1. Introduction to databases
   Sub-topics:
   a. Database Management Systems benefits

2. SQL
   Sub-topics:
   a. SELECT…FROM… WHERE… framework
   b. DISTINCT keyword
   c. ORDER BY
   d. Aggregate operators: COUNT, MIN, MAX, AVG, SUM
   e. GROUP BY… HAVING
   f. Subqueries
   g. Joins (select from multiple tables)

3. The Relational Model
   Sub-topics:
   a. Relation /Table
      • Attributes
   b. Integrity Constraints
   c. Keys
   d. Primary key
   e. Candidate key
   f. Surrogate key
   g. Foreign key
      • Referential integrity constraint

4. Normalization
   Sub-topics:
   a. Purpose
   b. Insert /delete/update anomalies
   c. Functional dependencies
      • Definition of key based on functional dependencies
   d. Normal forms
      • First normal form
      • Second normal form
      • Third normal form
      • Boyce-Codd Normal Form
      • Decomposition into relations that are in Boyce-Codd Normal Form
   e. Multivalued dependencies (not required for exam)
• Fourth Normal Form

5. Data Modeling with the Entity-Relationship Model

Sub-topics:
   a. Entities
      • Identifiers /Composite identifiers
      • Attributes
      • Strong entities
      • Weak entities
      • Id-dependent entities
   b. Relationships
      • Has-A relationships
         Maximum and minimum cardinality
         Identifying/non-identifying relationships
      • Is-A relationships (supertype/subtype)
         Inclusive/Exclusive

6. Transforming ER diagrams to Relational Model

Sub-topics:
   a. Transform entities
      • Specify primary key
      • Specify candidate (alternate keys)
      • Specify properties for each column
         1. data type
         2. null/not null
         3. default values
         4. other constraints
   b. Transform relationships (foreign keys used here)
      • 1:1 relationships, 1:N relationships
         - identifying relationships
         - non-identifying relationships
      • N:M relationships
      • Supertype/subtype relationships
   c. Specify logic to enforce minimum cardinalities
   d. SQL:
      • CREATE
      • DROP
      • ALTER
      • INSERT
      • DELETE
      • UPDATE