MIS 3720: Business Database Systems
Spring C 2020

Instructor:	Dr. Jim Ryan
Office:	102 Washburn Shops (enter at SOUTH entrance)
Office Hours:	By appointment
Email:	jryan@wpi.edu
Class Time:	8-9:50AM Mondays and Thursdays
Class Meeting:	Salisbury Labs 105

Overview

Managerial and operational decisions in organizations are increasingly based on data stored in computerized databases. The quality of these decisions depends on the quality of the data stored in the database and the quality of the database design. This course focuses on understanding business databases and educates students so that they can use existing organizational database design to build new organizational databases that are practical and theoretically sound. To do so, students must be able to link the data needs of organizations with the technology of relational databases. Exercises and exams ensure that students understand relational database concepts and can apply the practical tools used to access, design and develop relational databases. The course project integrates theory with practice through the design and development of a database application to meet specific organizational needs for data.

News and Updates

Regularly visit the Canvas course website (canvas.wpi.edu) to track your grades, and regularly check your WPI email to receive announcements, assignments, and syllabus/schedule updates.

Course Materials

- The text is *Database Systems: Databases and Organizations*, 6th Edition, Richard Watson, Prospect Press. Print ISBN: 9781337627900, 1337627909 ; e-text ISBN: 9781337670562, 1337670561. E-text available from Amazon ($9.99) and runs on Kindle or Kindle simulator via URL: http://www.amazon.com/dp/B00E8HS8N2

- The workbook text is published by Course Technology.
  New Perspectives Microsoft Office 365 & Access 2019 Comprehensive, 1st Edition. Mark Shellman and Sasha Vodnik, 2020. Print ISBN: 9780357392720. eText ISBN: 9780357119990. This is a link to VitalSource if you would like to rent an e-text version of the book. https://www.vitalsource.com/referral?term=9780357119990

Course Description from the Catalog

This course introduces students to the theory and practice of database management and the application of database software to implement business information systems that support managerial and operational decision making. Special topics covered include relational data models, query languages, normalization, locking, concurrency control and recovery. The course covers data administration and the design of data tables for computerized databases. Students

will use a commercial database package to design and implement a small business database application.

Learning Objectives

By the end of this course, a student should be able to:

- Understand the concepts of relational databases and the SQL query language
- Formulate and execute relational database queries
- Create a theoretically sound design for a relational database
- Translate organizational information needs into a sound database design
- Develop a small database application in a commercially available package
- Understand the technical and managerial issues in selecting and operating a database in a multi-user environment

Foisie Business School Mission

The Robert A. Foisie Business School (FBS) at WPI is rooted in WPI's strengths in technology, engineering, and science, and known for developing innovative and entrepreneurial leaders for a global technological world.

We focus on:
- Creating and leading technology-based organizations;
- Innovating by creating new processes, products, and services, based on technology;
- Integrating technology into the workplace.

We emphasize:
- Innovative and project-based education that integrates the theory and the practice of management, and prepares students to assume positions of leadership in an increasingly global business environment;
- Basic scholarship, while also valuing the scholarship of application and the scholarship of instruction;
- Interaction with the business community focused primarily on technological innovation and both individual and organizational entrepreneurship.

Relationship to the Foisie Business School Mission

This course addresses the third focus area in the mission, integrating technology into the workplace. The first part of the course focuses on understanding database technology. With this understanding of the technology, the course then focuses on translating the information needs of organizations into sound and useful database designs. Through the final project, students learn to integrate the theory of relational database design with the needs of organizations. The project assesses the student's ability to design and develop database applications that address organizational needs for storing and retrieving data to support its operations.

Course Assignments

In this course, you are expected to learn the techniques of designing, developing, querying, and managing a database, as well as to develop the ability to produce a sound design the meets organizational needs. The assignments support this learning and their weights are:

Access tutorials 10%
These hands-on tutorials are designed so that you learn to develop a small database application. Once you become accustomed to the format of the tutorials, they should take approximately two hours per class. While it is important that you develop skills in using a commercially available package, the particular package is not that important. We are using Access because it is widely available so you can work at WPI, at your office, at home, or as you travel. I have chosen tutorials designed for independent learning because teaching the details of Access is not a good use of class time.

SQL Homework, In-class Exercises, and Special Exercises 10%
In addition to the Access tutorials, there are assignments covering relational database creation and SQL to check your understanding of relational database material. Some in-class exercises will be collected and graded. In addition, there may be some special sessions for earning credit.

Midterm Exam 30%
The mid-term exam will cover your understanding of the concepts of relational databases, your ability to write database queries, and your understanding of basic database design techniques. It is closed book and closed notes.

