

CPS352 - DATABASE SYSTEMS

Professor: Russell C. Bjork Fall Semester, 2008-2009
Office: MacDonald 217 x4377 MWF 9:10-10:10 am
bjork@gordon.edu
Hours: MF 2:10-4 pm; Blackboard course site plus public site:
Tu 1:30-4:30 pm and by appointment <http://www.cps.gordon.edu/courses/cps352>

HANDOUT #1: SYLLABUS - 8/30/06

CATALOG DESCRIPTION:

Explores database technology; various data models, query languages, and application program-DBMS interface. Prerequisites: CS211, 212, 220, and MA229.

COURSE OBJECTIVES:

In general, this course is designed to introduce you to basic database management system concepts and applications.

In particular, upon completion of this course, you should be familiar with:

1. The major historical data models (entity-relationship, hierarchical, network, and relational), plus new directions involving object-orientation and XML.
2. The use of SQL.
3. Design and normalization principles for relational databases, including the various normal forms.
4. Underlying file structures used to implement databases, and their performance implications.
5. Multi-user database concerns such as crash recovery, concurrency control, security, integrity
6. New applications of database systems.

TEXT: Silberschatz, Abraham, Henry F. Korth and S. Sudarshan. *Database System Concepts* (5th ed). (New York: McGraw-Hill, 2006).

AVAILABLE ONLINE: Selected tutorial material on SQL and IBM documentation for DB2 will be accessible from the Blackboard site.

COURSE TECHNIQUES AND PROCEDURES:

This is a survey course, in which we will attempt to gain a general familiarity with a large volume of material. For this reason, textbook reading and problem sets will play a larger-than-usual role in the course, with a proportionately reduced emphasis on actual programming. Homework exercises and a semester project using commercial DBMS software will provide an opportunity for you to gain some familiarity with practical application of the theoretical material.

COURSE REQUIREMENTS AND EVALUATION:

1. You will be expected to read most of the textbook, as assigned in the topic schedule below. Reading assignments should be completed **BEFORE** the class hour in which the topic is discussed. Lecture presentations will assume that you have read the text, and it is expected that your participation in the class will reflect that fact. However, our classroom discussion will not rigidly follow the order of material in the text, nor will it be confined to material covered there.

2. Seven homework sets will be distributed during the semester and will be due as shown in the course schedule. These will consist mostly of selected problems from the text, plus on-line exercises using DB2 and/or XML. The value of each in the final grade computation will be as shown below. Note that these are fairly substantial assignments; you would do well to work on the problems throughout the week, rather than waiting until just before the set is due to tackle the whole assignment.

Set Number	Tentative Emphases	Value in Final Grade
1)	Fundamental Concepts; Data Models; The Relational Model	4%
2)	The E-R Model; Integrity and Security; The Relational Calculus	4%
3)	Relational Database Design and Normalization	6%
4)	Database Application Development; Object-Based Systems; XML	4%
5)	DBMS File Structures; Indices; Efficient Query Processing/Optimization	4%
6)	Transactions; Concurrency; Crash Recovery	4%
7)	Decision Support; Information Retrieval; Database System Architecture; Distributed Databases	4%
Total		30%

The following guidelines should be observed when doing these homework sets

- Homework sets will be due at the start of class on the date indicated. Late homework sets will **NOT** be accepted.
 - Homework sets must be done on one side only of 8-1/2 x 11 paper, and pages must be stapled in problem-number order. Problems must be numbered, and final answers (where appropriate) should be highlighted. (Homework sets not conforming to these standards will be returned ungraded.)
 - You may work together with another student on homework, provided each of you works on each problem.
 - Where an exercise calls for writing a program, it is sufficient to write it out by hand; you need not enter it into the computer.
3. Structured Query Language (SQL) has become the standard language for querying databases - even those based on some model other than the relational model for which it was developed. For this reason, it is important that you become thoroughly familiar and comfortable with using SQL. Most homework sets will include several questions that can be answered by performing a query on an example database; you will be required to turn in the queries and the answers that you got from them as part of the homework. Learning how to formulate the required queries may require some searching of relevant SQL tutorial resources.
4. During the semester, you will apply what you are learning to a designing a database application of your own choice, requiring on the order of a dozen tables. You will be responsible for turning in (1) a description of the requirements for this system; (2) an E-R diagram; and (3) an actual database with simulated data. (You are not responsible for building the application - only for designing the database for it.) Specific requirements for the project will be distributed in class. All parts of this project, together, will be worth 20% of the final course grade.

