INST 327 - Database Design and Modeling - Section 0104
Fall 2018 - Tentative Syllabus V2 (09/08/2018)

This syllabus is subject to change throughout the semester. Check Canvas (ELMS) for the current version.

Personnel:	Vedat G. Diker (Dr. Diker)	Itai Amon (TA) Nick DeWitt (TA)	**Class meeting time and place:**
Office:	Hornbake 0217A		Tuesday and Thursday *(8/28/2018 - 12/6/2018)*
Phone:	(301) 405-9814		5:00 PM to 6:15 PM
E-mail:	use ELMS messages	use ELMS messages	in Hornbake (HBK) 0115
Office Hrs:	Wed. 4:30-6:00PM By appointment	As announced	

Catalog Description

Pre-requisite: INST126, or CMSC122, or CMSC106
Pre- or co- requisite: INST 201 - Introduction to Information Science, or INST 301.
This course is an introduction to databases, the relational model, entity-relationship diagrams, user-oriented database design and normalization, and Structured Query Language (SQL). Through labs, tests, and a project, students develop both theoretical and practical knowledge of relational database systems.

Extended Course Description

A broad introduction to relational database systems, this course will provide students with a combination of conceptual understanding and technical practice. Students will learn about the relational model, which provides the logical framework for designing and querying relational databases. Students will also learn important technical and conceptual approaches to database design, including user-oriented design, requirements analysis and specification, entity-relationship modeling, and normalization. Students will put these fundamentals into action by learning and using the Structured Query Language (SQL) and a database management system (DBMS) to build, populate, and query a working database.

Student Learning Outcomes

Upon successful completion of the course, students will be able to:

- Create user-oriented database queries using the Structured Query Language (SQL)
- Describe the relational model as a logical system for structuring data for retrieval;
- Translate user needs into functional database requirements by using entity-relationship models that conform to the relational model;
- Build a working relational database using a database management system (DBMS);
- Normalize and de-normalize a relational database to optimize performance;
- Identify security issues in databases and develop approaches to address them.

Required Resources

- *Course Canvas (ELMS) Website:* https://myelms.umd.edu/courses/1253601
- *Required Textbook:* Murach, J. (2015) *Murach's MySQL, 2nd ed.* Mike Murach & Associates. (https://www.murach.com/shop/murach-s-mysql-2nd-edition-detail)
- Additional readings and resources may be assigned as needed. Extra materials will be announced in class and/or via Canvas.
- *Required Software; (you need both item 1 and item 2 below):*
  1) MariaDB Server: A fork of MySQL server that comes as part of the XAMPP distro, which is is available at http://apachefriends.org. Download and install XAMPP to deploy MariaDB on your computer. **(Important: Do not download and use the VM version).**
  2) MySQL Workbench: Available at https://dev.mysql.com/downloads/workbench/. This is a separate download and install; it does not come with XAMPP.
- *A Computer:* For the best learning experience in this course, you must bring to each class session a fully-charged computer that can run the software listed above.

Course Activities

- *Textbook Chapters / Lectures:* You must read the relevant chapters before each class as listed on the course schedule. The instructor will assume that you have read and studied assigned textbook chapters prior to class time. Lectures will be interactive; please arrive in class on time and prepared to participate. You may have your laptops open during lecture but only for class activities such as note-taking, referencing an e-copy of the book, or running class exercises in MySQL Workbench.

- *Quizzes:* Online and in-class quizzes will test your comprehension of readings and lectures. These will usually be administered online before on Tuesday's class. They will cover the readings for Tuesday of that week. All quizzes, including any that is done in-class, will be administered on Canvas. In-class quizzes will require being physically in the classroom at the time of the quiz. Quizzed cannot be made up; so, if you missed a quiz deadline without a university-sanctioned and documented excuse, you will get a grade of zero on that quiz.

- *Lab Exercises:* There will be several in-class lab exercises, usually on Thursdays. You will usually receive these practice problems before class and should preview them before class, but you must execute them in class. You will submit your work via Canvas. Some lab exercises will be done as part of your work with your project team.

- *Homework Assignments:* There will be several assignments over the semester, each of which will include multiple questions. Most of the questions will be practical tasks, such as writing SQL queries, normalizing a table, or developing a stored program. The assignments are individual work. Although you may consult with your classmates, the AMPs, TAs, and the instructor to develop general approaches to solving questions, you must work individually while you build, type, test and debug your answers. Assignment questions will be available on Canvas. Completed assignments will be submitted via Canvas, as well. Timely submission of the completed assignments is essential. The due date of each assignment will be stated clearly in the assignment description. If an assignment due date is a religious holiday for you, please let the instructor know as soon as the assignment is announced, so an alternate due date can be set for you.

