uCertify

Course Outline

Database Design Using Entity-Relationship Diagrams

30 Oct 2025

1. Exercises, Quizzes, Flashcards & Glossary

   Number of Questions
2. Expert Instructor-Led Training
3. ADA Compliant & JAWS Compatible Platform
4. State of the Art Educator Tools
5. Award Winning Learning Platform (LMS)
6. Chapter & Lessons

   Syllabus

   Chapter 1: Introduction

   Chapter 2: Data, Databases, and the Software Engineering Process

   Chapter 3: Data and Data Models

   Chapter 4: The Relational Model and Functional Dependencies

   Chapter 5: The Basic ER Diagram: A Data Modeling Schema

   Chapter 6: Beyond the First Entity Diagram

   Chapter 7: Extending Relationships/Structural Constraints

   Chapter 8: The Weak Entity

   Chapter 9: Further Extensions for ER Diagrams with Binary Relationships

   Chapter 10: Ternary and Higher-Order ER Diagrams

   Chapter 11: The Enhanced Entity-Relationship (EER) Model

   Chapter 12: Relational Mapping and Reverse Engineering ER/EER Diagrams

   Chapter 13: A Brief Overview of the Barker/Oracle-Like Model

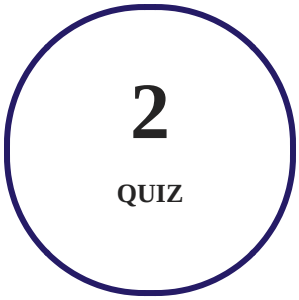
   Videos and How To
7. Performance Based labs

   Lab Tasks

   Here's what you get

1. Quiz

Quizzes test your knowledge on the topics of the exam when you go through the course material. There is no limit to the number of times you can attempt it.



2. flashcards

Flashcards are effective memory-aiding tools that help you learn complex topics easily. The flashcard will help you in memorizing definitions, terminologies, key concepts, and more. There is no limit to the number of times learners can attempt these. Flashcards help master the key concepts.

3. Glossary of terms

uCertify provides detailed explanations of concepts relevant to the course through Glossary. It contains a list of frequently used terminologies along with its detailed explanation. Glossary defines the key terms.

4.  Expert Instructor-Led Training

uCertify uses the content from the finest publishers and only the IT industry's finest instructors. They have a minimum of 15 years real-world experience and are subject matter experts in their fields. Unlike a live class, you can study at your own pace. This creates a personal learning experience and gives you all the benefit of hands-on training with the flexibility of doing it around your schedule 24/7.

5.  ADA Compliant & JAWS Compatible Platform

uCertify course and labs are ADA (Americans with Disability Act) compliant. It is now more accessible to students with features such as:

- Change the font, size, and color of the content of the course
- Text-to-speech, reads the text into spoken words
- Interactive videos, how-tos videos come with transcripts and voice-over
- Interactive transcripts, each word is clickable. Students can clip a specific part of the video by clicking on a word or a portion of the text.

JAWS (Job Access with Speech) is a computer screen reader program for Microsoft Windows that reads the screen either with a text-to-speech output or by a Refreshable Braille display. Student can easily navigate uCertify course using JAWS shortcut keys.

6.  State of the Art Educator Tools

uCertify knows the importance of instructors and provide tools to help them do their job effectively. Instructors are able to clone and customize course. Do ability grouping. Create sections. Design grade scale and grade formula. Create and schedule assessments. Educators can also move a student from self-paced to mentor-guided to instructor-led mode in three clicks.

7.  Award Winning Learning Platform (LMS)

uCertify has developed an award winning, highly interactive yet simple to use platform. The SIIA CODiE Awards is the only peer-reviewed program to showcase business and education technology's finest products and services. Since 1986, thousands of products, services and solutions have been

recognized for achieving excellence. uCertify has won CODiE awards consecutively for last 7 years:

- **2014**
    1. Best Postsecondary Learning Solution

- **2015**
    1. Best Education Solution
    2. Best Virtual Learning Solution
    3. Best Student Assessment Solution
    4. Best Postsecondary Learning Solution
    5. Best Career and Workforce Readiness Solution
    6. Best Instructional Solution in Other Curriculum Areas
    7. Best Corporate Learning/Workforce Development Solution

- **2016**
    1. Best Virtual Learning Solution
    2. Best Education Cloud-based Solution
    3. Best College and Career Readiness Solution
    4. Best Corporate / Workforce Learning Solution
    5. Best Postsecondary Learning Content Solution
    6. Best Postsecondary LMS or Learning Platform
    7. Best Learning Relationship Management Solution

- **2017**
    1. Best Overall Education Solution
    2. Best Student Assessment Solution
    3. Best Corporate/Workforce Learning Solution
    4. Best Higher Education LMS or Learning Platform

- **2018**
    1. Best Higher Education LMS or Learning Platform

2. Best Instructional Solution in Other Curriculum Areas
3. Best Learning Relationship Management Solution

- **2019**
  1. Best Virtual Learning Solution
  2. Best Content Authoring Development or Curation Solution
  3. Best Higher Education Learning Management Solution (LMS)

- **2020**
  1. Best College and Career Readiness Solution
  2. Best Cross-Curricular Solution
  3. Best Virtual Learning Solution

8. Chapter & Lessons

uCertify brings these textbooks to life. It is full of interactive activities that keeps the learner engaged. uCertify brings all available learning resources for a topic in one place so that the learner can efficiently learn without going to multiple places. Challenge questions are also embedded in the chapters so learners can attempt those while they are learning about that particular topic. This helps them grasp the concepts better because they can go over it again right away which improves learning.

