INTRODUCTION TO DATABASE MANAGEMENT SYSTEMS

Syracuse University
School of Information Studies
IST 459 Section M001

Spring 2003, 2002-2003 Academic Year

INSTRUCTOR

Dr. Jon P. Gant
Assistant Professor Information Management and Public Administration
Syracuse University
Maxwell School of Citizenship and
School of Information Studies
jpgant@syr.edu

Maxwell School of Citizenship and Public Affairs
Department of Public Administration
Center for Technology and Information Policy
400 H Eggers Hall
Syracuse, NY 13244
(315) 443-5100

IST Office
CST 4-123

Office Hours: Tuesdays and Thursdays 9:30 am to 11:30 am in 400 H Eggers Hall
Please use e-mail to make appointments.

COURSE RESOURCES

Required Text

1. Hoffer, Jeffrey A., Mary Prescott, Fred McFadden, Modern *Database Management*, 2002, Sixth Edition, Prentice Hall, ISBN:0-13-033969-5.
2. Adamski, Joseph J., Kathleen T. Finnegan, *New Perspectives on Microsoft Access 2002: Comprehensive*, 2002, Course Technology, ISBN: 0-619-02089-X.

Course Website – TBA

COURSE DESCRIPTION

This course is designed to provide the student with an overview of database management systems. You will learn the theory, methods, and techniques widely used today to design, build, implement and manage modern databases. We will learn about the context of managing databases, how to perform database analysis, how to design databases, strategies for implementing databases, and explore advanced database topics. While we will learn about the various database models, this courses

features the relational database model. You will learn the details of the relational database model by going through the logical and physical design phases. You will use SQL to implement relational database models. And you will learn how to implement databases in a client/server environment and how to enable your database for the Internet.

I will use a problem-based learning approach to give you learning experiences designed to prepare you for working successfully in an organization. So you should expect the learning experiences to reach far beyond how to use a particular database package. Instead you should expect to learn the fundamental principles of database theory and design as we apply them to real-world problems. You will sharpen your problem-solving, communication, management, and life-long learning skills. Many of the solutions for assignments, labs, case studies, and projects will not be found in the text book or operating manual of the software. You will need to develop solutions that reflect critical thought, creativity, persistence, and originality. *What's the point otherwise.* You will work individually and in teams. You will learn how to evaluate your peer's work and you learn how to learn from feedback provide to you by your peers.

PREREQUISITES

There three key requirements for this course.

1. Basic Computer Literacy:
   - This course assumes that all students have have a general background in computing literacy. *This course is not designed to teach you basic computer literacy.* If you need additional help, please see Professor Gant.
2. Active Participation:
   This course requires that all students participate actively in lecture, labs, and group projects. Class participation is essential to this course. You will be expected to actively participate in the class in the following ways:
   - Class attendance is expected and is a necessary component of class participation. The lecture sessions are important because the lectures not only cover materials discussed in the texts, but also will include supplemental materials from other sources and in-class discussions. If you miss a class session, you are responsible for the material covered. You should make arrangements with fellow classmates to get class information and materials
   - Quality participation is key. Ask yourself the following: Do your peers value your comments?, Do your comments reflect that you are paying attention?, and Are your comments supported by the readings?
   - You will be required to work as a team member on cases and other group assignments. You will be responsible for evaluating your team members participation on the cases. These evaluations will be used in part to determine your grade for each case. **All free-riders will receive failing grades for the course.**

3. Understanding of Management, Operations and Organizations:
   - Because we will be learning about information systems in an organizational context, all students must have a general understanding of the core elements of a business or organization including basic terms associated administrative functional areas. You are also expected to understand the basic concepts of managing operations and services in organizations.

IMPORTANT NOTICE ON HONOR CODE

All students enrolled in IST 459 are expected to abide by all aspects of the SU Student Handbook.

Students will also abide by all aspects of the SU Computing and Electronic Communications Policy. The details of this policy are located at http://cms.syr.edu/policy/computepolicy.html.

I expect that:

- Students will behave honorably, ethically, and responsibly in all academic matters both inside the classroom and while working with clients on the course projects. Students who are aware of academic misconduct in any form will report the violation to the instructor or other school representative. Students who are aware of academic misconduct and who fail to report the violation are considered to be guilty of academic misconduct themselves.
- Plagiarism of any kind will not be accepted. I expect professional documentation and citation of sources of information. If you don't know how to do this, please see me immediately. If you are not sure whether a source should be documented or cited, err on the safe side and do it. If you get help, make sure that the help is acknowledged and documented.

