COSC 304 - Introduction to Database Management Systems
Winter 2012 Term 1

Instructor:	**Dr. Ramon Lawrence**
Class Schedule:	12:30 p.m. – 2:00 p.m. Wednesday/Friday
Location:	EME 1101
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:	ASC 349
Phone:	807-9390
E-mail:	ramon.lawrence@ubc.ca (preferred contact method)
Course URL:	http://people.ok.ubc.ca/rlawrenc/304/

Course Description

Official Calendar: Database systems from user/developer perspective: querying using SQL and relational algebra, design using ER/UML diagrams and normalization, and programming using database APIs. Construction of database-driven applications and websites and experience with current database technologies.

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 and relational algebra. The second component involves designing relational databases using Entity-Relationship (ER) diagrams and UML. The last part involves database and web programming with Java, JDBC, 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, three hours)

Textbook and Reference Material:

- All notes are distributed as a course pack available at the book store.
- A text book is ***not required*** although the notes are based on the following textbooks:

  Thomas Connolly and Carolyn Begg, *Database Systems: A Practical Approach to Design, Implementation, and Management*, Addison Wesley, 5th edition, ISBN 0-321-52306-7, 2009.

  Hector Garcia-Molina, Jeffrey Ullman and Jennifer Widom, *Database Systems: The Complete Book (2nd edition)*, Prentice Hall, ISBN 0-131-87325-3, 2008.

Expectations

- Attend **all** classes and prepare before attending class.
- Read the lecture notes **before** the lecture.
- Learn the material in the course by completing all assignments.
- Enjoy attending class and feel free to participate according to your 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 Sylvie Desjardins at SCI 388, 807-8767.

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.

Equity, Human Rights, Discrimination and Harassment

UBC does not condone discrimination or harassment in classrooms, living or work environments on campus. For information about UBC's policies related to equity, human rights, discrimination or harassment please contact:
Equity Advisor: ph. 250-807-9291; email equity.ubco@ubc.ca Web: www.ubc.ca/okanagan/equity

Missing an Exam

Only students who miss an exam for a reason that corresponds to the UBC 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, which requires a strong effort to keep up. Below is an outline of topics. The professor is not bound to this timeline which serves only as a general reference.

Date	Topics Covered and Description
September 5 (W)	**First day of classes. Introduction to course/databases**
September 7 (F)	Relational Model - Schemas, Keys, Constraints, Integrity Relational Algebra - Select, Project
September 12 (W)	Relational Algebra – Set Operations, Cartesian Product, Outer Joins, Division
September 14 (F)	Relational Algebra – Practice Questions
September 19 (W)	SQL DDL – Create table, constraints, create indexes, Insert/Delete/Update
September 21 (F)	SQL - Simple Queries, LIKE operator, Set Operations, Order By
September 26 (W)	SQL - Group By, Aggregate Functions
September 28 (F)	SQL - Subqueries, Outer joins
October 3 (W)	Database Design – General Approach ; ER and UML Modeling
October 5 (F)	ER and UML Modeling examples and questions
October 10 (W)	**Midterm Exam #1 In-Class**
October 12 (F)	EER Design - Specialization, Generalization, Aggregation ER/EER Mapping to Relational model
October 17 (W)	Database and Web Programming using Java/JDBC
October 19 (F)	Database and Web Programming – Web servers/databases, JSP/servlets
October 24 (W)	Database and Web Programming – Web servers/databases, JSP/servlets
October 26 (F)	JSON, NoSQL Databases
October 31 (W)	Relational Design - Functional Dependencies and Normalization
November 2 (F)	**Midterm Exam #2 In-Class**
November 7 (W)	Relational Design (cont.) – 1NF, 2NF, 3NF, BCNF
November 9 (F)	Advanced SQL DDL – Triggers, Views, and Security
November 14 (W)	Advanced SQL – recursion, object-relational databases, transactions
November 16 (F)	**Initial Project Demonstrations.**
November 21 (W)	Introduction to XML
November 23 (F)	XPath and XQuery
November 28 (W)	Data warehousing and Data Mining Database System Implementation – Storage, Transactions, Concurrency, Recovery
November 30 (F)	**Final Project Demonstrations. Final Exam Review.**

Laboratory times: The laboratory time will be primarily spent performing lab assignments and practice questions. 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 4	**No Lab during First Week of Class**
2	September 11	Lab 1: Querying using relational algebra
3	September 18	Lab 1: Querying using relational algebra (cont.)
4	September 25	Lab 2: Creating tables using SQL and MySQL
5	October 2	Lab 3: Writing SQL queries on a MySQL database
6	October 9	Lab 4: Building ER diagrams using the JUDE UML modeling tool
7	October 16	Lab 5: Converting ER/UML diagrams into the relational model
8	October 23	Lab 6: Using Java/JDBC with MySQL and Microsoft SQL Server
9	October 30	Lab 7: Building your own database-enabled web site using JSP (cont.)
10	November 6	Lab 7: Building your own database-enabled web site using JSP (cont.)
11	November 13	Lab 8: Database Normalization
12	November 20	Lab 9: Using SQL transactions and triggers
13	November 27	Lab 10: XML, XPath, and XQuery