1. Introduction to databases

Covered in:
- Lecture set 1
- Chapter 1 - Kroenke

Sub-topics:
  a. Database Management Systems benefits

2. Data Modeling with the Entity-Relationship Model

Covered in:
- Class 2
- Chapter 5 - Kroenke

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
3. The Relational Model

Covered in:
- Class 3
- Chapter 3, pages 69-74, 79-81 Kroenke

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. Transforming ER diagrams to Relational Model

Covered in:
- Class 3, 4
- Chapter 6 - Kroenke

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
5. Normalization

Covered in:
- Class 5, 6
- Chapter 3, pages 74-99 - Kroenke
- Chapter 4 - Kroenke

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
  - Boyce-Codd Normal Form
  - Decomposition into relations that are in Boyce-Codd Normal Form
- e. Multivalued dependencies (not required for exam)
  - Fourth Normal Form

6. SQL

Covered in:
- Class 7, 8
- Chapter 7, pg 220-234 and Chapter 2 - Kroenke

Sub-topics:
- a. CREATE
- b. DROP
- c. ALTER
- d. INSERT
- e. DELETE
- f. UPDATE
- g. SELECT…FROM… WHERE… framework
- h. Conceptual evaluation of queries
- i. DISTINCT keywork
- j. ORDER BY
- k. Aggregate operators: COUNT, MIN, MAX, AVG, SUM
- l. GROUP BY… HAVING
- m. Subqueries
- n. Joins (select from multiple tables)