

This **Data Modeling course** is designed to provide participants with **intermediate-level skills** equivalent to 2–3 years of experience. It focuses on relational and dimensional modeling, advanced concepts, data architecture, and practical applications for real-world scenarios.

Week	Topic	Key Concepts	Hands-On Activities
1	Introduction to Data Modeling	What is data modeling, its importance, and types (conceptual, logical, physical).	Identifying entities and attributes in a business use case.
2	Basics of Relational Databases	Understanding tables, columns, primary/foreign keys, relationships (1:1, 1:N, N:N).	Creating tables and defining relationships in MySQL/PostgreSQL.
3	Entity-Relationship (ER) Modeling	Creating ER diagrams, cardinality, and identifying relationships.	Designing an ER diagram for a retail business.
4	Data Normalization	Normal forms (1NF, 2NF, 3NF, BCNF), advantages of normalization.	Normalizing a dataset to 3NF.
5	Introduction to Dimensional Modeling	Star schema, snowflake schema, and their applications in data warehousing.	Designing a star schema for sales data.
6	Fact and Dimension Tables	Identifying facts, measures, and dimension attributes.	Creating fact and dimension tables for an e-commerce scenario.
7	Advanced Dimensional Modeling	Slowly Changing Dimensions (SCD Types 1, 2, 3), role-playing dimensions, junk dimensions.	Implementing SCD Type 2 in a dimensional model.
8	Physical Data Modeling	Data types, indexes, and constraints; optimizing physical models for performance.	Implementing indexing strategies in a database.
9	Data Modeling Tools	Overview of tools: Erwin, Lucidchart, DB Designer, and others.	Creating models using a selected tool like Erwin or Lucidchart.
10	SQL for Data Modeling	Writing queries for data retrieval, joins, and aggregations.	Building SQL queries for a data warehouse.
11	Hierarchies and Aggregations	Modeling hierarchies (e.g., organizational structure), pre-aggregated data, and summary tables.	Designing a model with hierarchical data.
12	Performance Tuning	Query optimization, denormalization, and partitioning strategies.	Optimizing queries for a large dataset in a relational database.

Week	Topic	Key Concepts	Hands-On Activities
13	Big Data Modeling Basics	Differences between traditional and big data modeling; introduction to NoSQL databases.	Designing a schema for a NoSQL database like MongoDB.
14	Document and Key-Value Stores	Modeling for document databases (MongoDB) and key-value stores (Redis).	Creating a document-oriented schema in MongoDB.
15	Graph Data Modeling	Graph databases, nodes, edges, and properties; use cases for graph models.	Designing a graph schema in Neo4j for a social network.
16	Data Vault Modeling	Introduction to Data Vault methodology; hubs, links, and satellites.	Creating a Data Vault model for a financial dataset.
17	Metadata Management	Importance of metadata in data modeling; tools and techniques for metadata management.	Documenting metadata for a data warehouse.
18	Data Modeling in Cloud Environments	Cloud data modeling concepts for AWS Redshift, Snowflake, Google Big Query.	Designing a schema for Snowflake or Big Query.
19	Industry-Specific Data Modeling	Customizing models for industries like healthcare, retail, and finance.	Designing a healthcare data model.
20	Data Modeling Best Practices	Ensuring scalability, security, and maintainability in data models.	Auditing an existing model for best practices compliance.
21	Data Governance in Data Modeling	Aligning models with governance policies (GDPR, HIPAA).	Implementing role-based access control in a data model.
22	Case Study Analysis	Analyzing real-world data modeling use cases and common challenges.	Reviewing and improving a provided data model.
23	Capstone Project Development	Applying all concepts to design an end-to-end data model.	Designing a complete data model for a real-world business problem.
24	Capstone Presentation	Presenting the capstone project;	Showcasing the project.
25-36	Live Project	3 Months Live Project Experience	