COSC 304 - Introduction to Database Management Systems
Winter 2008 Term 1

Instructor: **Dr. Ramon Lawrence**
Class Schedule: 12:30 p.m. – 2:00 p.m. Monday/Wednesday
Location: FIP 239
Lab time/location: 9:00 a.m. – 11:00 a.m. Tuesdays at SCI 234
Office Hours: 2:00–3:30 p.m. Monday/Wednesday or by appointment
Office Location: SCI 263
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Course URL: http://people.ok.ubc.ca/rlawrenc/304/

Course Description
Official Calendar: Introduction to the use and operating principles of database management systems. Semantic modeling; query languages; relational calculus and algebra as applied to the database design, implementation, and access. Hands-on experience in accessing information using a query language. OUC equivalent: COSC 304.

Specific description: This course provides an introduction to database systems including database querying, design, and programming. The course consists of three major components. The first component explains databases from a user perspective including how to query using SQL, relational algebra, and other query languages. The second component involves designing relational databases using Entity-Relationship (ER) diagrams and other modeling languages. The last part involves database programming with current technologies such as JDBC, XML, and JSP. Students completing the course have experience with current database technologies, and the ability to use and develop databases and associated applications.

Prerequisite
- COSC 222 – Computer Data Structures

Marking and Evaluation
Assignments	**20 %**	
Project	**20 %**	
Two Midterm Exams	**30 %**	(in class, 15% each)
Final Exam	**30 %**	(cumulative, two hours)

Textbook and Reference Material (*Optional*)
Recommended: Thomas Connolly and Carolyn Begg, *Database Systems: A Practical Approach to Design, Implementation, and Management,* Addison Wesley, 4th edition, ISBN 0-321-29401-7, 2005.

Alternate Textbook: Hector Garcia-Molina, Jeffrey Ullman and Jennifer Widom, *Database Systems: The Complete Book*, Prentice Hall, ISBN 0-130-31995-3.

Expectations

- I expect students to attend **all** classes and prepare before attending class. This includes reading relevant sections of the textbook and reviewing notes from previous lectures.
- I recommend all students download and read a copy of the lecture notes **before** the lecture.
- I expect all students to learn the material in the course and undertake sufficient effort to produce all the programming assignments and quality projects.
- I want all students to enjoy attending class and feel free to participate according to their own personalities. Feel free to ask questions by raising your hand or speaking out at appropriate times.
- Please actively participate in class discussions, questions, and problem solving exercises.
- **I want all students to pass the course, receive a good grade, and feel the course was beneficial.**

Homework Expectation

For this course, it is expected that you will spend *at least six hours per week in out-of-class preparation*.

Grievances and Complaints Procedures

A student who has a complaint related to this course should follow the procedures summarized below.

• The student should attempt to resolve the matter with the instructor first. Students may talk first to someone other than the instructor if they do not feel, for whatever reason, that they can directly approach the instructor.

• If the complaint is not resolved to the student's satisfaction, the student should go to the departmental chair Barbara Rutherford, at ART 334, 807-8734.

Your Responsibilities

Your responsibilities to this class and to your education as a whole include attendance and participation. You have a responsibility to help create a classroom environment where all may learn. At the most basic level, this means you will respect the other members of the class and the instructor and treat them with the courtesy you hope to receive in return. Inappropriate classroom behavior may include: disruption of the classroom atmosphere, engaging in non-class activities, talking on a cell-phone, inappropriate use of profanity in classroom discussion, use of abusive or disrespectful language toward the instructor, a student in the class, or about other individuals or groups.

Academic Integrity

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the break down of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences. A more detailed description of academic integrity, including the policies and procedures, may be found at http://web.ubc.ca/okanagan/faculties/resources/academicintegrity.html. **If you have any questions about how academic integrity applies to this course, please consult with your professor.**

Disability Services

If you require disability-related accommodations to meet the course objectives please contact the Coordinator of Disability Resources located in the Student development and Advising area of the student services building. For more information about Disability Resources or about academic accommodations visit http://okanagan.students.ubc.ca/current/disres.cfm.

