Oracle Database Learning Roadmap (Easy to Advanced)

A structured guide to mastering Oracle Database from basics to expert-level topics.

🌓 Beginner Level — Fundamentals

1. Introduction to Oracle Database

- Overview of Oracle Database
- Oracle editions and versions
- Oracle architecture basics (Instance + Database)
- Tools: SQL*Plus, SQL Developer

2. SQL Basics

- Data Types
- DDL: `CREATE`, `ALTER`, `DROP`
- DML: `INSERT`, `UPDATE`, `DELETE`
- TCL: `COMMIT`, `ROLLBACK`, `SAVEPOINT`
- DCL: `GRANT`, `REVOKE`
- Basic `SELECT` queries
- `WHERE`, `ORDER BY`, `GROUP BY`
- Aggregate functions: `SUM`, `AVG`, `COUNT`, etc.

3. Constraints and Joins

- Constraints: PRIMARY KEY, FOREIGN KEY, UNIQUE, NOT NULL, CHECK
- JOINS: INNER, LEFT, RIGHT, FULL OUTER
- Subqueries
- Set operations: `UNION`, `INTERSECT`, `MINUS`

4. Basic PL/SQL

- What is PL/SQL?
- Anonymous blocks
- Variables and data types
- Control structures: `IF`, `CASE`, `LOOP`, `WHILE`
- Exception handling

🌓 Intermediate Level — Programming & Administration

5. Advanced PL/SQL

- Stored Procedures and Functions

- ==Packages==
- Cursors (Implicit and Explicit)
- Triggers (BEFORE/AFTER INSERT, UPDATE, DELETE)
- Collections: VARRAY, Nested Tables, Associative Arrays

6. User Management & Security

- ==Creating Users and Roles==
- ==System and Object Privileges==
- Profiles and Resource Limits
- Password policies
- Auditing basics

==7. Data Modeling==

- ==ER Diagrams==
- ==Normalization (1NF, 2NF, 3NF, BCNF)==
- ==Schema design==
- ==Tables and Relationships==

8. Indexes & Views

- ==B-tree and Bitmap Indexes==
- ==Index performance==
- ==Simple and Complex Views==
- Materialized Views (with Refresh Options)

◍ Advanced Level — Architecture & Tuning

9. Oracle Database Architecture (In-Depth)

- Memory structures: SGA, PGA
- Background processes: DBWR, LGWR, SMON, PMON
- Files: Datafiles, Controlfiles, Redo Log Files, Archive Logs

10. Backup & Recovery

- Cold and Hot Backup
- RMAN (Recovery Manager)
- Flashback features
- Export/Import (exp/imp)
- Data Pump (expdp/impdp)

11. Performance Tuning

- SQL Tuning Advisor and AWR Reports
- EXPLAIN PLAN and TKPROF
- Index and Query tuning
- Optimizer Hints

- ADDM and ASH reports

12. Partitioning & Storage

- Types: Range, List, Hash, Composite
- Partitioned Indexes
- Tablespaces and Datafiles
- ASM (Automatic Storage Management)

🪩 Expert Level — Enterprise & Cloud

13. High Availability Solutions

- Oracle RAC (Real Application Clusters)
- Oracle Data Guard (Physical, Logical Standby)
- Oracle GoldenGate (Replication)

14. Oracle Cloud & Autonomous Database

- Oracle Cloud Infrastructure (OCI)
- Autonomous Database (ATP, ADW)
- Cloud-based backup, scaling, patching
- Cloud security practices

15. Advanced Security & Compliance

- Transparent Data Encryption (TDE)
- Data Masking and Redaction
- Virtual Private Database (VPD)
- Fine-Grained Auditing (FGA)

✅ Learning Tips

- Practice on [Oracle Live SQL](#)
- Use Oracle SQL Developer for hands-on learning
- Read Oracle official documentation
- Build and test with sample schemas (e.g., HR schema)