

SCHOOL OF BUSINESS ADMINISTRATION
MANAGEMENT AND MARKETING DEPARTMENT
UNIVERSITY OF MISSISSIPPI
FALL 2006

COURSE NUMBER: MIS 619
COURSE TITLE: Advanced Information Systems Management
INSTRUCTOR: Sumali Conlon; <http://faculty.bus.olemiss.edu/sconlon/>
Notes <http://student.bus.olemiss.edu/files/Conlon/>
Office: Holman 247, Phone: 915-5470; e-mail: sconlon@bus.olemiss.edu
Office Hours: 2:00-4:00 MW and by appointment

REQUIRED TEXTS:

1. Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, 5/E ISBN: 0321369572; Publisher: Addison-Wesley; 2006.
2. Joline Morrison, Mike Morrison, Rocky Conrad, Guide to Oracle 10g, ISBN: 0619216298; Publisher: Course Technology; 5 edition (August 16, 2005)
3. Journal articles (about 35 articles)

DESCRIPTION OF COURSE:

A study of data structures, file processing, databases and database management systems within organizations. The course covers all logical models of database, i.e., hierarchical, network, relational, and object-oriented models. Students will have experience practicing data analysis, design, implementation, and administration. This course will also cover advanced database technology including query optimization, recovery, integrity, concurrency, security, distributed databases and client/server systems, data mining and data warehousing, knowledge base, and text-based intelligent systems.

PREREQUISITE: MIS 609 or consent of instructor

OBJECTIVES: The major objectives of this course are:

1. Understanding Database Management Systems (DBMS).
2. Understanding various data models (hierarchical, network, relational, object-oriented).
3. Experience in database design and implementation
4. Application of DBMS techniques in various areas
5. Understanding of advanced database technologies.

CLASS MEETINGS: Tuesday at 6:00 - 8:30 (Conner 13)

TEACHING METHOD:

1. Lecture and discussion in class
2. Homework
3. Students will practice database development by using Oracle
4. Class presentations

POLICY

1. CHEATING:

1. Minimum penalty for cheating on out of class assignments is zero credit for that assignment.

2. Minimum penalty for cheating on exams is an F in the course.

2. GRADING SCALE:

| | | Score includes | |
|---|------------|---------------------------------------|-----|
| A | 90% - 100% | Midterm exam | 20% |
| B | 80% - 89% | Final exam | 20% |
| C | 70% - 79% | HW and first Oracle project | 20% |
| D | 60% - 69% | Second Oracle project (MBA) | |
| F | Below 60% | or research paper (Ph.D.) | 20% |
| | | Class participation and presentations | 20% |

PROJECTS:

Masters Students: Two projects

Ph.D. students: One project, one research paper, and presentations

TOPICS COVERED: The following is a description of the topics to be covered and the number of hours that will be spent on each topic:

| Topics | Hours |
|--|----------|
| Part 1 - Introduction and Conceptual Modeling | 4 |
| Chapter 1 - Databases and Database Users | |
| Chapter 2 - Database System Concepts and Architecture | |
| Chapter 3 - Data Modeling Using the Entity-Relationship (ER) Model | |
| Chapter 4 - The Enhanced Entity-Relationship (EER) Model | |
| Part 2- Relational Model: Concepts, Constraints, Languages, Design, and Programming | 6 |
| Chapter 5 - The Relational Data Model and Relational Database Constraints | |
| Chapter 6 - The Relational Algebra and Relational Calculus | |
| Chapter 7 - Relational Database Design by ER and EER-to-Relational Mapping | |
| Chapter 8 - SQL-99: Schema Definition, Constraints, Queries, and Views | |
| Chapter 9 - Introduction to SQL Programming Techniques | |
| Part 3 - Database Design Theory and Methodology | 6 |
| Chapter 10 - Functional Dependencies and Normalization for Relational Databases | |
| Chapter 11 - Relational Database Design Algorithms and Further Dependencies | |
| Chapter 12 - Practical Database Design Methodology and Use of UML Diagrams | |
| Part 4 - Data Storage, Indexing, Query Processing, and Physical Design | 4 |
| Chapter 13 - Disk Storage, Basic File Structures, and Hashing | |
| Chapter 14 - Indexing Structures for Files | |

