

Sessions 1 - 10

Instructor:

Dr. Faisal Akkawi
Director, Master of Science in Computer Information Systems
Northwestern University, School of Continuing Studies

Wieboldt Hall
339 N. Chicago Ave., Office 715
Chicago, IL 60611

(312) 503-2418
f-akkawi@northwestern.edu

Course Description:

Welcome to CIS 317 - Introduction to Databases

This course is designed to present the fundamentals of database management and data organization. This includes database design, database models, database languages and database system implementation. We will discuss the history of how the DBMS (database management system) has evolved from the old file system, about their importance in managing large bodies of data, what database model can be used to implement them, what relational languages are used to provide the interface for DBMS, and how the data are actually organized in the abstract data structures.

Texts:

The primary text for the course will be *Database Processing: Fundamentals, Design, and Implementation* (10th Edition), by David M. Kroenke. Additional readings can be found on the course Web site.

Texts:

Database Processing: Fundamentals, Design, and Implementation
David M. Kroenke
10th Edition, 2006
ISBN: 0-13-167267-3

Online Activities and Class Projects:

Students will form discussion groups for online interactions. Each week, a different student will be identified as the group facilitator and manage the online discussion. Results of the online discussions will be summarized and shared with the class.

A project that applies the concepts presented in the course to a challenging situation in healthcare will be required. Students will prepare a project proposal, final paper and in-class presentation of their project and be assessed on each stage of the project, both individually and as a group.

Student Goals:

The goals for this course are:

- Design a database that meets a set of provided standards
- Avoid common databases design problems
- Organize data using common data modeling techniques
- Retrieve data from a SQL database

Learning Objectives:

By the end of this course, you will be able to:

- Understand basic elements of database design process
- Identify and troubleshoot database design problems
- Recognize common data modeling techniques
- Recognize the function of basic SQL commands

Evaluation Method:

Students will be evaluated using the following criteria:

- Midterm Exam 30%
- Homework 15%
- Project Phase 1 (Design) 15%
- Project Phase 2 (Implementation) 10%
- Final Exam 30%

Course Schedule

Online Synchronous Meetings are Thursdays from 7-9:00 PM. Some weeks may not have a Sync Session; your Instructor will indicate the exact schedule during the first Sync Session.

Sessions

Below, you will find a quick reference guide to the readings, deliverables and synchronous activities for each session.

Session 1 - Enhanced Entity-Relationship Modeling

Readings	Assignments	Synchronous Meeting(s)
<p>Assigned Readings</p> <ul style="list-style-type: none"> • Chapters 4, 5 and 6 in the textbook: <i>Database Processing: Fundamentals, Design, and Implementation</i> (10th Edition), by David M. Kroenke • PowerPoint presentation on Entity-Relationship Modeling • PowerPoint presentation on Enhanced Entity-Relationship Modeling <p>Optional Readings</p> <ul style="list-style-type: none"> • Any additional books on this topic • Independent Internet research on enhanced entity relationship modeling; please share useful links with classmates via the discussion board 	<p>Begin working on the project.</p> <p>And, of course, please keep up with the reading assignments.</p>	<p>Synchronous Session: Join the online discussion with your instructor and classmates.</p> <p>Online Office Hours: Meet online with your instructor to review or ask any questions.</p> <p>As office hours may change, ask your instructor for the schedule.</p>

Session 2 - Methodology - Logical Database Design for the Relational Model (ER - Relation Mapping)