GROUP PROJECTS

Group projects will be assigned in this course. Group projects are beneficial because they allow students to develop group skills along with software application development skills. In addition, students are able to work on more complex and challenging assignments that are also more indicative of real world problems.

I will evaluate your group projects based on your individual contribution and your group's effort. Key factors indicating your individual effort includes:

- The quality of your meeting skills
- Feedback
- Oral delivery and communication
- Information manipulation
- Team interaction

Your group evaluation will include the final quality of the project and the following factors:

- Effective role assignment and execution of these roles
- Proper goal setting
- Adequately setting up procedures for getting the work done
- Executing your plans to complete the project
- Professional delivery of the project

If your group encounters problems with "free-riders", notify the instructor immediately. I will encourage the project member to become more involved with the team. Please be aware that any member of a group who has been identified as not contributing toward the completion of the project is subject to receiving a grade of zero on the project and may receive a failing grade for the course.

GRADING

Activity

- Project I 15%
- Final project 30%
- Examination I 15%
- Examination II 15%

Participation

- 5 randomly collected case or lab assignments 15%
- Professional expression of critical thinking, self and group-learning skills, and problem-solving skills through in-class discussion, peer-review project evaluations, lab participation and in-class presentations 10%

- Under no circumstances will late assignments be accepted without prior authorization from Professor Gant.
- If you object to any grading decisions, you may appeal the grade to the instructor. To do so, you must document your appeal in writing. The appeal must be given along with the original assignment, project or exam to the instructor by 5pm of the following day of receiving the grade. The entire assignment, project or exam will be re-graded by the instructor. Your grade may be higher or lower than the original grade.
- You will receive a failing grade for this course if:
    - you plagiarize or otherwise cheat on any assignment, task or exam
    - misrepresent information in any peer evaluation
    - or conduct yourself inappropriately with any outside client or other student as part of your team assignments.

GRADING SCHEDULE

Grade	Percentage of total points	Grade	Percentage of total points
A+	**100% - 98%**	**D+**	**69.9% - 68%**
A	**97.9% - 92%**	**D**	**67.9% - 62%**
A-	**91.9% - 90%**	**D-**	**61.9% - 60%**
B+	**89.9% - 88%**	**Failure**	**59.9% or less**
B	**87.9% - 82%**		
B-	**81.9% - 80%**		
C+	**79.9% - 78%**		
C	**77.9% - 72%**		
C-	**71.9% - 70%**		

IST 459, Spring 2003 Schedule

(subject to change)

Date	***Topic and Readings***
Jan 14	Course Introduction
Jan 16	The Database Environment and Database Development Process – Read Hoffer Ch.1 and 2 – Read Case: Mountain Valley Community Hospital, Chapter 1 – Read Case: Mountain Valley Community Hospital, Chapter 2 Prepare Discussion Memo: • Answer Project Questions and Project Exercises for Chap 1 case
Jan 21	Data Modeling – Read Hoffer Ch. 3 Modeling Data in the Organization – Prepare answers to Hoffer Chap. 3, Problems and Exercises questions 3 and 4, p. 120-121.
Jan 23	Data Modeling – Skim Hoffer Ch. 4 – Prepare answers for Hoffer Chap. 3 Mountain Valley Community Hospital Case, Project Exercises questions 1-7 pp. 126.
Jan 28	Logical Database Design and the Relational Model – Read Hoffer, Chapter 5 and 6 – Prepare answers for Hoffer Chap. 5 Mountain Valley Community Hospital Case, Project Exercises questions 1-4 pp. 207. –
Jan 30	Structured Query Language – Read Hoffer, Chapter 7 and 8 – Do Hoffer Chapter 7, Problems and Exercises 1-9, pp. 290-291. –
Feb 4	SQL continued - Do Hoffer Chapter 8, Problems and Exercises 1-5, pp. 318-319
Feb 6	LAB: Tutorial 1, 2, 3
Feb 11	Designing forms, reports and interfaces Readings TBA
Feb 13	LAB Tutorial 4 – Creating Forms and reports
Feb 18	MIDTERM EXAMINATION
Feb 20	LAB: Tutorial 5 and 6 - Enhancing a table's design and creating custom reports
Feb 25	Midterm Feedback and Project Meeting
Feb 27	LAB: Application development workshop
Mar 3 & 4	Project Meetings – schedule appointment with Prof. Gant to review your project