5. You will do a major programming project involving the development of a DBMS application using SQL embedded in Java, using a database design and GUI furnished by the professor. Specific requirements will be distributed in class. This project will be worth 15% of the final grade.
6. There will be two take-home examinations plus a final examination given as shown in the course schedule below. Each take-home exam will account for 10% of the final course grade, and the final exam will account for 15% (total 35%). Exams will be open book, open notes.

7. Summary:	7 Homework sets	30%
	Database design project	20%
	Programming project	15%
	3 Exams	<u>35%</u>
		100%

8. Your final grade will be computed on the basis of a weighted sum of the items listed above.

The following are minimum guaranteed grades for the percentages indicated:

	93% - 100%: A	90% - 92.9%: A-
87% - 89.9%: B+	83% - 86.9%: B	80% - 82.9%: B-
77% - 79.9%: C+	73% - 76.9%: C	70% - 72.9%: C-
67% - 69.9%: D+	63% - 66.9%: D	60% - 62.9%: D-

POLICY STATEMENT ON EXTENSIONS AND INCOMPLETES:

1. Extensions of the due dates for homework or projects will be given in the event of extenuating circumstances (such as illness, personal emergency) IF you submit a brief written request to the professor as soon as possible after the circumstances arise. This request will be initialed (if approved) and will be returned to you. You must attach it to the piece of work for which the extension was granted.
2. A grade of Incomplete will be given without penalty IF you are unable to complete the course work by the last day of the term due to major illness or other similar emergency. Again, a written request should be submitted. Such a request will only be granted if you are substantially up-to-date with your course work and were making good progress in the course up to the time that the difficulty arose. Of course, you must complete all work for the course by the midpoint of the next semester in accordance with College policy.
3. A grade of Incomplete with a penalty of one letter grade to be applied in the final grade computation MAY be given if you are unable to complete all the course work for reasons other than those noted above. You must make a written request, and your progress in the course, class attendance etc. will be taken into consideration in determining whether to grant it. Again, you must complete all work for the course by the midpoint of the next semester.

ATTENDANCE POLICY:

Regular class attendance is expected of all students, and class attendance will be recorded. Absences from class will be classified as “documented” or “undocumented”. A documented absence is one where written documentation is submitted supporting an absence from class due to circumstances beyond the student’s control. An undocumented absence is any other absence, including one which could qualify as documented if proper documentation were submitted.

Students who have more than three absences (of any kind) during the semester should expect to see their final grade reduced by 1% for every undocumented absence and students who have more than 12 undocumented absences will fail the course automatically. Note that it is not necessary to document absences unless there are more than three total absences; for most students, this will avoid the need to submit documentation. A student who anticipates the need to miss more than three classes due to athletic competitions or other student activities should review the college's attendance policy on page 31 of the catalog, and should then discuss alternatives to class attendance with the professor at the start of the semester.

A student who is habitually late will have late arrival for class counted as a half absence for that class, and a student who sleeps through most or all of a given class session will be counted as absent for that class.

You may ask the professor to waive this policy for you if you earned an A in the prerequisite course, or if you have an A average in this course as of the mid-term exam. If you wish to take advantage of this exemption, you must so inform the professor. However, the attendance policy will be reimposed if your subsequent work deteriorates.

STUDENTS WITH DISABILITIES:

Gordon College is committed to assisting students with documented disabilities (see Academic Catalog Appendix C, for documentation guidelines). A student with a disability who may need academic accommodations should follow this procedure:

1. Meet with a staff person from the Academic Support Center (Jenks 412 X4746) to:
 - a. make sure documentation of your disability is on file in the ASC,
 - b. discuss the accommodations for which you are eligible,
 - c. discuss the procedures for obtaining the accommodations, and
 - d. obtain a **Faculty Notification Form**.

2. Deliver a Faculty Notification Form to each course professor *within the first full week of the semester*; at that time make an appointment to discuss your needs with each professor.

Failure to register in time with your professor and the ASC may compromise our ability to provide the accommodations. Questions or disputes about accommodations should be immediately referred to the Academic Support Center. See Grievance Procedures available from the ASC.

