COMPSCI 751 Advanced Database Systems

Course Outline

Schedule

First Semester 2017.

For current timetable and rooms please refer to university timetabling system; please watch out for room changes in the first week of semester.

Assessment

Tests 20%, Labs 4%, Report 20%, Assignment 8%, Exam 48%. You must pass both exam and practical (combined coursework).

Description

This course is about database management systems. It covers data organisation, query processing, transactions and advanced database concepts.

Contents

Relational model, Relational Algebra, Relational Calculus, SQL, Entity Relationship Model, Normalization, Query Processing and Query Optimization, Physical Database Design, Transaction Management, ACID Transactions, Transaction Isolation Levels, Database Recovery, Distributed Databases.

Coursework 2017

- **751 Report:** 20% towards the final mark.
  Due: 8 May, 5pm.
- **Assignment 1**: 4% towards final mark
  Due: 30 March 2pm
- **Labs:** 4% towards final mark.
- **Test 1:** 10% towards final mark
  Date: Thursday, 13 April, during class time
  Room: to be confirmed.
- **Assignment 2**: 4% towards final mark
  Due: 24 May 2pm
- **Test 2**: 10% towards final mark
  Date: Thursday, 8 June during class time
  Room: to be confirmed.

Exam: 48% towards final mark
Closed Book, 2 hours.

Recommended Textbook

- Database Management Systems, 3ed, Raghu Ramakrishnan and Johannes Gehrke, McGraw-Hill, 2003.
- Foundations of Database Systems, 4th, Elmasri and Navathe, Addison Wesley, 2004.
- Data on the Web: From Relations to Semistructured Data and XML, Serge Abiteboul, Peter Buneman, and Dan Suciu, Morgan Kaufmann, 2000.

Lecturers

- Dr Gerald Weber - course director
- Prof Gillian Dobbie
- Prof Sebastian Link

Learning Outcomes

After successful completion of the course, students will be able to:

- Assess established and upcoming technologies in the field of databases critically.
- Transform conceptual diagrams into logical database schemata
- Normalize and de-normalize logical database schemata to process frequent database queries and database updates efficiently
- Implement logical database schemata in the industry-standard SQL in order to define, manipulate and query data according to best practice
- Declare complex database queries in relational calculus
- Exploit SQL to execute semantically sound database queries and updates
- Apply relational algebra to optimize the evaluation of database queries
- Adjust database designs to evolving requirements by using suitable evaluation strategies and physical data structures that help achieve good performance
- Understand transactions as a foundation for the concurrent execution of database programs and the recovery from system failures
- Appreciate data distribution techniques to achieve local ownership, increased availability and better performance