Mar 6	Project Due – Turn in to my IST Faculty mailbox by midnight
Mar 11 & 13	Spring Break
Mar 18	The Client/Server Database Environment and Internet Database Environment – Read Hoffer, Chapter 9 and 10 – Do Hoffer Chap 10, Mountain View Community Hospital case
Mar 20	LAB Tutorial 7 – Integrating Access with the Web
Mar 25	Data Warehousing Read Hoffer Chapter 11 • Do Hoffer Chap 11, Mountain View Community Hospital case
Mar 27	LAB Tutorial Customizing the interface
Apr 1	Data and Database Administration Read Hoffer Chapter 12 • Do Hoffer Chapter 12, Mountain View Community Hospital case
Apr 3	LAB Tutorial 11 – Managing a database
Apr 8	Distributed DBMS Read Hoffer Chapter 13
Apr 10	LAB Tutorial 9 - Macros
Apr 15	MIDTERM EXAMINATION
Apr 17	LAB Tutorial 10 – Visual Basic
Apr 22	Midterm Feedback and Project Workshop
Apr 24	LAB: Application development workshop
Apr 28 & 29	Project meetings
May ?? - TBA	Final project due at Final – In class presentations • Project presentations (All students are required to participant and attend)

PREPARING FOR CASE METHOD DISCUSSIONS

We will be using active learning methods, including the case method, throughout the course as the basis for class discussion. You are expected to participate actively throughout the entire course and you should make thoughtful contributions to the discussion. You should consider the class meetings as a laboratory in which you can test your ability to convince peers of the correctness of your approach to complex problems and of your ability to achieve the desired results by using that approach. These discussions represent a significant portion of your final grade. You will, therefore, want to do as well as you can in them. The following guidelines and suggestions are meant to help you achieve your best performance.

1) Form a study group to prepare for case discussions.
   a) Experience and research both show that preparing cases alone is not as productive (nor as much fun!) as doing it in groups. Not only do study groups help improve your own skills, you also can learn from other students' patterns of thinking and problem-solving styles.
   b) Use the study group to present informally initial analyses, to practice articulating your ideas, to get feedback on both the ideas and presentation, to compare different views, to refine and rethink positions, and to build confidence for making contributions to the case discussion with the whole class.
2) Read the case meticulously…and in phases.
   a) *Peruse the case*: Quickly look at the case by reading the introduction and conclusion, and by skimming the rest of the contents. Now you know what you are getting into.
   b) *Quickly read the case:* Read the entire case rapidly, without underlining or highlighting. You now know the basic structure of the case and where the main information is.
   c) *Make a brief outline:* Who is involved in the case? What problems do they face? What is their situation like?
   d) *Set preliminary goals:* What do the study questions ask? What will it take to answer them? What issues in the course does the case involve?
   e) *Re-read the case:* Focus on the important information that was located during the skimming, and take initial steps toward answers to the preliminary questions. Highlight, underline, or make marginal notes to organize the details and record new thoughts or questions generated by reading.
   f) *Re-formulate the problem:* What is the case really about? What issues are central to the problem? What conflicts between ideas, perspectives, or values are involved in deciding what action to take? Whose interests are really at stake? What are the alternatives?
   g) *Work the problem:* Answer the specific study questions, using the relevant information located during the reading and study group session. Make thoughtful assumptions about the information that is not available in the case.

Criteria for measuring effective class participation include:

1. Is the participant a good listener?
2. Does the student make points that are relevant to the discussion? Are the points linked to the comments of others?
3. Do comments show evidence of incorporating the concepts from the readings into the analysis of the case?
4. Is there a willingness to test new ideas, or are all comments "safe"? ("Safe means simply restating case facts without analysis and conclusions).
   Do comments clarify or build upon the important aspects of earlier comments and lead to a clearer statement of the concepts being covered and the problems being addressed?

Final Project

The group project allows you to demonstrate that you have synthesized the materials covered in the course. The group project is an opportunity for you to design, build, implement, and document a working database system.

During various project workshops, I will ask selected groups to "solutions" for each of the three phases described below. Each group will present only once. After seeing the presentations (or giving your own), your group may decide to change direction. This is perfectly acceptable - all I ask is that you provide documentation of the change and your reasons for it. Do NOT blindly accept another model!!!

