2EE

Introduction to JAVA EE

- Computer, Application, Types of Applications
- Standalone, Web applications
- Network, Internet, Intranet, Server
- Database, API
- J2EE overview and APIs
- JAVA EE 2-tier and 3-tier architecture

JDBC

- Introduction and prerequisites

- Installing MYSQL/DB server
- First JDBC program

Drivers

- JAR files and Driver class
- Loading driver class
- Types of Drivers

DB URL

- What is URL?
- Structure of DB URL

Connection Interface

- Driver Manager class
- getConnection() method
- Connection object

JDBC Objects and Methods

- Dynamic and Static SQL queries
- Statement and PreparedStatement objects
- ExecuteQuery(), ExecuteUpdate() methods

Result Set

- Handling and Processing ResultSet

Closing JDBC Objects

- Why and How to close objects

Servlet

- Introduction to Web resources and servers
- Apache Tomcat setup

About Servlet

- Creating first servlet in web app
- Steps to create WAR file
- Build & Deployment

Web URL

- Structure and Query strings
- HTTP & HTTPS protocols
- HTTP request/response
- GET vs POST

Servlet Container

- Advantages of containers
- Request and Response objects
- getParameter methods
- XML and deployment descriptor (web.xml)

Servlet Hierarchy

- Generic Servlet, HTTP Servlet
- Differences and lifecycle
- Servlet context & config
- Redirect, Forward, Include

Attributes

- Need, Types

Cookies

- Creating Cookies
- Types, Life cycle, Applications

Session

- Creating and managing Sessions
- Types, Life cycle, Applications

JSP

- Introduction and creation of JSP
- JSP vs Servlet

JSP Scripting Elements

- Scriptlet, Expression, Declaration

JSP Implicit Objects

- Request, Response, Config, Application, Session

Exception Handling in JSP

- isErrorPage and errorPage

JSTL

- Core Tags and Function Tags

Module 4: Frameworks

Hibernate

- Overview and ORM
- Architecture, Environment setup
- Configuration and Session
- Mapping files and types
- Annotations
- HQL (Hibernate Query Language)

Spring

- Introduction and Advantages
- Spring modules
- Spring applications
- Spring in Eclipse

Spring IOC

- IOC container and Dependency Injection
- Constructor and Setter Injection
- Injection with Collections and Maps
- Auto wiring and Factory methods

Spring MVC

- MVC overview
- Multiple Views and Controllers
- Model interface and Request Param annotation
- Form tag library – text, radio, checkbox, dropdown

- JDBC Template examples (PreparedStatement, ResultSetExtractor)
- CRUD Example
- Spring Expression Language (SPEL)
- MVC Validation

Module 5: Web Services

- Web Services introduction and importance
- SOAP and REST overview
- Real-time examples
- HTTPS, XML, JSON
- JSON–Java conversion (GSON)
- XML–Java conversion (JAXB)
- XPath overview
- SOAP using Spring & Apache CXF
- REST using Spring-REST & Jersey

Module 6: Web Technology

- Introduction to Web Technology – Web, Network, Internet, Browser, Server, HTTP
- HTML5 – Structure, Tags, Attributes
- Tables, Lists, Audio/Video, I-frames, SVG
- Forms – login, registration, attributes
- CSS3 – Types, Background, Box Model, Selectors, Combinators
- Pseudo-classes and Pseudo-elements
- Transitions, Transform, Animations (Project-based)
- JavaScript – Introduction, Syntax, Datatypes, Loops, Conditionals
- Functions, Arrays, Strings, Objects, Date & Math
- Collections in JS
- Advanced Array Methods, Closures, DOM, JSON, AJAX, Canvas
- Regular Expressions, Dynamic Forms
- Bootstrap – Grid, Classes, Tables, Forms, Carousel
- Responsive Project – HTML, CSS, JS, Bootstrap

Module 7: Quantitative Aptitude

- Numbers – Number system, Divisibility, Remainder theorem, LCM & HCF, Unit digits
- Arithmetic – Ratio, Percentages, Averages, Time & Work, Time-Speed-Distance, Mixtures, Partnership, Profit & Loss, SI & CI, Clocks
- Algebra – Equations, Calendars, Set theory, Progressions, Ages
- Geometry – Mensuration, Basic Trigonometry

Module 8: Logical Reasoning

- Coding-Decoding
- Syllogisms
- Blood Relations
- Direction Sense
- Seating Arrangements (Linear, Circular)
- Visual Reasoning (2D & 3D)
- Ranking

Module 9: Verbal Ability

- Tenses
- Subject-Verb Agreement
- Active & Passive Voice
- Conditionals
- Prepositions, Articles
- Direct & Indirect Speech
- Word Analogies
- Parajumbles
- Critical Reasoning
- Reading Comprehension
- Vocabulary Building

***Note:** This outline is comprehensive and can be tailored based on course duration, depth of coverage, and the participants expertise levels. As technology continues to evolve, it is crucial to review and update the content regularly to incorporate emerging tools, practices, and industry best standards.