

MIS 6110: Data Warehousing

Instructor & Course Information:

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| Instructor: | Yong Seog Kim, PhD | Course Location: | BUS 120 |
| Phone: | (435) 797-2271 | Course Times: | MW 12:30-1:45 PM |
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| Office: | BUS 710 | Office Hours: | MW 10:00 – 11:30 AM or Appt. |

Introduction

Data Warehouses (DWs) are central repositories of integrated data from multiple sources for decision makings in a timely manner. These current and historical data in DWs are used for diagnosing business performance and creating analytical reports. Examples of reports could range from annual and quarterly comparisons and trends to detailed daily sales analysis. Therefore, DWs naturally become an essential part of business intelligence and data mining applications for churn prediction, cross-selling, fraud detection, customer segmentation, and so on.

This course starts with a brief but sufficient theoretical differences between database designed for optimal transaction processing (OLTP) and data warehouse designed for efficient decision makings and analytical processing (OLAP). After fundamental concepts for DWs such as facts, dimensions, user-defined hierarchies of dimension members, and dimension relationships are introduced, two important schemas for DWs will be introduced and practiced. Then students will have an opportunity of creating a DW and a multi-dimensional cube from a DW using Microsoft SQL 2016 Server. To this end, two of three representative services of Microsoft SQL 2016 Server will be extensively explored: SQL Server Integration Services (SSIS) and SQL Server Analysis Services (SSAS). Finally, students will master basic and advanced syntax of multidimensional expressions (MDX) queries to extract information from a cube and interpret the outcomes.

The detailed objectives of this class are mapped to the IDEA center course evaluation objectives used by USU as shown below. **Please note that you will be asked to rate this course at the end of the semester based on the IDEA Center objectives listed.**

Course Objectives

Upon completion of this course, students should master following skills:

| IDEA Center Learning Objectives | MIS 6110 Learning Objectives |
|--|---|
| Objective 1 (Essential): Gaining factual knowledge (terminology, classifications, methods, trends) Objective 2 (Important): Learning fundamental principles, generalizations, or theories | <ol style="list-style-type: none">1. Understand essential principles and practices of data mart and data warehousing design including star schema and snow flake schema.2. Understand the concepts of facts, dimensions, user-defined hierarchies of dimension members, and dimension relationships.3. Understand the concepts of KPIs, calculated members and measures, named sets and dimension, actions, perspectives, and translations, and partitions. |

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| | 4. Understand the basic and advanced syntax of multidimensional expressions (MDX). |
| <p>Objective 3 (Essential): Developing specific skills, competencies, and points of view needed by professionals in the field most closely related to this course</p> <p>Objective 4 (Important): Learning to <i>apply</i> course material (to improve thinking, problem solving, and decisions)</p> | <p>1. Install and manage complex DWs software such MS SQL Server 2016.</p> <p>2. Utilize SSIS module of MS SQL 2016 to implement ETL (Extract, Transformation, and Loading) solution with package, control and data flow objects.</p> <p>3. Design a data mart based on a transaction database and implement it on MS SQL Server 2016 after identifying facts and dimensions.</p> <p>4. Create, modify, extend, and secure SSAS cubes that contain advanced features such as KPIs, calculated members and measures, named sets and dimension, actions, perspectives, and translations, and partitions.</p> <p>5. Utilize MDX to extract information from multi-dimensional cubes and interpret the outcomes.</p> |

Required and Recommended Textbooks

The required texts for the course are the following:

- Title: Delivering Business Intelligence with Microsoft SQL Server 2016
Author: Brian Larson
Publisher: McGraw Hill (2017). ISBN 978-1-25-964148-0.
Required: Yes
- Title: Professional Microsoft SQL Server 2012 Analysis Services with MDX and DAX
Author: Sivakumar Harinath et al.
Publisher: Wiley (2012). ISBN 978-1-118-10110-0.
Required: No

Prerequisites

Having experiences in database will be preferred but not required. Programming experiences using Microsoft Visual Studio are strongly suggested but not required as long as students can familiarize with this complex development environment.

Course Materials/Access

I will use Canvas (<http://canvas.usu.edu>) to post course material, including lecture notes, assignments, grades, etc. It is very important that you access Canvas early and regularly in the semester, since you will be responsible any course material, change, or notification that is posted there.

Required Software

Students are required to install SQL Server Enterprise 2014 (or 2016) server module on their own computers. You can download it at <http://e5.onthehub.com/WebStore/ProductsByMajorVersionList.aspx?ws=3ab8aab6-bf9b-e011-969d-0030487d8897&vsro=8>. The course fee for MIS 6110 (\$30) is used to provide lab support, hardware maintenance and software licensing support.

Course Approach

MIS 6110 takes a holistic approach which includes textbook readings, faculty presentations, computer-based instruction, and practical exercises. The textbook readings and faculty presentations will convey the main body of knowledge for this class and include a variety of terms, concepts, and issues related to Databases, Data Warehouses, and Business Intelligence. The computer-based instruction will demonstrate ways of using various complex tools (e.g., SSDT and SSMS). Finally, the exercises and assignments that require BI tools will provide students the opportunity to be familiar with SQL Server Integration Services (SSIS) and SQL Server Analysis Services (SSAS).