Learners can do Flashcards, Exercises, Quizzes and Labs related to each chapter. At the end of every lesson, uCertify courses guide the learners on the path they should follow.

Syllabus

Chapter 1: Introduction

- The ER Models We Chose
- Course Highlights

Chapter 2: Data, Databases, and the Software Engineering Process

- Introduction
- Data
- Building a Database
- What Is The Software Engineering Process?
- Entity-Relationship Diagrams and the Software Engineering Life Cycle
- Lesson Summary
- Exercises

Chapter 3: Data and Data Models

- Introduction
- Files, Records, And Data Items
- Moving From 3 × 5 Cards to Computers
- Database Models
- The Network Model
- The Relational Model
- Lesson Summary

Chapter 4: The Relational Model and Functional Dependencies

- Introduction
- Fundamentals of Relational Database
- Relational Database and Sets
- Functional Dependency
- Non-1NF To 1NF
- The Second Normal Form
- The Third Normal Form
- The Equijoin Operation
- Some Functional Dependency Rules
- The Boyce–Codd Normal Form
- Lesson Summary
- Exercises

Chapter 5: The Basic ER Diagram: A Data Modeling Schema

- Introduction
- What Is a Data Modeling Schema?
- Defining a Database—Some Definitions: Entity, Relationship, and Attribute
- A First “Entity-Only” ER Diagram: An Entity with Attributes

- More about Attributes
- English Description of the Entity
- Mapping the Entity Diagram to a Relational Database
- Lesson Summary
- Exercises
- Case Study

Chapter 6: Beyond the First Entity Diagram

- Introduction
- Examining an Entity: Changing an Attribute to Be an Entity
- Defining a Relationship for Our New Entity
- A Preliminary Grammar for ER Diagrams
- Defining a Second Entity
- Does a Relationship Exist?
- Attribute or Relationship?
- Lesson Summary
- Exercises
- Case Study

Chapter 7: Extending Relationships/Structural Constraints

- Introduction
- The Cardinality Ratio of a Relationship
- Participation: Full/Partial
- English Descriptions
- Tighter English
- Some Examples of Other Relationships
- One Final Example
- Mapping Relationships to a Relational Database
- Lesson Summary
- Exercises
- Case Study

Chapter 8: The Weak Entity

- Introduction
- Strong and Weak Entities
- Weak Entities and Structural Constraints

- Weak Entities and the Identifying Owner
- Weak Entities Connected to Other Weak Entities
- Revisiting the Methodology
- Weak Entity Grammar
- Mapping Weak Entities to a Relational Database
- Lesson Summary
- Exercises
- Case Study

Chapter 9: Further Extensions for ER Diagrams with Binary Relationships

- Introduction
- Attributes of Relationships
- Relationships Developing into Entities: The M:N Relationship Revisited
- More Entities and Relationships
- More Evolution of the Database
- Attributes That Evolve into Entities
- Recursive Relationships
- Multiple Relationships

- The Derived or Redundant Relationship
- Optional: An Alternative ER Notation for Specifying Structural Constraints on Relationships
- Review of the Methodology
- Mapping Rules for Recursive Relationships
- Lesson Summary
- Exercises
- Case Study

Chapter 10: Ternary and Higher-Order ER Diagrams

- Introduction
- Binary or Ternary Relationship?
- Structural Constraints for Ternary Relationships
- An Example of an n-ary Relationship
- n-ary Relationships Do Not Preclude Binary Relationships
- Methodology and Grammar for the n-ary Relationship
- Ternary Relationships From Relationship-Relationship Situations
- n-ary Relationships That May Be Resolved into Binary Relationships
- Mapping n-ary Relationships to a Relational Database

- Review of the Methodology
- Lesson Summary
- Exercises

Chapter 11: The Enhanced Entity-Relationship (EER) Model

- Introduction
- What Is a Generalization or Specialization?
- Variants
- Examples of Generalizations or Specializations
- Methodology and Grammar for Generalization/Specialization Relationships
- Mapping Rules for Generalizations and Specializations
- Subclasses of Subclasses
- Categories or Union Types
- Final ER Design Methodology
- Lesson Summary
- Exercises
- Case Study

Chapter 12: Relational Mapping and Reverse Engineering ER/EER Diagrams

- Introduction
- Steps Used to Map ER/EER Diagrams to Relational Databases
- Reverse Engineering
- Lesson Summary
- Exercises

Chapter 13: A Brief Overview of the Barker/Oracle-Like Model

- Introduction
- A First “Entity-Only” ER Diagram: An Entity with Attributes
- Attributes in the Barker/Oracle-Like Model
- Relationships in the Barker/Oracle-Like Model
- Structural Constraints in the Barker/Oracle-Like Model
- Dealing with the Concept of the Weak Entity in the Barker/Oracle-Like Model
- Dealing with the Concept of Multivalued Attributes in the Barker/Oracle-Like Model
- Treatment of Foreign Keys
- Recursive Relationships in the Barker/Oracle-Like Model
- Mapping M:N Relationships
- Lesson Summary

- Exercises

9. Performance Based Labs

uCertify's performance-based labs are simulators that provides virtual environment. Labs deliver hands on experience with minimal risk and thus replace expensive physical labs. uCertify Labs are cloud-based, device-enabled and can be easily integrated with an LMS. Features of uCertify labs:

- Provide hands-on experience in a safe, online environment
- Labs simulate real world, hardware, software & CLI environment
- Flexible and inexpensive alternative to physical Labs
- Comes with well-organized component library for every task
- Highly interactive - learn by doing
- Explanations and remediation available
- Videos on how to perform

Lab Tasks

Here's what you get