- *Team Project:* Students will work in teams to design and build a non-trivial relational database throughout the semester. Project-related work is central to this course, and a big portion of your final grade is based on the project. The project will involve identifying an end-user need for a relational database, reviewing and evaluating an existing, non-optimal database aimed at addressing the identified need, determining the requirements for the database, developing a deadline-oriented plan for building the database, and designing the logical specifications, building and populating the database, and developing queries/views that will showcase the capabilities of the database for fulfilling the identified user needs. Students will be assigned to teams by the instructor. The teams will choose their topics from a list of possible project topics.

- *Mid-term Exam:* An in-class mid-term exam will be administered on Canvas to test students' understanding of data modeling and relational database concepts, as well as their SQL query developing skills. The mid-term exam may include conceptual questions such as those that ask for definitions of and comparisons between data modeling and relational database concepts, as well as query challenges that test students' SQL skills. Some of the questions may be related to students' work on the team project.

- *Final Exam:* An in-class final exam will be administered on Canvas to test students' understanding of data modeling and relational database concepts, as well as their SQL query developing skills. The final exam may include conceptual questions such as those that ask for definitions of and comparisons between data modeling and relational database concepts, as well as query challenges that test students' SQL skills. Some of the questions may be related to students' work on the team project.

Grading

Your grade is determined by your performance on the assessment components in the course. All assessment scores will be posted on Canvas. If you would like to discuss your grade, or have questions about how something was scored, please schedule a time with the course TA. Grade disputes must be turned in within one week of receiving the graded work. They must be submitted as a written document in which you indicate the graded work, an explanation of what you believe was misgraded, and an explanation for why you think it should be given a different score. For any re-grade request, the entire assignment will be regarded, and your score may go up or down according to what changes are made for rectifying grading errors.

Some, (not all), graded work may allow slightly late submission for a percent deduction on the score. In such cases, the cut-off times and associated penalties will be indicated within the assignment. Cut-off dates and times for percent deductions are absolute, and cannot be relaxed retroactively due to any reason, including technical issues, such as those with your computer or submission problems on Canvas. **To avoid unexpected complications, complete and submit your work well in advance of the due dates and times.** Assignments submitted beyond the final due date will not be accepted and you will receive a grade of zero on the given graded component. Not all graded work will allow for late submission; please read all submission instructions carefully.

Scores on each component will be combined to produce a single overall score for each student as follows.

Component	**Percentage**
Quizzes	5%
Lab exercises	5%
Assignments	20%
Team Project	40%
Project Team Plan	*3%*
Project Proposal	*5%*
Proposal Review	*2%*
Progress Report	*5%*
Final Database and Report	*20%*
Peer Evaluation	*5%*
Mid-term Exam	15%
Final Exam	15%

Letter grades will be assigned using the following categories. These are firm cut-offs. No further rounding off, no extra credits options, no make-ups, no re-dos, no curving is offered. Just your overall grade based on the table above will be used to determine your final letter grade according to the following cut-offs.

A+	97-100 pts.	B+	87-89.99	C+	77-79.99	D+	67-69.99
A	93-96.99	B	83-86.99	C	73-76.99	D	63-66.99
A-	90-92.99	B-	80-82.99	C-	70-72.99	D-	60-62.99
						F	59.99 or lower

Policy on Academic Misconduct

Cases of academic misconduct will be referred to the Office of Student Conduct irrespective of scope and circumstances, as required by university rules and regulations. It is crucial to understand that the instructors do not have a choice of following other courses of actions in handling these cases. There are severe consequences of academic misconduct, some of which are permanent and reflected on the student's transcript. For details about procedures governing referrals and possible consequences visit http://osc.umd.edu/OSC/Default.aspx.

It is very important that you complete your own assignments, and do not share any files or other work. The best course of action to take when a student is having problems with an assignment question is to contact the instructor. The instructor will be happy to work with students while they work on the assignments.

University of Maryland Code of Academic Integrity

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://shc.umd.edu/SHC/Default.aspx.

Special Needs

Students with disabilities should inform the instructors of their needs at the beginning of the semester. Please also contact the Disability Support Services (301-314-7682 or http://www.counseling.umd.edu/DSS/). DSS will make arrangements with the student and the instructors to determine and implement appropriate academic accommodations. Students encountering psychological problems that hamper their course work are referred to the Counseling Center (301-314-7651 or http://www.counseling.umd.edu/) for expert help.

