## 

CSC/CIS 384

Data Base Design

Course Syllabus

#### Course Information

#### ***DATA BASE DESIGN***

#### **Winter 2010, January 6, 2010 to April 20, 2010**

#### **Lecture: Tuesdays, Thursdays 4:00 – 5:15 (MSB-104)**

###### Instructor Information

**Instructor:** Murali Mani, MSB 102B

**E-mail:** mmani@umflint.edu

**Phone:** (810) 762-0606

**Office Hours:** Tuesdays: 5:15 – 6:00,

Wednesdays: 2:30 – 3:30

Thursdays: 2:30 – 3:30

Or by appointment

###### Texts and Assigned Readings

**Texts (required):**

1. Database Design, Application, Development & Administration (3rd Edition) by Michael V. Mannino, McGraw-Hill Higher Education, 2007.

ISBN 978-0-07-294220-0

There are several other excellent textbooks for introductory databases.

* Database Management Systems. Third Edition (information and additional resources available online at http://www.cs.wisc.edu/~dbbook/) by Raghu Ramakrishnan and Johannes Gehrke, McGraw-Hill
* *Database Systems: The Complete Book*, by Hector Garcia-Molina, Jeffrey D. Ullman, and Jennifer Widom, Prentice Hall.
* *Fundamentals of Database Systems*, by Ramez Elmasri and Shamkant Navathe, Addison Wesley.
* *An Introduction to Database Systems*, by C. J. Date, Addison Wesley.

###### Course Overview

**Course Description**

This course introduces students to foundational aspects of database design, focusing on relational databases and SQL. The course will cover topics related to data modeling, including conceptual modeling techniques, designing relational databases, normalization, query formulation including relational algebra operators, and application development with relational databases.

While we primarily concentrate on relational DBMSs, we may possibly also touch on selected topics from the current database research literature, such as distributed databases, web databases, object-relational databases, decision support systems, data warehousing, data mining, based on available time and interests of the students.

Quantitative examples and hands-on assignments will be given.

**Course Objectives**

This course provides students with a foundation for hands-on study of data base management systems. The course covers the concepts of database management, the relational data model, data base modeling, and application development. Upon completion of this course, you will be able to:

* Explain a formal database design methodology.
* Transform application requirements into a database design using ER-Model.
* Construct and evaluate entity-relationship diagrams.
* Transform ER schema to Relational database.
* Demonstrate ability to design a database to solve an information problem, by applying the relational model.
* Normalize the database to improve performance.
* Introduce techniques to eliminate joins and improve overall data access when joining tables
* Implement and manipulate database using Structured Query language (SQL).
* Introduce physical database design, query optimization and index selection.
* Introduce advanced SQL features such as views, stored procedures (PL/SQL) and triggers.
* Introduce Transaction Management.

**Attaining the Course Objectives**

To pursue the course objectives effectively, students will engage in the following activities:

1. Read assigned material for each class session;
2. Complete individual assignments and submit them on time;
3. Complete a midterm examination;
4. Complete a final examination.

Summary of Grading Scheme

|  |  |
| --- | --- |
| Homeworks | 30% |
| Mid-Term | 30% |
| Final Exam | 40% |

Homework and project assignment descriptions will be available from the course web site. Students are expected to view/download the assignments. Failing to check the course web site is not an acceptable excuse for late submission, or missing exams.

**Grading Scale: (inclusive)**

|  |  |
| --- | --- |
| A+ | 97-100 |
| A | 92–96 |
| A- | 90–91 |
| B+ | 88–89 |
| B | 82–87 |
| B- | 80–81 |
| C+ | 78–79 |
| C | 72–77 |
| C- | 70–71 |
| D+ | 68–69 |
| D | 60–67 |
| E | 0–59 |

*Grading may be curved if the class performance warrants it. Curving can only improve grades from the grading scale above.*