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| Chapter 15 - Algorithms for Query Processing and Optimization | |
| Chapter 16 - Physical Database Design and Tuning | |
| Part 5 - Transaction Processing Concepts | 4 |
| Chapter 17 - Introduction to Transaction Processing Concepts and Theory | |
| Chapter 18 - Concurrency Control Techniques | |
| Chapter 19 - Database Recovery Techniques | |
| Part 6 - Object and Object-Relational Databases | 4 |
| Chapter 20 - Concepts for Object Databases | |
| Chapter 21 Object Database Standards, Languages, and Design | |
| Chapter 22 - Object-Relational and Extended-Relational Systems | |
| Part 7 - Further Topics: Security, Advanced Modeling, and Distribution | 4 |
| Chapter 23 - Database Security | |
| Chapter 24 - Enhanced Data Models for Advanced Applications | |
| Chapter 25 - Distributed Databases and Client-Server Architectures | |
| Part 8 - Emerging Technologies | 3 |
| Chapter 26 - Web Database Programming Using PHP | |
| Chapter 27 - XML: Extensible Markup Language | |
| Chapter 28 - Data Mining Concepts | |
| Chapter 29 - Overview of Data Warehousing and OLAP | |
| Chapter 30 - Emerging Database Technologies and Applications | |
| Oracle implementations | <u>5</u> |
| Total | 40 |

Reading Lists (Tentative):

1. Aho A. V., C. Beeri and J. D. Ullman, "The Theory of Joins in Relational Databases." ACM Transactions on Database Systems, Vol. 4, No. 3, September 1979, Pages 297-314.
2. Armstrong W. W., "Decompositions and Functional Dependencies in Relations." ACM Transactions on Database Systems, Vol. 5, No. 4, December 1980, Pages 404-430.
3. Adam, Nabil R., Aryya Gangopadhyay, and Lames Clifford., "A Form-Based Approach to Natural Language Query Processing," *JMIS*/Fall 1994, Vol 11, No2, pp. 109-135.
4. Bernstein, P., "Synthesizing Third Normal Form Relations from Functional Dependencies," *ACM-TODS*, 1:4, December, 1976.
5. Bertino, E., Negri, M., Pelagatti, G., and Sbatella, L., "Object-Oriented Query Languages: The Notion and the Issues," *IEEE-TKDE*, 4:3, June, 1992
6. Bonifat, Angela, F. Cattaneo, S. Ceri, A. Fuggetta, AND S. Paraboschi. "Designing Data Marts or Data Warehouses" ACM Transactions on Software Engineering and Methodology, Vol. 10, No. 4, October 2001, Pages 452-483.

7. Bontempo, Charles and George Zagelew, "The IBM data warehouse architecture" pp. 38 – 48, *Communications of the ACM*, Volume 41, No. 9 (Sep. 1998).
8. Brachman, Ronald J., Tom Khabaza, Willi Kloeegen, Gregory Piatetsky-Shapiro and Evangelos Simoudis, "Mining business databases" pp. 42 – 48, *Communications of the ACM*, Volume 39, No. 11 (Nov. 1996).
9. Chen, P., "The Entity Relationship Mode - Toward a Unified View of Data," *TODS*, 1:1, March, 1976.
10. Codd, E. F., "Is Your DBMS Really Relational?" and "Does Your DBMS Run By the Rules?," *Computer World*, October 14 and October 21, 1985.
11. Codd, E. F., "Extending the Database Relational Model to Capture More Meaning," *ACM Transactions on Database Systems*, Vol. 4, No. 4, December 1979, Pages 397-434.
12. Delobel CLAUDE, "Normalization and Hierarchical Dependencies in the Relational Data Model," *ACM Transactions on Database Systems*, Vol. 3, No. 3, September 1978, Pages 201-222.
13. Deux, O. et al., "The Story of O₂" *IEEE-TKDE*, 1990.
14. Jochen Dirre, Peter Gerstl, Roland Seiffert. "Text mining: finding nuggets in mountains of textual data." *Proceedings of the fifth ACM SIGKDD international conference on Knowledge discovery and data mining*, 1999. pp 398-401.
15. Ein-Dor, Phiollip and Israel Spiegler, "Natural Language Access to Multiple Databases: A Model and Prototype," *JMIS/Summer 1995*, Vol 12, No 1, pp. 171-197.
16. Fagin, Ronald., "A Normal Form for Relational Databases That Is Based on Domains and Keys," *ACM Transactions on Database Systems*, Vol. 6, No. 3, September 1981, Pages 387-415.
17. Fagin, Ronald., "Multivalued Dependencies and a New Normal Form for Relatknal Databases," *ACM Transactions on Database Systems*, Vol. 2, No. 3, September 1977, Pages 262-278.
18. Fayyad Usama, David Haussler and Paul Stolorz, "Mining scientific data", *Communications of the ACM*, Volume 39, No. 11 (Nov. 1996), pp. 51 – 57.
19. Fayyad, Usama and Ramasamy Uthurusamy, "Data mining and knowledge discovery in databases," *Communications of the ACM*, Volume 39, No. 11 (Nov. 1996), pp. 24 – 26.
20. Fayyad, Usama, Gregory Piatetsky-Shapiro, and Padhraic Smyth, "The KDD process for extracting useful knowledge from volumes of data," *Communications of the ACM*, Volume 39, No. 11 (Nov. 1996), pp. 27 – 34.
21. Gardner, Stephen R., "Building the data warehouse," *Communications of the ACM*, Volume 41, No. 9 (Sep. 1998), pp. 52 – 60.