Grading Policy

Final grades will be determined as follows:

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| Test 1 | 25% |
| Test 2 | 30% |
| Assignments | 33% |
| Class activities | 10% |
| Professional conduct | 1% |
| Attendance & class participation | 1% |

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|------|------|------|------|------|------|------|------|------|------|------|
| A | A- | B+ | B | B- | C+ | C | C- | D+ | D | F |
| ≥93% | ≥90% | ≥87% | ≥83% | ≥80% | ≥77% | ≥73% | ≥70% | ≥67% | ≥60% | <60% |

Exams (55%)

There will be one midterm (25%) and one final exam (30%) which will consist of multiple-choice, fill-in-blank, and/or short essay questions that cover the material presented in your textbook and lecture notes. In unexpected circumstances, the final exam may be replaced with one of assignments. **It is crucial that you read your textbook and lecture notes to perform well on the exams**, as some material may not be covered during class.

Assignments (33%)

There will be several assignments that require comprehensive understand of course materials including text book exercises, lecture notes, and additional time outside of class for your own studies. These assignments must be:

1. Submitted ON TIME. No late work is accepted. Due dates for each assignment will appear on the Canvas course calendar. Occasionally, there may be technical problems with Canvas that prevent you from submitting your assignment. In such cases, you may email your assignment to me in advance. However, I must receive the email **on or before the assignment due date** or no credit will be given.

2. Completed individually by you and you alone. You are welcome to ask other students for assistance, but your work must be your own.
3. Completed professionally (see Professionalism section above).

Class activities (10%)

There will be several class activities that test understanding of course materials from text book, lecture notes, and additional time outside of class for your own studies. Most class activities will be completed in a group setting and students who are absent and do not contribute to the group cannot take this credit.

Professional conduct (1%)

Professionalism implies positive participation in class discussions and an appropriate attitude for learning. I request that you always demonstrate professionalism in this course, in your work as well as in your conduct. I expect that you will demonstrate professionalism in your work by:

1. Submitting your work on time. All assignments are typically due by the midnight but you are allowed to upload your work by 5AM of the following day without any penalty. Remember you can submit an incomplete version and replace it with new one. Always check if you upload the final version. I will deduct 0.5% from your professional conduct credit (1%) each time when you ask for an extension of the due date of assignments for following or similar reasons
 - you (including your babies, dogs, and cats) accidentally delete or corrupt your file
 - you forget to submit your work on time due to an annual family union event or fatigue
 - you submit an incomplete or wrong version of your work (check if it is the final)
 - you have slow or lost Internet connection around the midnight on due date (plan ahead)
 - you could not complete assignment because your computer was suddenly broken, stolen, or malfunctioned for hardware or software reasons.
2. Displaying integrity by doing your own work; **never plagiarize the work of others**, including the textbook.
3. Submitting college graduate-level work. Your writing should consist of complete sentences, and should be free from spelling and grammatical errors. It should demonstrate to me that you understand the material and that you can thoughtfully justify your answers.

Attendance and class participation (1%)

I expect that you will demonstrate your class participation by:

1. Coming to class regularly and on time. Although I may not take roll every class and I understand if you need to miss class periodically, I expect that you will attend class consistently.
2. Participating in class discussions and exercises.
3. Do not engaging in activities that show disrespect to me or to your fellow students, including talking/texting on cell phones or browsing the Internet during class.
4. The Utah State University General Bulletin states that: "A student is expected to attend all meetings of a class for which he or she is registered. A student may be dropped from a course by the Dean if absences are repeated and the instructor recommends this action. A student can gain readmission only with permission of both the Dean and the instructor. A student dropped from a course receives an 'F' which counts as work attempted whenever grade point ratio calculations are made. Students with absences in excess of 10% of scheduled class meetings may be administratively withdrawn from the class with a grade of F which will count as work attempted whenever grade point ratio calculations are made."

Alternative Format Available for Course Materials

Students with disabilities are encouraged to discuss their needs with the instructor, preferably during the first week of the semester. Course materials in alternative format large print, audio, and Braille will be provided in cooperation with the Disability Resource Center (Ext. 7-2444). Reasonable accommodation will be provided for all persons with disabilities to ensure equal participation in class.

Comfortable Learning Environment

USU, the MIS Department, and your instructor are all committed to maintaining an inoffensive, non-threatening learning environment for every student. Class members (including the instructor) are thus to treat each other politely both in word and deed. Offensive humor and aggressive personal advances are specifically forbidden. If you feel uncomfortable with a personal interaction in class, see your instructor for help in solving the problem. The MIS Department Head, the Dean of the Huntsman School of Business, and USU's Affirmative Action Office are also willing to help as needed.

Incompletes

An "I" (Incomplete) grade is not to be used for avoiding a bad grade – this is University policy. Only extraordinary and unforeseen circumstances that prohibit a student from completing the course are adequate reason for giving an Incomplete grade.

Cheating

There is no room whatsoever for cheating in this class. Anyone caught cheating in **any way** will at best receive a failing grade for the course and at worst will be kicked out of the university. We have no tolerance for cheating. What is cheating? Cheating may include (but is not limited to): plagiarizing the work of other students or material from the textbook, Web, or other sources; utilizing more resources than allowed while completing exams (including other students, books, the Web, or other materials); and, finally, turning in the work of another student (present or past) as your own work.