

UNIVERSITY OF UTAH  
DEPARTMENT OF BIOMEDICAL INFORMATICS  
**BMI 6203-001/090 Clinical Database Design (Fall 2020)**

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#### Instructor

- Instructor: **Jaehoon Lee, PhD** (jaehoon.lee@utah.edu)

#### Schedule

- Online class: Thursdays

#### Materials and textbook

All course materials will be available on Canvas.

#### Course description

Clinical database is the foundation for clinical information systems such as electronic health records and data warehousing environments. Designing a clinical database may require thorough understanding of the theories of database systems, underlying information models, and architectural features of clinical information systems. This course will provide systematic learning activities for fundamentals of clinical databases and practices of database design. In addition, we will spend time on learning SQL (Structured Query Language) to develop databases and use SQL queries to answer clinically relevant questions using example data sets in the databases. Lastly, we will cover learning of how clinical information models are associated with database design and state-of-the-art trends in the healthcare IT industry.

Since data modeling methods for data warehousing are different than transactional systems, a separate data warehousing course is offered through our department. Same way, clinical information modeling and standard terminologies that are already covered by other courses will be discussed only as a part of design issues in this course. New database technologies such as NoSQL or Hadoop topics may be discussed if time allows, but will not be a primary focus of this course.

#### Didactic objective

We will accomplish our learning objectives through lectures, quizzes, individual homework assignments, a group project, and hands-on experience using Oracle or other relational database technologies. Through the activities, students will be able to:

1. Describe the database development process and key considerations
2. Create a conceptual entity relationship (ER) model based on clinical user requirements
3. Convert an ER model into a logical relational model
4. Understand the purpose and process of normalization
5. Understand fundamentals of clinical information models and how they are associated with designing database scheme
6. Implement a physical database using SQL
7. Analyze clinical data using SQL
8. Learn state-of-the-art of clinical database design and future direction in the health IT industry

## Course schedule

Week	Date	Topic	Activities	HW	RD	Quiz
1	Aug 18	Introduction to database	Review syllabus Lecture 1			
2	Aug 25	Conceptual data modeling	Lecture 2			Quiz 1
3	Sep 1	Logical database design	Lecture 3,4	HW1	RD1	
4	Sep 8	Conceptual data modeling practice	Exercise #1 Form project groups			Quiz 2
5	Sep 15	Physical database design	Lecture 5		RD2	
6	Sep 22	Group project student meeting		HW2		Quiz 3
7	Sep 29	Relational algebra	Lecture 6			
8	Oct 6	FALL BREAK! No Class!				
9	Oct 13	SQL (Part 1) Introduction to SQL	Lecture 7	HW3	RD3	
10	Oct 20	SQL (Part 2) Select SQL (Part 3) Join	Lecture 8,9			Quiz 4
11	Oct 27	SQL practice - 1	Exercise #2			
12	Nov 3	SQL (Part 4) Set	Lecture 10	HW4		
13	Nov 10	SQL (Part 5) Advanced SQL	Lecture 11			Quiz 5
14	Nov 17	SQL practice - 2	Exercise #3	HW5		
15	Nov 24	Finalize Group Project				
16	Dec 1	Group Project Presentation	<b>Project</b>			

\* **HW** : Homework assignment

\* **RD** : Reading assignment

Class may be adjusted due to student progress or conflicts

## Quizzes

All quizzes must be of individual efforts. Quizzes are administered according to the syllabus schedule below. Make-up quizzes will be given ONLY in extraordinary circumstances on a pre-approved basis. Quizzes are open books and open notes.

## Homework / Reading assignments

All homework / reading assignments must be of individual efforts. If you have difficulties with the assignments, please contact the instructor or TA for assistance. All assignments should be submitted on Canvas by due date and time.

## Group project

Students will design and develop a healthcare database according to materials learned in class. Refer to the project guideline document for more details.

## Grading

Points will be assigned to each student based on the following items.

<b>Item</b>	<b>Percentage of grade</b>
Quiz	30%
Individual assignment	20%
Reading assignment	20%
Group project	30%
Total percentage	100 %

Tentative grading scale is as follows.

<b>Grade</b>	<b>Percentage score</b>	<b>Grade score</b>
A	91.0 and above	4.0
A-	89.0 – 90.99	3.7
B+	86.0 – 88.99	3.3
B	82.0 – 85.99	3.0
B-	80.0 – 81.99	2.7
C+	77.0 – 79.99	2.3
C	72.0 – 76.99	2.0
C-	70.0 – 71.99	1.7
D+	67.0 – 69.99	1.3
D	66.99 and below	1.0

## Grading policy

Please respect yourself, your fellow students, and your instructor by NOT bargaining or negotiating for grades after the course is over. If you need to reach a minimum grade for scholarship, etc., please work with the instructor during the course to ensure that you understand the content, so that you will perform well.

## Expected student behavior

The University expects regular attendance at all class meetings. Instructors must communicate any particular attendance requirements of the course to students in writing on or before the first class meeting. Students are responsible for acquainting themselves with and satisfying the entire range of academic objectives and requirements as defined by the instructor. (Policy 6-100III-O)

Students are expected to adhere to the standards of behavior outlined in the University of Utah Code of Student Rights and Responsibilities (Policy 6-400). Students engaging in behavioral misconduct could be subject to suspension or dismissal from the University.

<http://regulations.utah.edu/academics/6-400.php>

## Disability accommodation

Americans with Disabilities Act (ADA) Statement: The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All information in this course can be made available in alternative format with prior notification to the Center for Disability Services.

## Plagiarism

According to the University of Utah Student Code (PPM 8-10 V.B.3), "Plagiarism means the unacknowledged use or incorporation of any other person's work in, or as a basis for, one's own work offered for academic consideration or credit, or for public presentation." Plagiarism or academic dishonesty is not expected and will affect the grade negatively.

## End of course evaluation guidelines

<http://ctle.utah.edu/scf/student-guidelines.php>

## Campus safety resources

The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (2677). You will receive important emergency alerts and safety messages regarding campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit [safeu.utah.edu](http://safeu.utah.edu).

## Communications

Always use Canvas or your University Umail to communicate with your Instructor/TA.