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Data Modeling Syllabus

Introduction and Foundation of Referential Modeling

- Data Modeling Concepts
 - Introduction to Data Modeling
 - Functional Modeling
 - Three Levels of Data Models
 - Conceptual Data Model
 - Logical Data Model
 - Physical Data Model
 - Difference between Data Analyst and Data Modeler
 - Database/RDBMS
 - Data Model Approaches
- Data Entities and Attributes:
 - Entity-Relationship Modeling Overview
 - Data Modeling notations
 - Discovering and defining entities
 - Principal(SuperType) and secondary(SubType) entities
 - Relationship
 - Relationship Types: Identifying and Non-Identifying Relationship
 - Cardinality of Relationships

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- One-to-one
- One-to-many
- Many-to-many
- Mandatory Relationship / Many-to-Many Relationship
- Keys – primary, secondary, surrogate, natural, compound, candidate keys
- Referential Integrity
- Traditional Relational Models
- Data Integrity through Normalization
 - Levels of Normalization
 - Why Normalize?
 - Dependency – Functional, full functional, partial, transitive dependency
 - 1NF – Eliminate Repeating Groups
 - 2NF – Eliminate Redundant Data
 - 3NF – Eliminate Columns Not Dependent on Key

Modeling BI Rules and Patterns

- Dimensional Modeling Basics
 - What is Dimensional Modeling
 - De-normalization and its need
 - Facts

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- Keys
- Granularity
- Types of Measures
- Dimensions
 - Hierarchy
 - Time Dimension
 - Attributes
- Schema
 - Star Schema
 - Snowflake Schema
- Entity-Relationship vs. Dimensional Modeling
- Slowly changing dimensions
 - Type 1: Overwrite Existing Data (Row)
 - Type 2: Create New Row
 - Type 3: Add a New Attribute

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Data Modeling with Erwin

- Introduction to Erwin
 - The ERwin Model and Interface
 - Templates
 - Creating Entities
 - Creating Relationships
 - Creating Subtypes
- Creating Schema
 - Domain Definition
 - Constraint definition
 - Converting to Database schema
 - User Define Properties
- Creating Logical Model
 - Entity and View Diagram
 - Model and Subject area diagram
 - Entity, Attribute and key_group diagram
 - Entity, Attribute, key_group and Relationship diagram
- Creating Physical Model
 - Forward Engineering

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- Reverse Engineering

Note: Lab sessions for all the points mentioned above will be taken.

Data warehousing Syllabus

- Evolution of Datawarehousing - History
- The need of Datawarehousing
- Why Datawarehousing
- What is Datawarehousing – The Definition
 - Subject -Oriented
 - Integrated
 - Non – Volatile
 - Time Varying
- Datawarehousing Architecture
 - Data Source Layer
 - Data Extraction Layer
 - Staging Layer
 - ETL Layer
 - Data Storage Layer
 - Data Logic Layer

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Data Modeling Syllabus

- Data Presentation Layer
- Metadata Layer
- System Operation Layer
- Dimension table
- Fact table
 - Additive Facts
 - Semi Additive Facts
 - Non – Additive Fact
 - Cumulative
 - Snapshot
- Attribute
- Hierarchy
- Types of Schema
 - Star Schema
 - Snow Flake Schema
 - Fact Constellation Schema
- Slow Changing Dimension
 - SCD1 – Advantages/ Disadvantages
 - SCD2 – Advantages/ Disadvantages

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Data Modeling Syllabus

- SCD3 – Advantages/ Disadvantages
- OLAP and OLTP
 - Difference between OLAP and OLTP
 - Types Of OLAP
 - Multi-Dimensional (MOLAP)
 - Relational(ROLAP)
 - Hybrid(HOLAP)