TENTATIVE SCHEDULE OF TOPICS:

Date	Topic(s)	Reading	Homework/ Exams / Projects Due
W 8/27	Course Introduction; Fundamental DBMS Concepts	ch. 1	Start Design Project
F 8/29	Fundamental DBMS Concepts (ctd)		
M 9/1	<i>(Labor Day)</i>		
W 9/3	Data Models	ch 2. through §2.1.3; §6.2 through 6.3.1; Appendix A (online) §A.1; Appendix B (online) §B.1	

F 9/5	The Relational Data Model; Relational Algebra	rest of ch. 2	
M 9/8	(ctd)		Start Homework 1
W 9/10	(ctd)		
F 9/12	Database Design; The Entity-Relationship Data Model	Rest of ch. 6 (but omit §6.11)	
M 9/15	(ctd)		
W 9/17	Oral Presentations / Class Discussion of Design Project Requirements		DESIGN PROJECT REQUIREMENTS
F 9/19	Introduction to SQL	ch. 3	HOMEWORK 1
M 9/22	(ctd)	§4.7-4.8 (omit 4.7.1, 4.8.1)	
W 9/24	Relational Database Integrity and Security	§4.1-4.3; 8.6-8.7	
F 9/26	(ctd)		
M 9/29	The Relational Calculus; QBE	5.1-5.3	
W 10/1	Relational Database Design and Normalization	§7.1-7.5	
F 10/3	(ctd)		HOMEWORK 2
M 10/6	Oral Presentations/Discussions of Design Project E-R Diagrams; Relational Database Design (ctd)		DESIGN PROJECT E-R DIAGRAM
W 10/8	(ctd)	§7.6-7.10	
	Take-home Exam #1 distributed - through chapter 6 (except §4.4-4.5) plus §8.6-8.7 and Appendices A, B material		
F 10/10	(ctd)		
M 10/13	Database Application Development	§4.4-4.5; 8.1-8.5; 8.8-8.9	TAKE-HOME EXAM 1 DUE
W 10/15	(ctd)		
F 10/17	<i>(Quad Break)</i>		
M 10/20	Oral Presentations/Discussions of Design Project Database Design; Object-Based Database Systems	ch. 9	DESIGN PROJECT DATABASE DESIGN
W 10/22	(ctd)		
F 10/24	XML	§10.1-10.3; 10.5-10.8	HOMEWORK 3
M 10/27	(ctd)		
W 10/29	DBMS File Structures	ch. 11	

F 10/31	(ctd)		HOMEWORK 4
M 11/3	BTree and Hashed Indices	ch. 12	
W 11/5	(ctd) (Take-home Exam #2 distributed - chapters 7-10 (except §8.6-8.7) plus §4.4-4.5)		DESIGN PROJECT DATABASE IMPLEMENTATION; Start Programming Project
F 11/7	Efficient Query Processing Strategies	ch. 13	
M 11/10	(ctd)		
W 11/12	Query Processing Optimization	§14.1-14.3	TAKE-HOME EXAM 2 DUE
F 11/14	The Transaction Concept	ch. 15 (omit 15.5.2)	
M 11/17	(ctd)		PROGRAMMING PROJECT PART I
W 11/19	Concurrency Control	§16.1-16.5 (omit 16.1.4)	HOMEWORK 5
F 11/21	Crash Recovery	§17.1-17.4	
M 11/24	Decision Support Systems; Data Mining	ch. 18	
11/26-28	<i>(Thanksgiving Break)</i>		
M 12/1	(ctd)		
W 12/3	Database System Architectures	ch. 20	HOMEWORK 6
F 12/5	Distributed Database Systems	ch. 22	
M 12/8	(ctd)		PROGRAMMING PROJECT PART II
W 12/10	Information Retrieval Systems	§19.1-19.7	
F 12/12	<i>(Reading Day - homework due by 4:00 pm)</i>		HOMEWORK 7
M 12/15	10:30 am-12:30 pm - Exam #3 (Comprehensive - with particular emphasis on material covered in chapters 11-22)		

NOTES: Textbook Appendices A and B are only available on line - see the Blackboard site. Some of the homework assignments will include suggested readings in Birchall - also accessible on the Blackboard site.