**MIS633 – B**

**Fall 2022**

**School**: **School of Business**

**Course Title**: **Business Intelligence & Data Integration**

**Program(s)**:  BI&A, MSIS

**Instruction: Victor Moya, vmoya@stevens.edu**

**Description**

This 2-credit course focuses on the design and management of data warehouse (DW) and business intelligence (BI) systems. The course is organized around the following general themes: business value of data, planning and business requirements, architecture, data design, implementation, business intelligence, deployment, data integration and emerging issues. Practical examples and case studies are presented throughout the course.

**Students in MIS 633 must also enroll in the associated 1-credit lab course MIS 634 Business Intelligence & Data Integration Lab.**

**Course Objectives**

1. Understand the role of business intelligence (BI) in decision making and the necessity of competing on analytics
2. Develop a project plan for a large-scale BI data system
3. Develop a data architecture and a technical architecture
4. Design operational data stores and data warehouse star schemas
5. Learn to track history
6. Develop the physical design: aggregation, cubes
7. Advanced modeling: surrogate keys, partitioned table spaces, conformed dimensions, snowflake & outrigger tables, bridge tables, views
8. Build the data staging area: ETL functions using a commercial software platform
9. Build BI dashboards and data visualizations using a commercial tool
10. Build and query a NoSQL database

**ASSIGNMENTS**

There are several team exercises, an individual mid-term exam, and a final team project.

Grading

The grading of the assignments and their weights are as follows:

1. Midterm (Written Individual assignment) 30%

2. Star Schema Design (Individual homework assignment) 20%

3. Final Project (Team Assignment) 40%

4. Class Participation, Exercises, and Homework (Team) 10%

The *final team project* due at the last meeting will include the design and construction of a full data warehouse and OLAP application, including an OLAP cube, loading schedule, reports, and OLAP navigation applications. This will be accomplished using a commercial product. The final team assignment due at the last meeting will include the design and construction of a full-scale data warehouse and BI application. The activities include the development of design and management templates that provide a planning framework for enterprise deployment of business intelligence systems. Also included are data extraction, transformation, and integration using a commercial tool, commonly known as ETL. Design embodies multi-dimensional data modeling, cube databases, and aggregation tables. The project concludes with the development of a BI portal and dashboards that support executive management and data analytics. Each dashboard includes data visualizations, data navigation and analytics using a commercial product.

**Prerequisites**:[[1]](#footnote-1)       **Cross-listing**:        — show cross-listed course number(s)

**Grading Percentages**: HW  20% Mid-term 30% Final project 40% Class participation  10%

Other  (specify both percent and kind of work)

**Credits**:  2 credits   Other

**For Graduate Credit toward Degree or Certificate**  Yes  No  Not for Dept. Majors  Other

**PREREQUISITES**

Students must satisfy the requirement for enrollment in either the BI&A or MIS master’s degree programs.

**Textbook(s) or References**

Required Readings

1. *The Data Warehouse Lifecycle Toolkit: Practical Techniques for Building Data Warehouse and Business Intelligence Systems*. Second Edition. Kimball, R., Ross, M., Thornthwaite, W., Mundy, J., and Becker, B. John Wiley & Sons, 2008. ISBN 978-0-470-14977-5. **[K]**

2. Case studies and papers

3. “DW packets” of design and management templates

4. PDF graphics

Suggested Readings

Business Intelligence Guidebook: From Data Integration to Analytics. First Edition. Sherman, R., Morgan Kaufmann, 2015. ISBN 978-0-12-411461-6.

**GRADING PROCEDURES**

Homework/Class Assignments (40%)

Class Project (40%)

Class participation (20%, i.e., reading and discussing recent papers assigned)

**Department Point of Contact and Title: Joseph Morabito**

**Syllabus**

SCHEDULE

-🡪 Indicates an exercise that will be carried out in the lab course MIS 634.

| **Lecture** | | | **Topic** | **Assignment Due** | |
| --- | --- | --- | --- | --- | --- |
| 1  Sep 2 | | | Course Introduction  Overview of Data Warehouse and Business Intelligence | **[**K] Chapter 1  McKinsey report on big data  -🡪 Lab. Install MongoDB  -🡪 Lab. Install Alteryx, ERwin | |
| 2  Sep 9 | | | Tutorial Review: Database, Conceptual schema, relational database design, normalization | -🡪 Lab. ERwin Tutorial. Use ERwin to develop an ER and OLTP database | |
| 3  Sep 16 | | | Project Requirements and Project Planning | [K] Chapters 2, 3  Data Warehouse Packet #1  -🡪 Alteryx exercises | |
| 4  Sep 23 | | | Team case study / research presentations | Team case study / research presentations | |
| 5  Sep 30 | | | Technical Architecture & Product Selection: Backroom Architecture, - Front Office Architecture, Infrastructure, Metadata.  ER Modeling | [K] Chapters 4, 5  Data Warehouse Packet #2  -🡪 Mongo DB exercises | |
| 6  Oct 7 | | | Dimensional Modeling - Basics | [K] Chapter 6  Class handouts  -🡪 Complex ERwin exercise | |
| 7  Oct 14 | | | Dimensional Modeling - Advanced  Midterm Presented | -🡪 Dimensional modeling – basics | |
| 8  Oct 21 | | | Building Dimensional Models. Design & Management Templates  Star Schema Assignment (Accreditation) Presented | [K] Chapter7  Class handouts  -🡪 Dimensional modeling – advanced  Midterm due | |
| 9  Oct 28 | | | Aggregations and Physical Design. Relational and Cube Design | [K] Chapter 8  Data Warehouse Packet #3  ---> Bridge tables | |
| 10  Nov 4 | | | BI Application Development. Data Visualization | -🡪 Aggregation tables  Star Schema Assignment due | |
| 11  Nov 11 | | | Data Visualization for BI Application.  Integrated Visualization, Dashboard, and Portal Design | [K] Chapters 11, 12  Class Handouts  -🡪 Tableau Instruction | |
| 12  Nov 18 | | | Data Staging & ETL  Big Data Design, Applications, and Management.  Row- and column-oriented databases  Internet of Things (IoT) | -🡪 Final project lab | |
| Week of Nov 23 | Thanksgiving week | | No Classes, Nov 25 |
| 13  Dec 2 | | | Review Requirements, Student Samples  Review with each team  OR  Final Project Presentations  Group: | [K] Chapters 9 and 10  *Class handouts*  *Data Warehouse Packet #3*  -🡪 Final project lab | |
| 14  Dec 9 | | | Final Project Presentations  Group: | **---> Lab. Final project delivery** | |
| Wed  Dec 14 | | | Last Day of Class. |  | |
|  | Final Exam Period | | Thursday Dec 15 – Thursday Dec 22 |
| 15  Dec 16 | | | Final Project Presentations  Group: | **---> Lab. Final project delivery** | |

1. You may provide a list of courses, competencies or other criteria (e.g., “Students must have taken CS 6XX” or “Students must have taken a course in thermodynamics,” or “Students must be part of a certain cohort.”) [↑](#footnote-ref-1)