Readings	Assignments	Synchronous Meeting(s)
<p>Assigned Readings</p> <ul style="list-style-type: none"> • Chapter 2 in the textbook: <i>Database Processing: Fundamentals, Design, and Implementation</i> (10th Edition), by David M. Kroenke • PowerPoint presentation on Methodology - Logical Database Design for the Relational Model (ER - Relation Mapping) <p>Optional Readings</p> <ul style="list-style-type: none"> • Any additional books on this topic • Independent Internet research on Methodology - Logical Database Design for the Relational Model (ER - Relation Mapping); please share useful links with classmates via the discussion board 	<ul style="list-style-type: none"> • Your preliminary project proposal. The documents you need for the project are: <ul style="list-style-type: none"> ○ Project Description, Background and Assignments ○ Patient Medication Form 	<p>Synchronous Session: TBA</p> <p>Online Office Hours: Meet online with your instructor to review or ask any questions.</p> <p>As office hours may change, ask your instructor for the schedule.</p>

Session 3 - Structured Query Language (SQL)

Readings	Assignments	Synchronous Meeting(s)
<p>Assigned Readings</p> <ul style="list-style-type: none">• Chapter 7 in the textbook: <i>Database Processing: Fundamentals, Design, and Implementation</i> (10th Edition), by David M. Kroenke• PowerPoint presentation - SQL Chapter 1• PowerPoint presentation - SQL Chapter 2• PowerPoint presentation - SQL Chapter 3• PowerPoint presentation - SQL Chapter 4• PowerPoint presentation - SQL Chapter 5• PowerPoint presentation - SQL Chapter 6• PowerPoint presentation - SQL Chapter 7 <p>Optional Readings</p> <ul style="list-style-type: none">• Any additional books on this topic• Independent Internet research on SQL; please share useful links with classmates via the discussion board		<p>Synchronous Session: TBA</p> <p>Online Office Hours: Meet online with your instructor to review or ask any questions.</p> <p>As office hours may change, ask your instructor for the schedule.</p>

Session 4 - Structured Query Language (SQL) (continued)

Readings	Assignments	Synchronous Meeting(s)
<p>Assigned Readings</p> <ul style="list-style-type: none"> • Chapter 8 in the textbook: <i>Database Processing: Fundamentals, Design, and Implementation</i> (10th Edition), by David M. Kroenke • PowerPoint presentation - SQL Chapter 1 • PowerPoint presentation - SQL Chapter 2 • PowerPoint presentation - SQL Chapter 3 • PowerPoint presentation - SQL Chapter 4 • PowerPoint presentation - SQL Chapter 5 • PowerPoint presentation - SQL Chapter 6 • PowerPoint presentation - SQL Chapter 7 <p>Optional Readings</p> <ul style="list-style-type: none"> • Any additional books on this topic • Independent Internet research on SQL; please share useful links with classmates via the discussion board 		<p>Synchronous Session: TBA</p> <p>Online Office Hours: Meet online with your instructor to review or ask any questions.</p> <p>As office hours may change, ask your instructor for the schedule.</p> <p><u>Please note:</u> the midterm is next session, so this is a good time to ask questions, if you have them.</p>

Session 5 – Midterm Exam

Readings	Assignments	Synchronous Meeting(s)
<p>Assigned Readings</p> <ul style="list-style-type: none">• No assigned readings this session <p>Optional Readings</p> <ul style="list-style-type: none">• Any additional books on this topic• Independent Internet research on entity-relationship modeling; please share useful links with classmates via the discussion board	<ul style="list-style-type: none">• Complete the midterm; this will become available during this session, but not before	<p>Synchronous Session: TBA</p> <p>Online Office Hours:</p> <p>Meet online with your instructor to review or ask any questions.</p> <p>As office hours may change, ask your instructor for the schedule.</p>

Session 6 - Functional Dependencies

Readings	Assignments	Synchronous Meeting(s)
<p>Assigned Readings</p> <ul style="list-style-type: none"> Chapter 1 in the textbook: <i>Database Processing: Fundamentals, Design, and Implementation</i> (10th Edition, ISBN: 0-13-167267-3), by David M. Kroenke For reference during the video: PowerPoint presentation on Design Theory for Relational Databases Information on functional dependencies Database Concepts <p>Optional Readings</p> <ul style="list-style-type: none"> Any additional books on this topic Independent Internet research on functional dependencies; please share useful links with classmates via the discussion board 	<ul style="list-style-type: none"> Case-Study: Based on this data, answer the following: <ul style="list-style-type: none"> a) The data in the table is susceptible to update anomalies. Provide examples of how insertion, deletion, and modification anomalies could occur on this table. b) Identify the functional dependencies represented by the data shown in the table. State any assumptions you make about this data. 	<p>Synchronous Session: TBA</p> <p>Online Office Hours: Meet online with your instructor to ask any questions.</p> <p>As office hours may change, ask your instructor for the schedule.</p>