22. Glymour, Clark, David Madigan, Daryl Pregibon and Padhraic Smyth, "Statistical inference and data mining," *Communications of the ACM*, Volume 39, No. 11 (Nov. 1996), pp. 35 – 41.
23. Hammer, M. and McLeod, D., "Database Description with SDM: A Semantic Data Model," *TODS*, 6:3, September, 1980
24. Imielinski, Tomasz and Heikki Mannila. "A database perspective on knowledge discovery," *Communications of the ACM*, Volume 39, No. 11 (Nov. 1996), pp. 58 – 64.
25. Inmon, W. H., "The data warehouse and data mining." *Communications of the ACM*, Volume 39, No. 11 (Nov. 1996), pp. 49 – 50.
26. Inmon, W.H. Building the Data Warehouse. Second ed. John Wiley & Sons, Inc., 1996.
27. Kim, W., Garza, J., Ballou, N., and Woelk, D., "Architecture of the ORION Next Generation Database System," *IEEE-KDE*, 2:1, March, 1990.
28. Kimball, Ralph. The Data Warehouse Toolkit. First ed. John Wiley & Sons, Inc., 1996.
29. Knight, Kevin. "Mining online text," *Communications of the ACM*, Volume 42, No. 11 (Nov. 1999). pp. 58 – 61.
30. Lam, W. M. Ruiz, and P. Srinivasan, "Automatic Text Categorization and Its Application to Text Retrieval," pp. *IEEE-KDE*, Vol. 11, No. 6, November/December 1999.
31. Ling Tok-wang, Frank w. Tompa, and Tiko Kameda. "An Improved Third Normal Form for Relational Databases." *ACM Transactions on Database Systems*, Vol. 6, No. 2, June 1981, Pages 329-346.
32. Lie, Håkon Wium and Janne Saarela, "Multipurpose Web publishing using HTML, XML, and CSS," *Communications of the ACM*, Volume 42, No. 10 (Oct. 1999). pp. 95 – 101.
33. Mitchell, Tom M., "Machine learning and data mining" *Communications of the ACM*, Volume 42, No. 11 (Nov. 1999). pp. 30-36.
34. Nanduri, Sastry and Spencer Rugaber, "Requirements Validation via Automated Natural Language Parsing," *JMIS/Winter1995-1996*, Vol 12, No 3, pp 9-19.
35. Oren Etzioni, "The World-Wide Web quagmire or gold mine?" *Communications of the ACM*, Volume 39, No. 11 (Nov. 1996), pp. 65 – 68.
36. Scott Jim, "Warehousing over the Web," *Communications of the ACM*, Volume 41, No. 9 (Sep. 1998), pp. 64 – 65.
37. Sutter, James R., "Project-based warehouses," *Communications of the ACM*, Volume 41, No. 9 (Sep. 1998), pp. 49 – 51.

The School of Business Administration upholds honor and academic integrity in all of its teaching, research, and service activities. All business faculty, staff, and students are charged with the responsibility to behave with personal and professional integrity and to refrain from dishonorable conduct.