1. **Course number and name:** CSCI 4132 Data Warehouse Design

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

3. **Instructor’s or course coordinator’s name:** Ray Hashemi, PhD

4. **Textbook, title, author and year:**
   - William H. Inmon, “Building the Data Warehouse”, Wiley (Publisher)
   - Jiawei. Han and Michelin Kamber, ‘Data Mining: Concepts and Techniques’, Morgan Kaufmann (Publisher)

   a. **Other supplemental materials:** None

5. **Specific course information**
   a. **Brief description of the content of the course (Catalog Description)**
      The course will cover data warehouse design principles and technical problems. Topics will include: data warehouse architectures, organizing data warehouse design projects, analyzing data and requirements. SQL aggregate and analytic functions, materialized views, star-joins and other DW related features, data vault modeling, dimensional modeling, physical design and implementation of integrated data warehouse using commercial ROLAP engines such as Oracle or SQL Server.
   b. **Prerequisites:** A minimum grade of “C” in CSCI 3432
   c. **Indicate whether a required, elective, or selected elective course in the program**
      Elective 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>Explain fundamentals of Data Warehouse, Data Warehousing, and OLAP.</td>
<td>1a, 1b, 1i</td>
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<tr>
<td>Understand concept and several methods of Data Cleaning, Data Integration and Data Consolidation</td>
<td>1a, 1b, 1i</td>
</tr>
<tr>
<td>Understand foundation of Data Cube, Discovery-Driven Exploration of Data Cubes, and Multi-feature Cubes</td>
<td>1a, 1b, 1i</td>
</tr>
<tr>
<td>Understand and explain the foundations of Data Warehouse architecture.</td>
<td>1a, 1b, 1c, 2a</td>
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</table>
Analysis, design and implementation of a comprehensive Data Warehouse using commercial ROLAP engines such as Oracle or SQL Server.

Explain relation among Data Warehousing, OLAP, and Data Mining.

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
   - 1d: An ability to function effectively on teams to accomplish a common goal
   - 1f: An ability to communicate effectively with a range of audiences
   - 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

7. Brief list of topics to be covered
   - Fundamentals of Data Warehouse, Data Warehousing, and On-line Analytical Processing (OLAP).
   - Concept and several methods of data cleaning
   - Concept and several methods of data integration
   - Concept and several methods of data consolidation
   - Differences between “data warehousing” and “Warehouse DBMS”
   - Differences between “data warehousing” and traditional approach of heterogeneous database integration
   - Differences between On-line Transaction Processing (OLTP) systems and OLAP
   - Concept and foundations of “Data Cube” and Data Cube Technology
   - Data warehouse architectures including Starts, Snowflakes, and Constellations
   - Foundation, analysis, design and implementation of a data warehouse.
   - Transition from OLAP to OLAM (On-line Analytical Mining)