1. **Course number and name:** CSCI 3432 Database Systems

2. **Credits and contact hours:** 3 credit, 3 contact

3. **Instructor’s or course coordinator’s name:** Mehdi Allahyari, PhD

   
   c. **Other supplemental materials:** Data Design course pack

5. **Specific course information**
   a. **Brief description of the content of the course (Catalog Description)**
   The fundamental concepts of database management systems (DBMS) including logical and physical database organization, data models and design issues. Emphasis will be placed upon the rational data model including design and implementation using commercial database systems.
   
   b. **Prerequisites:** A minimum grade of “C” in CSCI 1301, MATH 2130
   
   c. **Indicate whether a required, elective, or selected elective course in the program**
   Required course for BS-CS.

6. **Specific goals for the course**
   a. **Specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.**

<table>
<thead>
<tr>
<th>Course Learning Outcomes</th>
<th>Student Outcomes</th>
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<tbody>
<tr>
<td>Understand DB concepts and relevant theoretical foundations of the relational model</td>
<td>1a, 2a</td>
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<tr>
<td>Understand normalization and functional dependencies</td>
<td>1a, 2a</td>
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<tr>
<td>Understand the SQL language model</td>
<td>1c, 2b</td>
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<tr>
<td>Understand and apply the ER model</td>
<td>1a, 2a</td>
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<tr>
<td>Ability to design and implement schema using SQL</td>
<td>1c, 2b</td>
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<tr>
<td>Ability to design and execute SQL queries</td>
<td>1c, 2b</td>
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<tr>
<td>Understand the need for and use of VIEWS</td>
<td>1c, 2b</td>
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<tr>
<td>Understand the need for use of joins</td>
<td>1c, 2b</td>
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<tr>
<td>Ability to select appropriate referential integrity constraints</td>
<td>1b, 1i, 2b</td>
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<tr>
<td>Understand data aggregation</td>
<td>1i, 2b</td>
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</table>
Understand the concept of a transaction, ACID properties, and two-phase commit protocol 1i, 2b

Understand the use of triggers and stored procedures 1c, 1i, 2b

Understand XML in the context of database systems 1a, 2b

Ability to recognize and define appropriate constraints on relationships 1c, 2b

Understand basic DB security, auditing and privacy 1c, 1e, 2b

Understand database performance issues 1a, 1c, 1i, 2b

b. Student Outcomes:
   • 1a: An ability to apply knowledge of computing and mathematics appropriate to the discipline
   • 1b: An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution
   • 1c: An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs
   • 1e: An understanding of professional, ethical, legal, security, and social issues and responsibilities
   • 1i: An ability to use current techniques, skills, and tools necessary for computing practice
   • 2a: An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices
   • 2b: An ability to apply design and development principles in the construction of software systems of varying complexity

7. Brief list of topics to be covered
   • Basic SQL
   • Intermediate SQL
   • Advanced SQL
   • Problems with DB design and DB Applications development
   • Basic Data Modeling
   • Intermediate DM processes/techniques
   • Logical DB design