

CMSC 508
Database Theory
Fall 2022

Catalog listing: CMSC 508 (See: <http://bulletin.vcu.edu/azcourses/cmssc/>)
Semester: Fall 2022
Classroom: Engineering West Building, room 101 (Auditorium)
Meeting Times: Monday/Wednesday 5:30pm-6:45pm
Final Exam: Monday, December 19, 4pm-7pm
Course Level: Undergraduate
Prerequisites: CMSC 303 with a minimum grade of “C” (CS undergraduates);
BNFO 501 (Bioinformatics graduate students)
Instructor: John Leonard
Office: ERB 2327 (Engineering Research Building)
Office Hours: By appointment
The instructor reserves the right to amend this syllabus as necessary.

Catalog Description

Semester course; 3 lecture hours. 3 credits. Prerequisites: CMSC 303 with grade C or better. Introduction to databases. Database design and the E-R model. Unified Modeling Language. Relational database design. Normalization and decomposition. Database implementation. SQL. Data definition language. Data manipulation language. Views. Triggers. Indexes and transactions. Security, performance, and scalability of databases.

Course Structure

Lecture hours/week – 3
Lab hours/week – 0

Course Goals

This course provides an overview of databases design and SQL language. The students will be expected to have mathematical and analytical reasoning abilities, and background on algorithms, data structures, and programming languages. The students will learn to provide database solutions to real-world problems and translate them into database implementations in SQL.

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

1. Demonstrate an understanding of the concepts underlying databases design.
2. Analyze problems to identify data requirements, types and relations.
3. Create E-R and relational designs from problem statements.
4. Design data structures and functions to store and process the information.
5. Design and implement databases using SQL language.
6. Query and manipulate data using SQL language.
7. Design and implement reports using data queried from a database.

ABET Criteria Addressed

SLO #1: Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions..

SLO #6: Apply computer science theory and software development fundamentals to produce computing-based solutions.

Other Criteria Addressed:

- Substantial coverage of software development.
- Substantial coverage of at least one general-purpose programming language.
- Exposure to information management.
- A major project that requires integration and application of knowledge and skills acquired in earlier course work.

Major Topics Covered

- Data storage
- Entities and relations
- Entity-Relationship model, diagrams, and design
- Unified Modeling Language
- Relational design
- Functional dependencies
- Normal forms
- Decomposition
- SQL; Queries; Subqueries; Functions; Views; Triggers; Indexes

Textbooks

- Silberschatz, S. Sudarshan, H.F. Korth, Database system concepts, Sixth Edition, McGraw Hill. (Recommended, not required)
- Ramakrishnan, J. Gehrke, Database Management Systems, Third Edition, McGraw-Hill ISBN 0072465638. (Recommended, not required)

Class Schedule

- Lecture: refer to the weekly schedule in Canvas

Grading:		Grading scheme:
		A: $\geq 90\%$
		B: $\geq 80\%$ and $< 90\%$
		C: $\geq 70\%$ and $< 80\%$
		D: $\geq 60\%$ and $< 70\%$
		F: $< 60\%$
Category	% weight	
Homework	20	
Final Project	30	
Quizzes	30	
Final Exam	20	

VCU Statements

Use [VCU Libraries](#) to find and access library resources, spaces, technology and services that support and enhance all learning opportunities at the university.

Students should visit <http://go.vcu.edu/syllabus> and review all syllabus statement information. The full university syllabus statement includes information on safety, registration, the VCU Honor Code, student conduct, withdrawal and more.

General Instructions

1. Lecture slides are an aid to students, not a complete source of information required for this course; use of the recommended textbooks is highly recommended.
2. All assignments must be submitted on or before the due date specified. Only assignments submitted on or before the due date will be considered for grading. Requests to re-grade projects must be made within one week from the date the project grade is returned, requests after this time will be denied.
3. No assignments will be accepted late unless special permission has been given prior to the due date.
4. No makeup exams will be given unless special permission has been given prior to the date of the test. Be prepared to provide documentation for the reason you are requesting the makeup exam, or permission may not be granted.
5. Request to adjust scores or re-grade tests must be made at the end of the class meeting in which the test is returned, requests after this time will be denied.
6. Unless specifically stated otherwise, all assignments are to be individual efforts.
Plagiarism applies to code as with any other intellectual property. Plagiarized code is a form of cheating and will be treated as such. Instances of plagiarism and other violations of the VCU Honor Code will be reported to the VCU Honor Council.
7. Personal computers/laptops/cell phone may be used in class only with the instructor's permission. There will be some class meetings in which a laptop is required in order to complete in-class assignments.
8. **Use of any unauthorized websites is prohibited during quizzes and exams.**
9. Assignments and projects will be submitted online through an assignment link in Canvas.
10. This is a 15-week course that will require participation and collaboration with fellow classmates. Be prepared to complete assignments as well as participate in group discussions and a semester-long group project .
11. Follow the course schedule to be sure you are keeping up with discussion, activities and assignments.