**MIS631 – A and B**

**Spring 2022**

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

**Course Title**: **Data Management**

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

**Instructor: Joseph Morabito; jmorabit@stevens.edu**

**Description****:**

This 2-credit course focuses on data and database management, with an emphasis on modeling and design, and their application to business decision making. The course provides a conceptual understanding of both organizational and technical issues associated with data. The central theme concerns data modeling and databases. We examine organizational approaches to managing and integrating data. Among the topics included are normalization, entity-relationship modeling, relational database design, SQL, and data definition language (DDL). Discussed are specific applications such as strategic data management, master data management, and physical database design. The course concludes with a brief overview of Decision Support Systems, data warehousing and business intelligence, NoSQL databases (e.g., MongoDB) and cloud computing. The course includes several case studies and modeling and design projects.

**Students in MIS 631 *must* also enroll in the associated 1-credit lab course MIS 632 Managing Data Lab.**

**Course Objectives:**

1. Understand the role of data in the competitiveness and strategy of organizations
2. Design relational databases in normalized form
3. Build SQL queries
4. Develop and critique entity-relationship (ER) data models
5. Elucidate advanced data modeling issues e.g., temporal data modeling, meta-data, etc.
6. Identify and analyze data quality in a business context
7. Develop and evaluate strategic data plans; e.g., Master data management plan, enterprise data strategy & models
8. Understand the growing importance and issues associated with data warehousing, business intelligence and analytics, and big data.

**ASSIGNMENTS**

**Individual & Team Assignments (10%)**

Review and comment on several assigned readings from the research and professional literature and modeling exercises. Developing a business case.

**SQL Certification (10%)**

Required SQL Module: https://www.sololearn.com/Course/SQL/

**Information Modeling Exam (15%)**

**Mid Term (15%) - Individual**

The mid-term paper is an individual assignment and is technology focused. References and all sources used (articles, texts, Web sites, etc.) must be provided in standard format.

**Team Database Project (40%)**

Students will develop a functional database that will be demonstrated at the conclusion of the course. The development of the Team Project will be accomplished via a series of assignments throughout the MIS 632 lab course. These assignments include: business problem analysis, identification of database requirements, data modeling, and creation of the database. The final deliverable consists of a running database system and written documentation.

**Participation (10%)**

Students will be assessed on their contributions to in-class discussions throughout the semester.

**Course Outcomes**

      After taking this course, students are able to:

* Understand basic deep modeling constructs
* Creatively apply data modeling to solve real business problems
* Assess model performance accurately to understand each model’s pros/cons
* Explain models, interpret model outcomes, and understand potential bias
* Execute SQL queries

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

**Grading Percentages**: HW  20% Class work  10% Mid-term  20%

SQL Certificate  10% Database Projects  40%

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 Textbook: *Database Concepts* (8th Edition), by David Kroenke, David Auer, Scott

L. Vandenberg, Robert C. Yoder. Pearson 2017. ISBN-13: 978-0134601533, ISBN-10:

013460153X

Required SQL Module: <https://www.sololearn.com/Course/SQL/>

Required Software:

ERwin

**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; jmorabit@stevens.edu**

**Syllabus**:

NOTE: -🡪 Indicates an MIS 632 lab exercise

|  |  |  |
| --- | --- | --- |
| ***Session*** | ***Subject(s)*** | ***Assignment(s)*** |
|  | PART 1 - DATABASE FOUNDATIONS |  |
| 1  Jan 24 | Introduction to MIS631  Introduction to Data Management Functions  Factors Affecting Data Management Functions | Read Ch. 1  -🡪 ERwin installation  --> Install PostgreSQL |
| 2  Jan 31 | Tutorial on Database and Database Design | Read Ch. 2  -🡪 ERwin basics+ normalization |
| 3  Feb 7 | Organizations and Data  Research paper presentations & discussion | **Prepare research paper presentations (Team)** |
| 4  Feb 14 | Query Languages – SQL | Read Ch 3, 3A  -🡪 ERwin tutorial + examples |
|  | PART II – Data Modeling |  |
| Monday  Feb 21 | President’s Day – No Class |  |
| 5  Feb 22  Tuesday | Tutorial on Abstraction and ER Data Modeling  Tuesday, Stevens following Monday schedule | Read Ch 4, 5  -🡪 SQL queries - basics |
| 6  Feb 28 | Extended ER; Generalizating Data Model Patterns  Information Modeling | -🡪 Construct complex SQL queries  SQL Certificate due |
| 7  Mar 7 | Information Modeling – Advance Modeling (continued);  Contracts and Formal Methods  Discuss Key Semester Learnings | -🡪 SQL queries - advanced |
|  | PART III - DATABASE MANAGEMENT |  |
| Mar 14 | Spring Break: Mar 13 – Mar 20 | No Class |
| 8  Mar 21 | Data and Database Administration Functions  Physical Database Design  Strategic Data Modeling  Major Data Project Requirements Presented | -🡪 Extended ER data modeling  Information Modeling Exam due   * Major Project |
| 9  Mar 28 | Application of Data Modeling and Database Design to a business area  Major Data Project Requirements Presented | -🡪 Extended ER data modeling II – complex business examples  Midterm Exam Due   * Major Project (continued) |
| 10  Apr 4 | Data Warehouse, Business Intelligence, and Big Data  Row & Column data storage  *MapReduce exercise* | ---> Develop a DB model in Postgres using DDL   * Major Project (continued) |
| 11  Apr 11 | Cloud Computing and Data Architectures  NoSQL: document, key-value, column-wide, graph | -🡪 Install a database in the cloud (AWS)   * Major Project (continued) |
| 12  Apr 18 | Open: Review of Key Concepts & Final Project | * Major Project (continued) |
| 13  Apr 25 | Major Data Project Presentation (Team) | -🡪 Use Erwin for data design project: modeling and database design |
| 14  May 2  May 9  May 16 | Last Day of Class: Wednesday May 4 (Friday Schedule)  Final Exam Period: May 5 – May 18  Major Data Project Presentation (Team) – Continued  Major Data Project Presentation (Team) – Continued  (Overflow) |  |

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)