Course-Related University Policies

UMD's Office of Undergraduate Studies has developed a guide to provide students with resources and information relevant to participation in a UMD course. You can access the guide at http://www.ugst.umd.edu/courserelatedpolicies.html.

Course Schedule (This schedule is for planning purposes and may change. See Canvas (ELMS) for current information and deadlines.)

The class meets twice a week for 75 minutes per session. This schedule is subject to change.

Session	Date	Topics	Readings Due	Non-project Work	Project Work
1	Aug. 28 (Tu)	Introduction, Software installation and tests	Appendix A Appendix B	Download XAMPP (or MySQL Server) and MySQL Workbench	
2	Aug. 30 (Th)	Introduction, Software installation and tests	Appendix A Appendix B		
3	Sep. 4 (Tu)	Relational DB concepts; SELECT from single table	Chapter 1, Chapter 3		
4	Sep. 6 (Th) [Lab Day]	LAB: MySQL Workbench, SELECT	Chapter 2	All software installed, configured, and tested	
5	Sep. 11 (Tu)	Relationship types; Joins; UNION	Chapter 4		Introduction of Team Project Process
6	Sep. 13 (Th) [Lab Day]	LAB: SELECT with JOIN			Form teams; Students without a team will be assigned to a team
7	Sep. 18 (Tu)	Team project overview; INSERT, UPDATE, DELETE	Chapter 5	Assignment 1 due	
8	Sep. 20 (Th) [Lab Day]	LAB: INSERT, UPDATE, DELETE			
9	Sep. 25 (Tu)	Aggregate functions; Summary queries; Subqueries	Chapter 6, Chapter 7		
10	Sep. 27 (Th) [Lab Day]	LAB: Summary queries		Assignment 2 due	
11	Oct. 2 (Tu)	Data types; Functions	Chapter 8, Chapter 9		Project Plan due **Monday, 10/1, 11:00PM** (Develop preliminary project plan)
12	Oct. 4 (Th) [Lab Day]	LAB: Subqueries			
13	Oct. 9 (Tu)	Normalization; Dependencies; Relationships	Chapter 10		
14	Oct 11 (Th) [Lab Day]	LAB: Normalization; DB Evaluation		Assignment 3 due	

15	Oct. 16 (Tu)	**Midterm Exam**			Project Proposal due **Thursday, 10/18, 11:00PM** (Propose detailed project plan)
16	Oct. 18 (Th) [Lab Day]	In-class Group work on Team Project			
17	Oct. 23 (Tu)	Entity-Relationship diagrams	Ch. 10 [Re-read], Chapter 11		
18	Oct. 25 (Th) [Lab Day]	LAB: ERD and Forward engineering; Creating/altering DBs and tables			
19	Oct. 30 (Tu)	Indexes; Views; Stored program development	Chapter 12, Chapter 13		Project Proposal Peer-review due **Monday, 10/29, 11:00PM** (Assess another team's proposal)
20	Nov. 1 (Th) [Lab Day]	In-class Group work on Team Project ERD			
21	Nov. 6 (Tu)	Transactions, Concurrency, Locking, Stored procedures	Chapter 14, Chapter 15		
22	Nov. 8 (Th) [Lab Day]	LAB: Indexes; Views; Stored programs			
23	Nov. 13 (Tu)	Functions, Triggers, Events in depth	Chapter 16	Assignment 4 due	Project Progress Report due **Monday, 11/12, 11:00PM** (Report project progress)
24	Nov. 15 (Th) [Lab Day]	LAB: Data import/export; Backup/Restore, Reverse eng'g.			
25	Nov. 20 (Tu)	DB admin., Security, Backing up and restoring databases	Ch. 17, Ch. 18, Ch. 19		
--	Nov. 22 (Th)	**Thanksgiving Break - NO CLASS**			
26	Nov. 27 (Tu)	In-class Group work on Team Project: Forward Engineering			
27	Nov. 29 (Th) [Lab Day]	In-class Group work on Team Project: Sample Data/Queries			
28	Dec 4 (Tu)	Non-relational DB paradigms; Graph databases			Project DB and Report due **Monday, 12/3, 11:00PM** (Report project work and DB)
29	Dec 6 (Th) [Lab Day]	In-class Group work on Team Project: Report/Wrap-up			

This schedule is for planning purposes and may change. See Canvas (ELMS) for current information and deadlines.