## COURSE DESCRIPTION

| Dept., Number | CS 4342<br>Required Course | Course Title | Database Management |
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| Date Approved | May 2022 | Course Coordinator | Natalia Villanueva-Rosales |

Current Catalog Description

Introduction to database fundamentals, modeling, the use of database management systems for applications, and current trends for data management including: relational algebra, entity-relationship models, relational data models, semi-structured data models, schema design, query processing, data integrity, privacy, security, and data analytics.

Course Outcomes:

**Level 1: Knowledge and Comprehension.**
Level 1 outcomes are those in which the student has been exposed to the terms and concepts at a basic level and can supply basic definitions. The material has been presented only at a superficial level.

Upon successful completion of the course, students will be able to:
1a. Identify key characteristics of data models based on their level of abstraction (e.g., Entity-Relationship model, relational model) and explain how these models are used for data management.
1b. Describe the components of a database system (e.g., query optimizer, query executor, storage manager) and how they are used.
1c. Describe the main goals and functions of database management systems.
1d. Identify database languages and tools for data management.
1e. Critique an information application with regard to satisfying user information needs.
1f. Identify database architectures (e.g., centralized, distributed, web-based).
1g. Identify new trends in data management paradigms (e.g., semi-structured model, non-relational databases) and describe for which scenarios they are best suited.
1h. Describe technical solutions to the challenges in information privacy, integrity, security, and preservation.
entify the careers/roles associated with information management.

**Level 2: Application and Analysis.**
Level 2 outcomes are those in which the student can apply the material in familiar situations, e.g., can work a problem of familiar structure with minor changes in the details.

Upon successful completion of the course, students will be able to:
2a. Demonstrate uses of explicitly stored metadata/schema associated with data.
2b. Use relational algebra and set theory that are supported in the relational model.
2c. Use a relational query language (e.g. SQL) to elicit information from a database.
2d. Normalize a database using the 1st, 2nd, and 3rd normal forms.
2e. Demonstrate the ability to work in teams.

**Level 3: Synthesis and Evaluation.**

Level 3 outcomes are those in which the student can apply the material in new situations. This is the highest level of mastery.

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

3a. Design a database system from a problem statement to a conceptual, high-level data model (e.g., Entity-Relationship) using standard notation and modeling principles.

3b. Design a relational data model from a conceptual data model.

3c. Design and implement a relational data model in a relational database schema using a database management system.

3d. Design and implement an interface for a database system applying best practices for usability, privacy and security.

Textbook:

Elmasri, R. and S. Navathe. *Fundamentals of Database Systems.* Seventh Edition. Ed. Pearson. ISBN-13: 9780133970777

Student Outcomes:

Not applicable

Prerequisites by Topic:

CS 2302 with a grade of "C" or better