Course Calendar/Schedule

#### ***Winter Semester January 6, 2010 to April 20, 2010***

|  |  |  |  |
| --- | --- | --- | --- |
| # | Date | TOPIC/ACTIVITY | READING |
| 1 | Jan 7 – Jan 12 | Introduction and Course Overview  Oracle Setup | Chapter 1 |
| 2 | Jan 14 | Introduction to Data Base Development | Chapter 2 |
| 3 | Jan 19 | Introduction to the Relational Model; SQL DDL (Data Definition Language) | Chapter 3.1 – 3.3 |
| 4 | Jan 21 – Jan 26 | Conceptual Modeling: Entity Relationship Model | Chapter 5.1 – 5.4 |
| 5 | Jan 28 – Feb 2 | Business Data Modeling  Refining and Finalizing ERD  Converting ERD to Relational Tables | Chapter 6 |
| 6 | Feb 4 – Feb 9 | Normalization | Chapter 7 |
| 7 | Feb 11 – Feb 16 | Relational Algebra Operators | Chapter 3.4 |
| 8 | Feb 18 – Feb 25 | SQL DML (Data Manipulation Language) | Chapter 4 |
|  | Feb 23 | **MID-TERM** | Chapters 1 – 6 (Except 4) |
| 9 | Mar 9 – Mar 11 | File Structures; Query Optimization Overview; Index Selection | Chapter 8 |
| 10 | Mar 16 – Mar 18 | Advanced Query Formulation; Nested Queries; | Chapter 9 |
| 11 | Mar 23 – Mar 25 | Views | Chapter 10 |
| 12 | Mar 30 – Apr 1 | Database Programming Languages; Stored Procedures; Triggers | Chapter 11 |
| 13 | Apr 6 – Apr 8 | Database Design for Larger Business Problems | Chapter 12; Chapter 13 |
| 14 | Apr 13 – Apr 20 | DB Administration and Transaction Management | Chapter 14, Chapter 15 |
|  | Apr 27, 4:15 – 6:45 | **FINAL EXAM** | Comprehensive |

###### Course Policy

#### **General Policies:**

* Individual Assignments must be completely finished to pass the course. On time delivery of complete documentation is expected. Specific criteria for the deliverables will be provided prior to the work assignments.
* The topics listed in the syllabus are only an estimate of the material, which can be covered during the semester. Some topics might be deleted and some others might be added at the discretion of the instructor.
* Teamwork and collegiality are encouraged but everyone must understand and be responsible for their work, actions and work products; observations of the Academic Integrity Policy are mandatory.
* All other University policies regarding incomplete grades, etc. apply.

**Academic Integrity** (http://www.umflint.edu/departments/catalog/)

Intellectual integrity is the most fundamental value of an academic community. Students and faculty alike are expected to uphold the highest standards of honesty and integrity in their scholarship. No departure from the highest standards of intellectual integrity, whether by cheating, plagiarism, fabrication, falsification, or aiding and abetting dishonesty by another person, can be tolerated in a community of scholars. Such transgressions may result in action ranging from reduced grade or failure of a course, to expulsion from the University or revocation of degree.

It is the responsibility of all students and faculty to know the policies on academic integrity in the instructional units at the University of Michigan-Flint. Information about these policies and the appeals process is available from the appropriate administrative office of the instructional units: in the College of Arts and Sciences, the Office of the Dean of the College of Arts and Sciences; in the School of Education and Human Services, the Office of the Dean of the School of Education and Human Services; in the School of Management, the Office of the Dean of the School of Management; in the School of Health Professions and Studies, the Office of the Dean of the School of Health Professions and Studies and for graduate students, the Office of the Dean of Graduate Programs.

Departments and programs within these instructional units may have specific policies and procedures which further delineate academic integrity. In such cases students are bound by the University policy on academic integrity as well as these department or program policies.

**Procedural Rights of the Accused Student.** A student who is charged with academic dishonesty by an instructor, administrator, or another student may be assured that he/she has the right to a fair hearing of the charges and the evidence, the right to question witnesses, to invite witnesses on his/her behalf, and to introduce whatever other evidence may be relevant to the charge.

