

DATABASE SYSTEMS

Background

When and where	Thursday mornings 8AM to 10:45AM in HC 1021 • Labs Fridays 8AM to 9AM and online	
Suggested Text	<i>Database Systems The Complete Book, second edition</i> by Garcia-Molina, Ullman, and Widom. Published by Prentice Hall. ISBN 978-0-13-187325-4	
Web	https://www.labouseur.com/courses/db	
Instructor	Alan G. Labouseur Hancock 3007 (Office hours are posted.)	Alan.Labouseur@Marist.edu 845-575-3832 Marist 845-440-1102 home office

Grades

Letter Grades				
You can earn up to 1000 points, broken down as follows:	Labs	20.0%	200 points: 10 at 20 points each	[1, 2]
	Graph Database Project	15.0%	150 points	[1, 2]
	Relational Database Project	20.0%	200 points	[1,2,5]
	Mid-term Exam	20.0%	200 points - study sheet permitted	[1,2,5]
	Final Exam	20.0%	200 points - study sheet permitted	[5]
	Attendance & Participation	2.5%	25 points for quality & quantity	[5]
	Laziness and Whining	2.5%	25 points for not (lazy or whining)	[1]

Themes, Objectives, and Assessment

Assessment methods include assignments, quizzes, exams, discussions, presentations, peer review, and projects.	In this course, I hope that you will . . .	
	• come to understand that data has value, and the right answer is infinitely better than a fast answer.	[1, 2]
	• reach a solid knowledge of and appreciation for principles and foundations of relational and graph database systems.	[1, 2]
	• gain an understanding of relational database concepts, terminology, and their superiority over NoSQL garbage like document stores.	[1, 2]
	• attain in-depth knowledge of the relational data model and why it's superior to other data models in general, and will likely remain so.	[1, 2]
	• realize that no SQL is better than NoSQL.	[1, 2, 5]
	• realize that Lotus Notes and Ms-Access are not databases, but rather a type of pernicious virus.	[1, 2]
	• appreciate, understand, use, and bask in awe of SQL.	[1, 2]
	• appreciate, understand, and bask in awe of graphs.	[1, 2, 5]
	• design, implement, test, and present a BCNF relational database.	[1, 2]
	• discuss and use new database technology.	[1, 2, 5]
	• come to know some modern graph data techniques and technologies	[1, 2]
	• develop continuing education skills. Capable problem solvers never stop learning. To the end, you will get practice in finding some answers for yourself.	[1, 2]

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Schedule

#	Week	Due	Chapters	Topics
0	20-Jan	—	1 9.1	The Plan — Data vs. Information — Data throughout history: Files, Hierarchies, Networks, Tables, Documents, Key-value stores, and Graphs
1	27-Jan	Lab 1 <i>Installing PostgreSQL</i>	2, 4.1, 5.1 6.1, 7.1, 9.2	The Relational Model — Relational Algebra — Data types — Keys Beginning SQL — Simple SQL queries
2	3-Feb	Lab 2 <i>Our beloved CAP database</i>	2, 6.2-3 7.1-2, 9.3	Entity/Relationship modeling — SQL create statements Referential Integrity and constraints — SQL subqueries
3	10-Feb	Lab 3 <i>Getting started with SQL</i>	2, 6.2-4 7.1-2, 9.3	Check constraints — Null and three-valued logic — Cursors — Subqueries SQL: Insert, update, and delete — Aggregations with GROUP BY and HAVING
4	17-Feb	Lab 4 <i>Subqueries SQL</i>	6.1 - 6.5 8.1-2	Joining relations with Inner and Outer joins The System Catalog — Views — Set operations in SQL
5	24-Feb	Lab 5 <i>Joins Three-quel</i>	G*	Graph Databases Review for the Mid-term Exam
6	3-Mar	Lab 6 <i>Interesting and Painful Queries</i>	—	Mid-term Exam in HC 2023 One-page study sheet permitted. Some restrictions apply.
7	10-Mar	—	8.3-4 14.1-3	Reflect upon the Mid-term Exam Indexes and Index Structures
8	17-Mar	—	—	<i>Spring Break</i>
9	24-Mar	—	3 4.1-6	Introduction to Normalization, Functional dependencies, and Normal forms
A	31-Mar	Graph Database Project	3 4.1-6	Normalization — Functional dependencies — Normal forms The normalization process — Lossless Joins — Normalization examples
B	7-Apr	Lab 7 <i>Normalization 1</i>	3, 4.1-6 10.1	Discuss Lab 7 — Database design and data modeling Weak entities and entity subtypes — Authorization and Security
C	14-Apr	Lab 8 <i>Normalization 2</i>	9.4	Discuss Lab 8 — Stored Procedures and Triggers
D	21-Apr	Lab 9 <i>Normalization 3</i>	1.2.4 18.3-4 19.2	Discuss Lab 9 — Locks, locking isolation levels, and deadlock
E	28-Apr	Lab A <i>Stored Procs</i>	6.6 17	ACID — Transactions, Recovery, and the Log file
F	5-May	Relational Database Project	all of it	Show off Relational Database projects Review for the Final Exam
∞	9-May	—	everything	Final Exam at 8AM in HC 2023 One-page study sheet permitted. Some restrictions apply.