Session 7 - Keys and Critical Thinking

Readings	Assignments	Synchronous Meeting(s)
<p>Assigned Readings</p> <ul style="list-style-type: none"> • PowerPoint presentation on Keys • Information on Candidate Keys • Information on Foreign Keys • Information on Superkeys <p>Optional Readings</p> <ul style="list-style-type: none"> • There is no specific textbook assignment this week, but reference as necessary: <i>Database Processing: Fundamentals, Design, and Implementation</i> (10th Edition), by David M. Kroenke • Any additional books on this topic • Independent Internet research on keys and critical thinking; please share useful links with classmates via the discussion board • PowerPoint presentation on Critical Thinking • Review information on functional dependencies 	<p>Case-Study:</p> <ol style="list-style-type: none"> 1. Using the functional dependencies identified in Part B of the case-study, explain the following terms in the context of the relational data model and provide an example for Key of that relation: <ul style="list-style-type: none"> ▪ Candidate Key ▪ Primary Key ▪ Super Key 2. Is a component of a primary key allowed to accept nulls? Why or why not? 	<p>Synchronous Session: TBA</p> <p>Online Office Hours: Meet online with your instructor to review or ask any questions.</p> <p>As office hours may change, ask your instructor for the schedule.</p>

Session 8 - Problems with Breaking Tables

Readings	Assignments	Synchronous Meeting(s)
<p>Assigned Readings</p> <ul style="list-style-type: none"> • PowerPoint presentation on breaking tables <p>Optional Readings</p> <ul style="list-style-type: none"> • There is no specific textbook assignment this week, but reference as necessary: <i>Database Processing: Fundamentals, Design, and Implementation</i> (10th Edition), by David M. Kroenke • Any additional books on this topic • Independent Internet research on breaking tables; please share useful links with classmates via the discussion board 	<p>There are no assignments this week so that everyone has time to fully understand and absorb the material we've covered.</p> <p>If you have fallen behind with the previous assignments, please take this opportunity to complete them and submit them to me.</p> <p>Lastly, please continue to keep up with reading assignments and participating in the discussion boards and online office hours.</p>	<p>Synchronous Session: TBA</p> <p>Online Office Hours: Meet online with your instructor to review or ask any questions. As office hours may change, ask your instructor for the schedule.</p>

Session 9 - Normalization

Readings	Assignments	Synchronous Meeting(s)
<p>Assigned Readings</p> <ul style="list-style-type: none"> Chapter 3 in the textbook: <i>Database Processing: Fundamentals, Design, and Implementation</i> (10th Edition), by David M. Kroenke PowerPoint presentation on Normalization Information on Denormalization <p>Optional Readings</p> <ul style="list-style-type: none"> More information on Normalization Independent Internet research on normalization; please share useful links with classmates via the discussion board 	<ul style="list-style-type: none"> Case-Study: Using the functional dependencies identified in Part B and the key from Part C, illustrate the process of normalization by converting customer/car relation to Third Normal Form (3NF) relations. Identify the primary and foreign keys in your 3NF relations. 	<p>Synchronous Session: TBA</p> <p>Online Office Hours: Meet online with your instructor to review or ask any questions.</p> <p>As office hours may change, ask your instructor for the schedule.</p>

Session 10 - Final Exam

Readings	Deliverables	Synchronous Meeting(s)
None	Final exam	Online Office Hours