Database Project 25%
The database project is an integrated project that demonstrates your ability to apply the course material to a specific organizational need for a database. The project has several intermediate milestones to simulate the process by which members of an organization agree on designs and manage the implementation process. More information on the project will be distributed later.

Final Exam 25%
The final exam is an in-class, comprehensive exam. It is closed book, but one 8 ½ x 11" page of notes is allowed.

Grading

The WPI Graduate Catalog defines grades as follows:

- A = Excellent (4.0)
- B = Good (3.0)
- C = Pass (2.0)
- D = Unacceptable for graduate credit (1.0)
- F = Fail (0.0)

The WPI Foisie Business School grade distribution guideline for a class like this is a class grade point average in the range of 3.2 – 3.4. Example grade distributions for 40 students are:

12 A's, 24 B's, 4 C's: GPA = 3.2   (12/40 = 30% A's)

16 A's, 24 B's: GPA = 3.4   (16/40 = 40% A's)

Accommodations Due to Disability

If you need course adaptations or accommodations because of a disability, or if you have medical information to share with me, please make an appointment with me as soon as possible. My office location and hours are listed at the beginning of this document. If you have not already done so, students with disabilities, who believe that they may need accommodations in this class, are encouraged to contact the Disability Services Office (DSO), as soon as possible to ensure that such accommodations are implemented in a timely fashion. The DSO is located in the Student Development and Counseling Center, 157 West Street, (508) 831-4908 and can be accessed via its web site https://www.wpi.edu/offices/office-disability-services.

Academic Honesty

All work in this course, except the project, is individual work. While you may discuss the tutorial exercises with your classmates, I expect you to do each assignment by yourself. For the final take-home exam, you may not discuss any aspect of the exam with anyone and you may not seek help from online sources. For further information on academic honesty and integrity, see WPI's Academic Honesty and Integrity Policy at the Web site: https://www.wpi.edu/about/policies/academic-integrity.

WPI has an established academic integrity policy. Please review the policy and be aware that I expect students to abide by the policy. With the ready availability of online information and the preponderance of group work it is particularly important that you make yourself aware of the requirements of the honor code and the expectations of the instructor.

Foisie Business School Academic Honesty Statement for Syllabi

The WPI Foisie Business School expects students to behave in an ethical manner at all times. This includes the legal acquisition of the rights to all assigned material. Digital material (such as Harvard Business School Publishing cases and articles) typically limits the use to one buyer, with no transfer of ownership or use. It is not considered ethical fo4r students in the Foisie Business School to pass digital copies of material or paper reproductions that violate the terms or purchase or copyright. In simple terms, this means that material purchased by one student may not be distributed to another student, nor can one student accept material from another. Each student is expected to purchase his/her own access to assignments.

Similarly, it is unethical to plagiarize. This includes using the thoughts, ideas, words, or expressions of another in submitted academic work and representing them as one's own, rather than accurately and adequately attributing them to the original source.

My Expectations of You

Successful learning depends on your active participation in the process. Your part in the learning process requires time outside of class, engaged and actively learning the material. If you do not understand a concept, then I expect you to ask questions and ultimately request an appointment to review the concept in detail.

Workload

I expect you to read the assigned material before class and complete assignments on time. For a typical week, this will take approximately 12 hours outside of class, depending on your background and learning speed. This may involve approximately 4 hours reading and understanding the textbook material, 4 hours learning SQL and the database applications package, 4 hours on other assignments, as well as starting your database project. The workload may be heavier for exam weeks and toward the end of the semester as you implement your project.

Missed Classes

While you should attend every class, I realize that occasionally you may be unable to attend a class. Missing more than one or two classes is likely to present serious problems in completing the course satisfactorily. If you are unable to attend class, I expect you to let me know by sending email sometime before the class. I guarantee that if I cannot attend class, then you will receive an email before-hand. Please submit any assignment due that class before the class. Of course, if it is an emergency, let me know as soon as you reasonably can. If the campus is closed due to in-climate weather, I will have options in our Canvas module and I will have a Zoom URL posted if you would like to discuss what is due.

Contacting Me

The best way to contact me is through e-mail (jryan@wpi.edu). I check it frequently through the day and a couple of times over the weekend (Saturday and Sunday afternoons or evenings). Voice messages are unreliable, but I do answer my phone if I am in my office. I encourage meetings by appointment. I also welcome drop-in visits, but I may need to cut these short in order to fulfill other demands on my time. My smartphone number is 334-444-8088 and texting is handled like email.

