

Course name	ECE 59500 Database Management Systems
Credit and contact hours	(3 cr.) Class 3
Course coordinator's name	Brian King
Textbook	Modern Database Management, 12 Ed., by Hoffer, Venkataraman & Topi; Pearson; ISBN: 9780133544619
Course information	<p>ECE 59500 Database Management Systems (3cr) P: Graduate standing or consent of instructor. This course covers relational database systems and non-relational database systems. Specific topics covered include data models, database languages, database design, application design, relational algebra, SQL, NoSQL, indexing, data warehousing in addition to advanced topics, such as Hadoop and HBase. Both theoretical and practical aspects of current and advanced databases will be discussed. MS SQL server will be used as an example of relational database systems. MongoDB and HBase will be used as examples of a non-relational database systems. Advanced topics such as distributed databases will explore the use of Hadoop in practical real-life applications.</p> <p>Prerequisites/ Co-Requisite Graduate standing or senior standing and data structures (ECE 35900 or CSCI 36200)</p> <p>Required, Elective, or Selected Elective: EE Elective, CE Elective</p>
Goals for the course	<p>Upon successful completion of the course, students should be able to</p> <ol style="list-style-type: none"> 1. Model databases at conceptual and logical levels of design, [1,2,6] 2. Develop database schemas with principled design that enforce data integrity. [1,2,6] 3. Create, alter, and manipulate tables, indexes, and views using relational algebra and SQL. [1,2,6] 4. Write queries in SQL to retrieve data from database. [1,2,6] 5. Develop and maintain Oracles database, and write application programs. [1,2,6] 6. Implement relational database system. [1,2,6] 7. Perform the fundamental tasks involved with storage and indexing. [1,2,6] 8. Understand and database integrity, concurrency control, and other advanced topics in databases. [1,2,6]
List of topics to be covered	<ol style="list-style-type: none"> 1. Introduction to database management 2. The entity relationship data model and conceptual schema design 3. Schema normalization and integrity constraints

	<ol style="list-style-type: none"> 4. SQL, query processing, query optimization 5. Database storage and indexing 6. Database transactions and concurrency control 7. Database Recovery 8. Other advanced topics in database such as key-value stores, object-relational mappings, streaming databases. <p>Week 1: Introduction, Overview of Database Systems and Relational Database Installation</p> <p>Week 2: Relational Model 1 and SQL</p> <p>Week 3: Relational Model 2 and Advanced SQL</p> <p>Week 4: Database Design and Database Normalization</p> <p>Week 5: Database Indexing and Database Views</p> <p>Week 6: Overview of JAVA and Application Design</p> <p>Week 7: Data Warehousing</p> <p>Week 8: Database Security and Auditing</p> <p>Week 9: Midterm Exam and Database Storage, Backup and Recovery</p> <p>Week 10: XML for Web Applications, Overview of NoSQL database</p> <p>Week 11: Hadoop and Map-Reduce</p> <p>Week 12: HBase and MongoDB</p> <p>Week 13: Information Retrieval and Map-Reduce Implementation</p> <p>Week 14: Project presentations</p>
Syllabi approved by	Brian King
Date of approval	8/27/2021