

# CIS 560: Database Management Systems

## Fall 2006

**Hours:** 3 hours

**Prerequisite:** CIS 301, Logic for Computer Science.

**Textbook:** Silberschatz, A., Korth, H. F., & Sudarshan, S. (2006). *Database System Concepts, 5<sup>th</sup> edition*. New York, NY: McGraw-Hill. ISBN: 0072958863.

**Venue:** MWF 14:30 – 15:20, Room 127 Nichols Hall

**Instructor:** William H. Hsu, Department of Computing and Information Sciences

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**Office hours:** Mon/Wed/Fri after class; other times TBA / by appointment

**Course web group:** K-State Online (KSOL) <http://snurl.com/va60>

**Course web page:** <http://www.kddresearch.org/Courses/Fall-2006/CIS560/>

**Tegrity lectures:** Linked from course web page and KSOL

### Course Description

This course provides an introduction to database management systems, including discrete mathematical structures and set theory foundations of databases, theory and practice of database systems, modern database design techniques, and some applications. The first half of the course will emphasize taxonomies of databases (flat, object-oriented, hierarchical, and relational), database theory (normal forms, structured queries), fundamental theory, and query design. The second half will delve deeper into database theory and examine topics in theoretical and applied databases: modern DBMS; data warehousing, modeling, and mining; online analytical processing (OLAP); semistructured data (XML) and the web; database research; online databases and DB security.

### Course Requirements

Component	Components	Grade Value	Total Value
<b>Exams and quizzes</b>	2 hour exams	30% (15% each)	60%
	1 final exam	30%	
	Quizzes	0%	
<b>Homework and class participation</b>	4 of 5 written problem sets	8% (2% each)	16%
	4 of 5 machine problems	8% (2% each)	
<b>Term project (DB implementation)</b>	Planning/design, interview	5%	17%
	Intermediate milestone	6%	
	Implementation, report	6%	
	Peer review	1%	
<b>Class participation</b>	Attendance	3%	7%
	Answering questions	2%	
	Discussion	2%	

### Selected reading (on reserve in K-State CIS Library):

- **Recommended text:** Sunderraman, R. (2004). *Oracle 9i Programming: A Primer*. Reading, MA: Addison-Wesley. ISBN: 0321194985

### Additional bibliography (excerpted in course notes and handouts):

- Ramakrishnan, R. & Gehrke, J. (2003). *Database Management Systems, 3<sup>rd</sup> edition*. New York, NY: McGraw Hill. ISBN: 0072465638
- Elmasri, R. & Navathe, S. B. (2003). *Fundamentals of Database Systems, 3<sup>rd</sup> edition*. Reading, MA: Addison-Wesley. ISBN: 0321206746

## Course Calendar

Lecture	Date	Topic	(Primary) Source
0	21 Aug 2006	Overview, database system concepts	Chapter 1
1	23 Aug 2006	Introduction to RDBs	Chapter 1
2	25 Aug 2006	Introduction to RDBs, relational algebra	Chapter 1, 2
3	28 Aug 2006	Relational algebra: select, project	Chapter 2
4	30 Aug 2006	Relational joins	Chapter 2, Chapter 3
5	01 Sep 2006	SQL query syntax	Chapter 3
6	06 Sep 2006	Modern SQL: cursors and views	Chapter 3, 4
7	08 Sep 2006	SQL in practice: embedded	Chapter 4
8	11 Sep 2006	SQL in practice: ODBC/JDBC examples	Chapter 4
9	13 Sep 2006	Relational calculus	Chapter 4
10	15 Sep 2006	Datalog	Chapter 5
11	18 Sep 2006	GQBE in Microsoft Access	Chapter 5
12	20 Sep 2006	Database design overview	Chapter 6
13	22 Sep 2006	Entity-relational (E-R) data modeling	Chapter 6
14	25 Sep 2006	E-R diagrams and UML	Chapter 6
15	27 Sep 2006	Normal forms; exam 1 review	Chapter 7
16	29 Sep 2006	Functional dependencies	Chapter 7
17	04 Oct 2006	More normal forms	Chapter 7
18	06 Oct 2006	Hour Exam 1 (time TBD)	Chapters 1-7 (focus: 1-6)
19	09 Oct 2006	Exam 1, database design review	Chapter 7
20	11 Oct 2006	Web databases	Chapter 8
21	13 Oct 2006	Web DB programming	Chapter 8
22	16 Oct 2006	Servlets and JSP	Chapter 8
23	18 Oct 2006	Triggers, XML intro	Chapter 8, 10
24	20 Oct 2006	XML structure and document schemas	Chapter 10
25	23 Oct 2006	XML applications; indexing intro	Chapter 10, 12
26	25 Oct 2006	Index files	Chapter 12
27	27 Oct 2006	Index files and hashing, Exam 2 review	Chapter 12
28	30 Oct 2006	Query processing: costs, sorting	Chapter 13
29	01 Nov 2006	Query processing: joins	Chapter 13
30	03 Nov 2006	Hour Exam 2 (time TBD)	Chapters 7-8, 10, 12-13
31	06 Nov 2006	Exam 2, DB implementation review	Chapters 7, 8, 10, 12-13
32	08 Nov 2006	MySQL primer	Handout
33	10 Nov 2006	MySQL primer	Handout
34	13 Nov 2006	ORACLE primer	Handout
35	15 Nov 2006	ORACLE primer	Handout
36	17 Nov 2006	Transactions: ACID property definitions	Chapter 15
37	20 Nov 2006	Transactions: ACID implementation	Chapter 15
38	27 Nov 2006	Concurrency: basic concepts	Chapter 16 (survey)
39	29 Nov 2006	Data mining and OLAP	Chapter 18
40	01 Dec 2006	Data warehousing	Chapter 18
41	04 Dec 2006	Information retrieval, client-server systems	Chapters 19 (survey), 20
42	06 Dec 2006	Client-server, final exam review	Chapter 20
43	08 Dec 2006	Term project discussions	N/A
44	14 Dec 2006	Final Exam, 16:10 – 19:10	Ch. 1-8, 10, 12-13, 15, 18, 20

Lightly-shaded entries denote the due date of a written problem set.

Heavily-shaded entries denote the due date of a machine problem (programming assignment).

Projects are due on Wed 29 Nov 2006, with reports due on Fri 01 Dec 2006.