601.315/415/615 - DATABASES
Fall 2023 Syllabus

Instructor: Prof. David Yarowsky
Hackerman 324G
410-516-5372
yarowsky@jhu.edu

Head CA: Nader Najjar
nnajjar2@jhu.edu

Meeting Time: Tu,Th: 3:00-4:15 PM (Baltimore Time)

Classroom: Hackerman B-17

Office Hours: Tue/Thu after class and by appointment
CAs - Times TBA and by appointment. CS undergraduate lab in Malone.

Required Textbook:

- A. Silberschatz, H. Korth and S. Sudarshan, *Database System Concepts*, 7th Edition, McGraw Hill, 2019, ISBN: 978-0-07-802215-9 or 6th Edition, McGraw Hill, 2010, ISBN: 978-0-07-352332-3.

601.315/415/615 will explore both formal and practical issues in databases. Hands-on database design and implementation using the MySQL DBMS will be an important component of the course.

Course Requirements: Final grades will be based on the following (subject to change):

Class Participation:	5%
Homeworks (4):	24%
Midterm:	15%
Final Exam:	28%
Final Project:	28%

Lateness Policy:

One homework assignment may be handed in up to 5 days late without penalty. No other late homeworks will be accepted. Final projects handed in late will receive a penalty of 10% for every day late.

601.315 vs. 601.415/615:

601.315/415/615 will be share common lectures. They will differ primarily in terms of assignments and grading. Homeworks in 601.415/615 will include 1 or more additional problems and the final project will include additional component(s) not required for 601.315. Exams will differ somewhat and will be graded on a different scale. Nevertheless, 601.415/615 should be manageable by advanced undergraduates and upperclass students are encouraged to enroll.

Midterm and Final Exams:

The midterm will cover material roughly through 10/17/23. The final exam will be cumulative, with approximately 1/3 of the content based on pre-midterm material.

Final Projects:

Students will be able to select final projects of interest to them from a fairly diverse set of options. Details will be provided in class. Students may work in teams of 1 or 2 people. A project proposal will be due in early November, including a detailed system specification and design. The final project submission, including a full database implementation in MySQL, will be due shortly after the end of classes in December. For most projects, students will be required to populate and test their implemented database design with substantial quantities of *real world data* extracted from the web or other online sources.

Computer Science Academic Integrity Code:

Academic honesty is required in all work you submit to be graded. You must solve all homework and programming assignments entirely on your own, unless group work is specified in writing. This means you must not show your program code, problem solutions, or work to other students. However, you may discuss assignment specifications with others in the class to be sure you understand what is required by the assignment. If you use fragments of source code from sources other than your text (such as on-line resources), you must put a reference to that effect in your homework submission. Falsifying program output or results is prohibited. Please see your professor if there are any questions about what is permissible. Students who cheat will suffer a serious course grade penalty in addition to being reported to university officials. You must abide by JHU's Ethics Code, available at http://jhunix.hcf.jhu.edu/~ethicsbd.

Solutions to Previous Exams and Homeworks:

A copy of the previous year's midterm (and one other midterm) and their solutions will be explicitly distributed to students for practice and guidance regarding expectations, and students are encouraged to study using them. Likewise, Homework 4 is composed of questions given on previous final exams, and is intended as preparation for the final exam, with sample solutions given **after** HW4 is submitted but before the final exam.

With the above exceptions, students are explicitly forbidden from looking at or using other 601.315/415/615 exams, homeworks and/or sample solutions.

Preliminary Class Schedule (subject to change):

Date	Topic	KS 7e	KS 6e	KS 5e	KS 4e
Tu. 8/29	Introduction	–	–	–	–
Th. 8/31	Overview of databases and data modeling	1	1	1	1
Tu. 9/5	Entity-Relationship data model	6	7	6	2
Th. 9/7	Database design principles	6	2	6	2
Tu. 9/12	Relational data model	2	3	2	3
Th. 9/14	Relational algebra	2	6	2	3
Tu. 9/19	Relational algebra and relational calculus	2	6	2,5	3
Th. 9/21	SQL	3	3	3	4
Tu. 9/26	SQL (continued)	4	4	4	4
Th. 9/28	Advanced SQL	5	5	4	4
Tu. 10/3	QBE (Query by Example), Views	27	C1	5	5
Th. 10/5	Relational database design, integrity constraints	7	8	7	7
Tu. 10/10	TBA	hnd	hnd	hnd	hnd
Th. 10/12	Relational database design, normalization	7	8	7	7
Tu. 10/17	Query processing and optimization	15-16	12-13	14	14
Th. 10/19	FALL BREAK				
Tu. 10/24	Query processing and optimization	15-16	12-13	14	14
Th. 10/26	MIDTERM	–	–	–	–
Tu. 10/31	Embedded SQL; PL-SQL/stored procedures	hnd	5	hnd	hnd
Th. 11/2	Application design and development	9	9	8	
Tu. 11/7	Transactions and database recovery	17-19	14,16	17-19	17-19
Th. 11/9	Distributed databases	20-22	19	22	19
Tu. 11/14	Database security	9	9	8	6
Th. 11/16	Object-oriented databases	29	22	9	8,9
Tu. 11/21	THANKSGIVING BREAK				
Th. 11/23	THANKSGIVING BREAK				
Tu. 11/28	Data warehousing, data mining, multimedia databases	10-11	25-26	18,24	22,23
Th. 12/30	nosql, datalog and XML data model	hnd,30	hnd	hnd	hnd
Tu. 12/6	Natural language interfaces, Natural language databases	hnd	hnd	hnd	hnd
Th. 12/8	WWW-based technologies/interfaces; future directions	26	21	10	22
Mo. 12/18	**Final Examination** 6PM-9PM				

KS = Korth and Silberschatz

Students are responsible for determining if they have a scheduled exam conflict with another course during the officially assigned exam slot for this class. In this very unlikely event, given that this is exclusively the official slot for TuTh3PM classes, students should notify both instructors as soon as possible, and no later than 12/08/23, so the scheduling conflict can be resolved.