**Code of Academic Conduct.** The University, like all communities, functions best when its members treat one another with honesty, fairness, respect, and trust. Therefore, an individual should realize that deception for the purpose of individual gain is an offense against the members of the community. Such dishonesty includes:

**Plagiarism:** taking credit for someone else’s work or ideas, submitting a piece of work (for example, an essay, research paper, assignment, laboratory report) which in part or in whole is not entirely the student’s own work without fully and accurately attributing those same portions to their correct source.

**Cheating:** using unauthorized notes, or study aids, or information from another student or student’s paper on an examination; altering a graded work after it has been returned, then submitting the work for regrading; allowing another person to do one’s work, then submitting the work under one’s own name.

**Fabrication:** fabricating data; selectively reporting or omitting conflicting data for deceptive purposes; presenting data in a piece of work when the data were not gathered in accordance with guidelines defining the appropriate methods of collecting or generating data; failing to include a substantially accurate account of the method by which the data were gathered or collected.

**Aiding and Abetting Dishonesty:** providing material or information to another person when it should reasonably be expected that such action could result in these materials or information being used in a manner that would violate this code of academic integrity.

**Falsification of Records and Official Documents:** altering documents affecting academic records; forging a signature of authorization or falsifying or omitting necessary information on an official academic document, election form, grade report, letter of permission, petition, or any document designed to meet or exempt a student from an established College or University academic regulation; falsification or unauthorized altering of information in any official academic computer file.

**Identity Theft:** Assuming another person’s identity or role through deception or without proper authorization. Communicating or acting under the guise, name, identification, email address, signature, or indicia of another person without proper authorization, or communicating under the rubric of an organization, entity, or unit that you do not have the authority to represent.

**Misrepresentation and Other Acts of Academic Dishonesty:**

Fraudulently obtaining and/or using academic materials that would give oneself an unfair advantage over other students or would deceive the person evaluating one’s academic performance.

**Attempts.** An attempt to commit an act prohibited by this code may be punished to the same extent as a completed violation.

**Incomplete Course Work:**

A student whose work is incomplete in a minor way at the end of the term may receive an I (Incomplete). If the student fails to complete the required work by the end of the six-week period, which begins after the last day of examinations, then the final grade is an E, unless the quantity and quality of all work completed merits a passing grade, as determined by the instructor. In extenuating circumstances, the Academic Review Committee may grant an extension of time. The student’s petition must be endorsed by the Instructor and received by the Committee before the date above.

**Classroom Etiquette:**

* + Bringing children or visitors to class is OK with advance notice to the instructor.
  + I strongly encourage all electronic devices (pagers, cell phones, etc.) to be turned off during class sessions.
  + Recording devices are allowed in class sessions with prior permission and minimal intrusion.

**Accessibility Issues:**

It is my intention to support the full participation of all students in the learning process of this class. Students with disabilities that may restrict their full participation in course activities are encouraged to meet with the instructor or to contact the Office of Accessibility Services (part of the Student Development Center, located at UCEN 264 University Center, 762-3456).

**Available Support Services:**

There is a plethora of support services available to students from tutoring to mental health services. Many times students are unaware of the services available to them. One such service is tutoring:

http://www.umflint.edu/studentdevelopment/tutorial\_services.htm

For other services, please check

http://www.umflint.edu/studentdevelopment/tutoring\_schedule.htm

**Notes:**

The instructor reserves the right to modify course policies, the course calendar, assignment point values, and due dates. Any extenuating circumstances that hinder your participation in the course should be discussed with me as soon as those circumstances are known. Make-ups for graded activities may be arranged if an absence is caused by documented illness or personal emergency. A written explanation, including supporting documentation, must be submitted to me; if the explanation is acceptable, then an alternative to the graded activity will be arranged. Whenever possible, make-up arrangements must be completed prior to the scheduled activity.

Only properly documented reasons may be a valid cause to change the exam or other grading requirements of this course for possible make-up or some re-arrangements. Taking a vacation early is NOT a valid excuse to change any of the above.