

CSC 4480: Principles of Database Systems

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Fall, 2019

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Office: ...

Course Website: <https://ebelenwaf.github.io/>
Class Hours: Th 6:10-8:50pm
Class Room: ...

Course Description

This course will present the basic concepts of database systems. Topics that will be covered include basic relational database theory, relational database modeling, relational database design and implementation, normalization, Semi-Structured data (XML, JSON), transaction management, the SQL language, non-relational database (e.g MongoDB), other languages and facilities provided by database management systems. A group project to design a fully functional database is a key requirement of this course.

Required Materials

R. Elmasri and S. Navathe, [Fundamentals of Database Systems](#), 7th Edition, Pearson, 2016.

Prerequisites

Prerequisites: (CSC 1051 or ECE 1620) and CSC 1300

Course Objectives

This course aims to introduce students to proven processes and techniques that are fundamental to database system management.

Learning Objectives

1. Understand terms related to database design and management.

2. Understand the objectives of data and information management.
3. Understand the relational data model and relational database management system.
4. Construct conceptual data models and develop logical data models.
5. Evaluate the normality of a logical data model, and correct any anomalies.
6. Develop physical data models for relational database management systems.
7. Use structured query language (SQL) to create objects, populate tables, and retrieve data.
8. Understand the Non-relational database model and identify types of non-relational databases.
9. Understand database performance issues.
10. Understand the basics of data management and administration.
11. Apply the ability to work in a team environment to design and implement a relational databases systems using an enterprise DBMS.

Accreditation/Certification Requirements

This course is required for Computer Science majors and minors, and is an elective for the FIT (Fluency in Information Technology) certificate. It is accredited through CAC (Computing Accreditation Commission) of ABET (Accreditation Board for Engineering and Technology, Inc.), and satisfies the following student outcomes:

- 1.1 Students will demonstrate understanding of the core areas of algorithms, theory of computation, operating systems, linguistics of programming languages, and architecture.
- 4.1 Graduates will be prepared for employment in high-technology companies that utilize their computing education.

Course Policies

Grading Policy

The typical Villanova University grading scale will be used. I reserve the right to curve the scale dependent on overall class scores at the end of the semester.

Grades	Score Range
A	93-100
A-	92-90
B+	86-89
B	83-85
B-	80-82
C+	76-79
C	73-75
C-	70-72
D+	66-69
D	63-65
D-	60-62
F	<60

Final grades will be determined based on the following areas and associated weighting factors:

- 5% of your grade will be determined by **Class Attendance**.
- 15% of your grade will be determined by a **Midterm Exam**
- 15% of your grade will be determined by a **Final Exam**
- 25% of your grade will be determined by **Homework Assignments**
- 30% of your grade will be determined by a **Term Project**

Attendance Policy

You are expected to and should attend classes regularly and complete all assignments on time. Class attendance may be a factor in determining the course grade. If you must miss a class, it's a good idea to let your instructor know in advance or as soon thereafter as possible. If you don't explain your absence, your instructor may assume you don't care about the class or your grade. Coming to class late three times will be counted as one class absence. And later than 10 minutes will also be counted as one class absence. Students are required to attend class during the regularly scheduled tests and the final exam unless prior arrangements have been made.

Absences for Religious Holidays

Villanova University makes every reasonable effort to allow members of the community to observe their religious holidays, consistent with the University's obligations, responsibilities, and policies. Students who expect to miss a class or assignment due to the observance of a religious holiday should discuss the matter with their professors as soon as possible, normally at least two weeks in advance. Absence from classes or examinations for religious reasons does not relieve students from responsibility for any part of the course work required during the absence. <https://www1.villanova.edu/villanova/provost/resources/student/policies/religiousholidays.html>.

Policy on Late assignment submissions

Assignments are due at the beginning of the class. Late assignments will be accepted for no penalty if a legitimate excuse is communicated to the instructor before the deadline. After the deadline, assignments will be accepted for a 50% deduction to the score up to 2 days after the deadline. After this any assignments handed in will be given 0.

Academic Integrity and Honesty

All students are expected to uphold Villanova's Academic Integrity Policy and Code. Any incident of academic dishonesty will be reported to the Dean of the College of Liberal Arts and Sciences for disciplinary action. For the College's statement on Academic Integrity, you should consult the Enchiridion. You may view the university's Academic Integrity Policy and Code, as well as other useful information related to writing papers, at the Academic Integrity Gateway web site: <http://library.villanova.edu/Help/AcademicIntegrity>.

Office of Disabilities (ODS) and Learning Support Services (LSS)

It is the policy of Villanova to make reasonable academic accommodations for qualified individuals with disabilities. Go to the Learning Support Services website (<http://learningsupportservices.villanova.edu>) for registration guidelines and instructions. For physical access or temporarily disabling conditions, please contact the Office of Disability Services at 610-519-4095 or email Stephen.mcwilliams@villanova.edu. Registration is needed in order to receive accommodations.

Schedule and weekly learning goals

This schedule is tentative and subject to change. The learning goals below should be viewed as the key concepts you should grasp after each week, and also as a study guide before each exam, and at the end of the semester. Each exam will test on the material that was taught up until 1 week prior to the exam.

Week 01, 08/26 - 08/30:

- Database Overview

Week 02, 09/02 - 09/06:

- Relational Database Model
- Entity Relationship (ER) Model

Week 03, 09/09 - 09/13:

- The Enhanced Entity Relationship (EER) Model
- Normalization

Week 04, 09/16 - 09/20:

- Normalization (cont'd)

Week 05, 09/23 - 09/27:

- SQL

Week 06, 09/30 - 10/04:

- More SQL - Advanced
- Query Processing & Optimization

Week 07, 10/07 - 10/11:

- [Midterm Exam](#)

Week 08, 10/14 - 10/18:

- [Semester Recess - No classes](#)

Week 09, 10/21 - 10/25:

- Relational Algebra

Week 10, 10/28 - 11/01:

- Semi-Structured Data (XML, JSON)

Week 11, 11/04 - 11/08:

- Non-Relational Database (NoSQL)

Week 12, 11/11 - 11/15:

- Indexing
- Hashing
- Physical Database Design

Week 13, 11/18 - 11/22:

- Transaction Management
- Concurrency Control

Week 14, 11/25 - 11/29:

- [Thanksgiving Break - No classes](#)

Week 15, 12/02 - 12/06:

- Concurrency Control (cont'd)
- Database Recovery

Week 16, 12/09 - 12/13:

- [Project Presentations](#)

Week 17, 12/16 - 12/20: [Final Exam](#)