



Course 414: Introduction to Data Modeling

Course Description...

Data Modeling is the classic method of designing systems. It provides the static structural look at the system to be developed. The principles of data modeling have been carried forward into class and object modeling in the object-oriented world. This course presents the basics of data modeling using Unified Modeling Language (UML) notation.

Learning Objectives...

- Understand the concepts of data: entities and relationships
- Apply the techniques of modeling to analysis and design
- Explore the checks and balances of the data modeling metaphor

Who should attend...

Business Analysts, requirements analysts, project managers, designers, architects and anyone involved with turning a business problem into an IT solution.

Prerequisites...

Knowledge of basic computers and data storage

Course Outline

Course Objective

Unit 1: The Concept of the Database

- A Database System
- Types of Database Systems
 - Hierarchical
 - Network (Codasyl)
 - Relational
 - Object-oriented
- Basic Data Design Approaches
 - OLTP
 - OLAP



Unit 2: Entity-Relationship Modeling

- Data modeling using E-R Diagrams
 - Entities
 - Attributes
 - Relationships
 - Many:many relationships
 - Entity subtypes
 - Participation
 - Recursive relationships
 - Exclusivity

Unit 3: Creating and Applying the Data Model

- Find the noun technique
- Analytical processes
- Structure and approach
- Data modeling in the design
- Data models in Agile approaches

Unit 4: Application of Design Principles

- Dealing with Data Anomalies
- Functional dependency and normalization
 - Functional dependencies
 - Using functional dependencies
- Functional dependency and normalization
 - First normal form
 - Second normal form
 - Third normal form
 - Other forms
 - When and where to use normalization
 - Denormalization

Unit 5: Relational Operations and SQL

- The Fundamental Relational Operations
- SQL Components
- SQL Data Definition Commands
- SQL Relational Queries
- Advanced Concepts
- Limitations of SQL

Unit 6: Physical Database Issues

- Indexing, B-trees, Hashing
- Concurrency and locking
- Transactional versus Warehousing Systems
- Data Security

Unit 7: The Bottom Line

- Data Modeling in Retrospect
- Where to go to Find More Information