CIS 560: Database Management Systems

Fall 2008

**Hours**: 3 hours; 3 hour extended course project option (CIS 499, 598, 690) available

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

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

**Venue**: MWF 11:30 – 12:20 (lecture MW, lecture/labs alternate F), Rooms 127 & 128 Nichols Hall

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

Office: 213 Nichols Hall URL: <http://www.cis.ksu.edu/~bhsu> (calendar posted here)

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**Office hours:** MWF 12:20 – 13:20, 14:20 – 15:20, T 08:30 – 10:30, appointment (see calendar)

**Course web group**: K-State Online (KSOL) <http://snurl.com/1pq4c>

**Course web page**: <http://www.kddresearch.org/Courses/Fall-2008/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

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| **Component** | **Components** | **Grade Value** | **Total Value** |
| **Exams and quizzes** | 2 hour exams | 30% (15% each) | 60% |
| 1 final exam  | 30% |
| Quizzes | 0% |
| **Homework and class participation** | 4 of 5 written problem sets4 of 5 machine problems | 8% (2% each)8% (2% each) | 16% |
| **Term project (DB implementation)** | Planning/design, interviewIntermediate milestoneImplementation, reportPeer review | 5%6%6%1% | 17% |
| **Class participation** | AttendanceAnswering questionsDiscussion | 3%2%2% | 7% |

## 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, 3rd edition.* New York, NY: McGraw Hill. ISBN: 0072465638
* Elmasri, R. & Navathe, S. B. (2003). *Fundamentals of Database Systems, 4th edition*. Reading, MA: Addison-Wesley. ISBN: 0321206746

## **Course Calendar**

|  |  |  |  |
| --- | --- | --- | --- |
| **Lecture** | **Date** | **Topic** | **(Primary) Source** |
| 0 | Mon 25 Aug 2008 | Overview, database system concepts | Chapter 1 |
| 1 | Wed 27 Aug 2008 | Set theory review | Chapter 1 |
| 2 | Fri 29 Aug 2008 | Intro to RDBs, relational algebra | Chapter 1, 2 |
| 3 | Wed 03 Sep 2008 | Relational joins | Chapter 2 |
| **4** | **Fri 05 Sep 2008** | **Implementing joins**  | **Chapter 2, Chapter 3** |
| 5 | Mon 08 Sep 2008 | PHP and MySQL basics | Chapter 3, Handout |
| 6 | Wed 10 Sep 2008 | MySQL: cursors and views | Chapter 3, 4 |
| 7 | Fri 12 Sep 2008 | SQL: embedded, ODBC/JDBC | Chapter 4 |
| 8 | Mon 15 Sep 2008 | Relational division | Chapter 4 |
| 9 | Wed 17 Sep 2008 | Relational calculus and datalog  | Chapter 5 |
| **10** | **Fri 19 Sep 2008** | **JSP setup and intro** | **Handout** |
| 11 | Mon 22 Sep 2008 | GQBE in Microsoft Access | Chapter 5 |
| 12 | Wed 24 Sep 2008 | Database design overview | Chapter 6 |
| 13 | Fri 26 Sep 2008 | Entity-relational (E-R) data modeling  | Chapter 6 |
| 14 | Mon 29 Sep 2008 | E-R diagrams and UML | Chapter 6 |
| **15** | **Wed 01 Oct 2008** | **Normal forms (1NF); exam 1 review** | **Chapter 7** |
| 16 | Fri 03 Oct 2008 | 2NF-3NF, BCNF, 4NF | Cbapter 7 |
|  | **Wed 08 Oct 2008** | **PHP Intro // Hour Exam 1** | **Chapters 1-7 (focus: 1-6)** |
| **17** | **Fri 10 Oct 2008** | **Web DBs, server-side programming** | **Chapter 8, Handout** |
| **18** | **Mon 13 Oct 2008** | **Exam 1, database design review** | **Chapter 7** |
| 19 | Wed 15 Oct 2008 | Web databases: forms and GUIs | Chapter 8 |
| 20 | Fri 17 Oct 2008 | OR data models and OODB | Chapter 9 |
| 21 | Mon 20 Oct 2008 | More servlets and JSP | Chapter 8 |
| 22 | Wed 22 Oct 2008 | Triggers, XML intro | Chapter 8, 10 |
| **23** | **Fri 24 Oct 2008** | **Importing, exporting, migrating DBs** | **Chapter 10, Handout** |
| 24 | Mon 27 Oct 2008 | XML structure, applications | Chapter 10 |
| 25 | Wed 29 Oct 2008 | Index files | Chapter 12 |
| **26** | **Fri 31 Oct 2008** | **Indexing/hashing, Exam 2 review** | **Chapter 12** |
| 27 | Mon 03 Nov 2008 | Indexing, query processing (select) | Chapter 13 |
| 28 | Wed 05 Nov 2008 | Query processing: sorting, joins | Chapter 13 |
|  | **Fri 07 Nov 2008** | **Hour Exam 2 // DB query costs** | **Chapters 7-8, 10, 12-13** |
| **29** | **Mon 10 Nov 2008** | **Exam 2, DB implementation review** | **Chapters 7, 8, 10, 12-13** |
| 30 | Wed 12 Nov 2008 | Course project review |  |
| **31** | **Fri 14 Nov 2008** | **ORACLE primer** | **Handout** |
| 32 | Mon 17 Nov 2008 | ORACLE primer | Handout |
| 33 | Wed 19 Nov 2008 | Transactions: ACID property def’ns | Chapter 15 |
| **34** | **Fri 21 Nov 2008** | **Transactions: ACID implementation** | **Chapter 15** |
| 35 | Mon 24 Nov 2008 | Concurrency: basic concepts | Chapter 16 (survey) |
| 36 | Mon 01 Dec 2008 | Data mining | Chapter 18 |
| 37 | Wed 03 Dec 2008 | Data warehousing and OLAP | Chapter 18, Han excerpt |
| **38** | **Fri 05 Dec 2008** | **Databases and Web Search** | **Chapter 19** |
| 39 | Mon 08 Dec 2008 | Info retrieval | Chapter 19 – 20 |
| **40** | **Wed 10 Dec 2008** | **Final exam review** | **Ch. 1-9, 10, 12 -13, 15, 18-20** |
| 41 | Fri 12 Dec 2008 | Term project discussions | N/A |
|  |  | **FINAL EXAM** | **Ch. 1-9, 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)

Interim project interviews will be held between the first and second hour exams (before spring break).

The **green-shaded date** is the due date of the draft project report and demo, with interviews and presentations to be held the last week of class.