Specific Project Requirements:
Your project will begin with conceptual data modeling and conclude with the implementation of a database using Microsoft Access, Oracle, Visual Basic, and/or any other software you choose. The three phases of database development included in the project are (1) conceptual data modeling, (2) logical database design, and (3) database implementation. This document describes work included in each phase of the project. You should refer to the syllabus for the due dates.

A. Conceptual data modeling

1. Read the case description and associated material, and generate a list of questions that you need answered.
2. Either submit these questions to me via email, or set up a time to come talk with me or about them (as though you were talking with an actual client)
3. Create an entity-relationship diagram showing the conceptual data model for your system. You should prepare both the preliminary and the implementation oriented model.

B. Logical Database design

1. Normalize the relations to at least third normal form.
2. Identify the primary and foreign keys for each relation (using appropriate notation).
3. Identify and describe any indexes needed for nonkey attributes – justify your decision.
4. Identify and describe referential integrity constraints needed to guarantee the integrity of your database – Explain your choices.
5. Consider whether you should denormalize some of your relations in order to reduce the time needed to retrieve date from your database. Present the justification for your denormalization decision. If you decide to denormalize some of your relations, present a new set of relations for your database.

C. Preliminary Database Implementation

1. Implement the database.
    a. Define your database
        (1) Create the tables needed to implement your database
        (2) Define keys and indexes
        (3) Define the relationships among your tables.
        (4) Define any necessary referential integrity constraints between your tables.
    b. Add sample data to the database tables.
    c. Design and implement the forms needed to input data to your database. Consider user needs in both your selection and design of the forms.
    d. Design and implement the reports needed to output data from your database.
    e. Write (and include) the SQL code necessary to produce answers to the questions posed.
2. Produce documentation explaining how to use your database. **Consider the audience of the documentation to be the actual users of your system. Assume they are familiar with how to use a computer – but they are not familiar with your particular database.**
3. Discuss the organizational and people issues associated with implementing this system, including BUT NOT LIMITED TO expansion, data integrity, and security (don't be constrained by this list!).

D. The Final System
Project Deliverables
You will document your work by turning in many items and by giving an oral presentation. Details follow.

A. Database
You should turn in all files (tables, forms, and reports) or URL needed to run your database system.

B. Written Paper (Due with final system)
Your final project paper should include (at a minimum) the items listed below. Essentially, you will have created nearly all of the necessary pieces throughout the project. For the final paper, you need to put them together in a more formal manner. You may present some of this information in appendices to your paper. User your judgment about what should be in the body of the paper and what should be appendices. Your paper should provide an **interesting** description of what you have done and why. Be sure to organize your paper in a way that meets this objective. It is not a good idea to simply include each of the items listed here in the order given. Give some thought about how to best structure your paper. **You will also probably want to include transitions to tie all of these together.** For example, you might discuss how decisions you made during the logical design of your systems constrained your final implementation. You should also include material on the relationships between the components of your paper (e.g., how is what you learned through interviews and presentations reflected in the relationship diagram).

Minimum requirements for the paper:
1. A summary of any questions asked, answers obtained and assumptions made.
2. An entity -relationship diagram showing the preliminary and implementation-oriented conceptual data models for your system.
3. The set of normalized relations for your database (including primary and foreign keys).
4. A discussion of any indexes needed for nonkey attributes.
5. A discussion of any referential integrity constraints needed to guarantee the integrity of your database.
6. A discussion of your justification for your denormalization decision (yes OR no). If you decide to denormalize some of your relations, include your new set of partial denormalized relations for your database.
7. A diagram showing the structure of your **implemented** database.
8. A description of the properties of each field in the tables of your implemented database (i.e., a data dictionary).
9. A depiction and description of each of your implemented forms.
10. A depiction and description of each of your implemented reports.
11. The SQL code needed to answer the questions posed.
12. The user documentation for your database.
13. Implementation issues and suggestions for addressing them.
14. ***Technology issues (strengths and limitations) that you discovered during the project.***
15. ***Lessons learned (this is really important!!).***

C. Presentation
The class presentation should highlight those aspects of the system likely to be of greatest interest to the class. The class presentations should be focused on the particular phase being presented. During the presentations, your classmates will assume many roles (e.g., client, IS team member, etc.) - you should design your presentation accordingly. Please prepare and deliver professional presentations. Your grade for the presentation will be based on professionalism, clarity, fluency, and accuracy. Of course, extra points will be available for pizzazz.