Missing an Exam

Only students who miss an exam for a reason that corresponds to the University of British Columbia Okanagan's policy on excused absences from examinations will be permitted to take the exam at a later time. A make-up exam may have a question format different from the regular exam. If the reason for absence is satisfactory, the student may either take the exam, or if a midterm exam is missed, the student's final exam will be worth more of the final grade.

Course Outline

The course has a substantial amount of material to be covered in a short time. This requires the student make a strong effort to keep up with the material discussed in class. Below is an outline of the topics. The professor is not bound to these topics and timelines as they only serve as a general reference.

Date	Topics Covered and Description
September 3 (W)	**First day of classes. Introduction to course/databases** (Chapters 1 and 2)
September 8 (M)	Relational Model - Schemas, Keys, Constraints, Integrity (Sections 3.1-3.3) Relational Algebra - Select, Project, Set Operations (Section 4.1)
September 10 (W)	Relational Algebra – Cartesian Product, Joins (Section 4.1)
September 15 (M)	Relational Algebra – Outer joins, Division operator, Practice Questions (Section 4.1)
September 17 (W)	SQL DDL – Create table, constraints, create indexes, Insert/Delete/Update (Chapter 6)
September 22 (M)	SQL - Simple Queries, LIKE operator, Set Operations, Order By (Sections 5.1-5.3)
September 24 (W)	SQL - Group By, Aggregate Functions (Sections 5.1-5.3)
September 29 (M)	SQL - Subqueries, Outer joins (Section 5.3)
October 1 (W)	Database Design – General Approach (Chapters 9 and 10) ER and UML Modeling (Chapter 11)
October 6 (M)	ER and UML Modeling examples and questions EER Design - Specialization, Generalization, Aggregation (Chapter 12)
October 8 (W)	ER/EER Mapping to Relational model
October 13 (M)	**No class for Thanksgiving.**
October 15 (W)	**Midterm Exam #1 In-Class**
October 20 (M)	Database and Web Programming – JDBC, ODBC (Appendix E, Section 29.7)
October 22 (W)	Database and Web Programming – Web servers/databases, JSP/servlets (Chapter 29)
October 27 (M)	Database and Web Programming (cont.)
October 29 (W)	Relational Design - Functional Dependencies and Normalization (Chapters 13 and 14)
November 3 (M)	Relational Design (cont.) – 1NF, 2NF, 3NF, BCNF, 4NF, 5NF
November 5 (W)	**Midterm Exam #2 In-Class**
November 10 (M)	**No class for Midterm Break.**
November 12 (W)	Advanced SQL DDL – Triggers, Views, and Security
November 17 (M)	**Initial Project Demonstrations.**
November 19 (W)	Advanced SQL – recursion, object-relational databases, transactions
November 24 (M)	Introduction to XML, XPath, and XQuery
November 26 (W)	**Final Project Demonstrations. Final Exam Review.**
OPTIONAL	Data warehousing and Data Mining (Parts of Chapters 31-34)
OPTIONAL	Database System Implementation – Storage, Transactions, Concurrency, Recovery

Laboratory times: The laboratory time will be primarily spent performing lab assignments. The start of the lab will contain a description of the topic being currently covered and some practice questions. The remaining time in the lab is dedicated to allowing students to work on the current lab assignment. The majority of labs involve hands-on use of a database system, programming language, or query tool.

Week	Dates	Topics Covered and Description
1	September 9	Lab 1: Querying using relational algebra
2	September 16	Lab 1: Querying using relational algebra (cont.)
3	September 23	Lab 2: Creating tables using SQL and MySQL
4	September 30	Lab 3: Writing SQL queries on a MySQL database
5	October 7	Lab 4: Building ER diagrams using the JUDE UML modeling tool
6	October 14	Lab 5: Converting ER/UML diagrams into the relational model
7	October 21	Lab 6: Using Java/JDBC to connect to databases Introduction to Microsoft SQL Server
8	October 28	Lab 7: Building your own database-enabled web site using JSP
9	November 4	Lab 8: Database Normalization
10	November 11	**No Lab on Remembrance Day**
11	November 18	Lab 9: Using SQL transactions and triggers
12	November 25	Lab 10: XML, XPath, and XQuery