Course Schedule (If changes are necessary you will be notified via email to your WPI account)

Date and Topic	Read in Advance	Deliverables
Class 1 (January 15) **Introductions to Databases** This session provides an introduction to database applications. We will discuss the importance of databases for providing the information for organizational decision-making. We will also use your laptop, with Access 2016 installed, to demonstrate how to do the Access assignments. Please bring your Access tutorial book to class with your laptop.	Syllabus Chapter 1 Module 1 Creating a Database, do Review Assignments 1-20 (starts on AC 1- 54)	
Class 2 (January 16) **Relational Data Model and Single Tables** This session presents the basics of the relational database model, focusing on databases with a single table. We will also start discussing the Structured Query Language (SQL), the language included with most relational database packages, focusing on retrieval of data from a single table.	Section 2 Overview, Chapter 3, Chapter 9 (stop after 'QBE') Module 2 Building Tables and Relationships, do Review Assignments (starts on AC 2-52) Data files are in Canvas Module.	
Class 3 (January 23) **Modeling and SQL for 1:M Relationships** This session builds on the relational model and SQL topics from the last class by extending them to multiple tables in a relational database, with focus on tables with one-to-many (1:M) relationships.	Chapter 4 Module 3 Querying a Database, do Review Assignments (starts on AC 3-56)	*Module 1 due.* *Module 2 due.*
Class 4 (January 27) **Modeling and SQL for N:M Relationships** This session builds on the relational model and SQL topics from the last two classes by extending them to tables with many-to-many (N:M) relationships.	Chapter 5 Module 4 Forms and Reports, do Review Assignments (starts on AC 4-44)	*Module 3 due.* *SQL Assignment 1 due.* *Project Milestone #1 due.*
Class 5 (January 30) **Entity-Relationship Data Modeling** This session focuses on database design using the Entity-Relationship (ER) model. It also covers the process of translating a conceptual database design in the form of an ER model into an implemented logical and physical design in a database management system.	Chapter 7 Module 5, Advanced Queries, do Review Assignments (starts AC 5-58) Data files are in Canvas.	*Module 4 due.* *SQL Assignment 2 due.*
Class 6 (February 3) **Design and Advanced Relationships** This session continues our focus on the relational model and design. It covers some special cases in relational database design, including 1:1 relationships, unary/recursive relationships, and generalization/subtype relationships.	Chapter 6 Module 6, Custom Forms, do Review Assignments (starts on AC 6-70)	*Module 5 due.* *Project Milestone #2 due.*
Class 7 (February 5) **Review for Exam, Project Designs** This session reviews the material to be covered on the midterm exam, namely database design, ER diagrams, and SQL. We will also discuss your first round design for your project.	Reference 1 Module 7, Custom Reports, do Review Assignments (starts on AC 7-55)	*Module 6 due.*
Class 8 (February 10) **Midterm Exam – In class, closed notes, timed.**	Chapters 1 to 7, 9 to QBE, and Reference 1	**Module 7 due.** **Midterm Exam**

Class 9 (February 13) **Database Design and Normalization** With the background from classes 1 through 7 on the relational data model, the entity-relationship model, and SQL, we can now turn our attention to normalization, which is a design process that produces relational tables that are of sound design. We will focus on the process of specifying a database in third normal form.	Chapter 8 Module 8 Sharing and Analyzing Data, do Review Assignments (starts on AC 8-48)	*Project Milestone #3 due.*
Class 10 (February 17) **Defining Tables and Views using SQL** In this session, we will learn how to use SQL, rather than the GUI in Access, to define tables and manipulate data in tables. Triggers and procedures are embedded routines of action within the database environment, where triggers are event-based and procedures are executed. We will discuss related issues of security, recovery, and ensuring that data are of high quality.	Chapter 10 Module 9, Using Action Queries and Advanced Table Relationships, do Review Assignments (starts on AC 9-42) Data files are in Canvas.	**Module 8 due.**
Class 11 (February 20) **User Interface Design** This session considers the design of user interfaces for database applications.	In-class Exercise – User Interface Design Evaluation Module 10, User Interface Design – Automating Tasks with Macros, do Review Assignments (starts on AC 10-50)	*Module 9 due.*
Class 12 (February 24) **Managing Data and Databases** With this session, we provide an overview of several topics related to the management of organizational databases and their data, including security, recovery, and the quality of the data.	Chapter 21 Module 11, Writing Visual Basic for Applications Code, do Review Assignments (starts on AC 11-38)	**Module 10 due.**
Class 13 (March 2) **Project Presentations** During this session, students will present their organizational data problems and the database design they used to address these problems. Presentations should be made using PowerPoint. The presentation should include a short demonstration of the database application. Depending on the class size, some groups may do their presentations in Class 12.		*Module 11 due.* **Project Milestone #4 due.** Project Final Report and DB application.
Class 14 (March 5) **Final Exam** In-class, comprehensive, final exam is scheduled to be completed during this session.		*Final Comprehensive Exam.*