ITEC870

Advanced Database Applications Development

S2 Evening 2015

Dept of Computing

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General Information

Unit convenor and teaching staff
Dzung Le
dung.le@mq.edu.au
Contact via email

Credit points
4

Prerequisites
ISYS326

Corequisites

Co-badged status

Unit description
This unit builds on ISYS326. It covers a number of important areas in advanced database management technologies. The aim of this unit is to provide students with a deep understanding and practical skills of advanced database technologies by exposing students to several important areas such as object-oriented databases, relational and object-relational databases, XML databases, and data mining. This unit has two distinct components. The theoretical design of advanced database management models will be covered in lectures. The practical component provides students with hands-on experience laboratory sessions.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

To explain the differences among database technologies such as Relational databases, Object-Oriented database, Object-relational database and XML databases.
To analyse given problems and implement solutions using procedural language extension for SQL (PL/SQL) in commercial Oracle.
To design and implement functional database applications that feature advanced database system such as XML-Enabled Database using commercial Oracle
To evaluate the most common but important analytical algorithms and apply them to mine large data set problems.using open source R

Assessment Tasks

Name	Weighting	Due
Weekly Submission	10%	Weekly
Assignment 1	15%	Week 6
Mid-semester Test	25%	Week 7
Exam	50%	Exam Period

Weekly Submission

Due: **Weekly**
Weighting: **10%**

Weekly submission Due: Every Wednesday Weighting: 10% Every week, lab practical work will be made available online on the unit website on iLearn after the lecture ends. You are expected to attempt all questions in the lab and submit the solutions on the following Wednesday. Your submission will be assessed and returned with some feedback.

On successful completion you will be able to:

- To explain the differences among database technologies such as Relational databases, Object-Oriented database, Object-relational database and XML databases.
- To analyse given problems and implement solutions using procedural language extension for SQL (PL/SQL) in commercial Oracle.
- To design and implement functional database applications that feature advanced database system such as XML-Enabled Database using commercial Oracle
- To evaluate the most common but important analytical algorithms and apply them to mine large data set problems.using open source R

Assignment 1

Due: **Week 6**
Weighting: **15%**

The first assignment focuses on the work covered in weeks 1-4. It requires an implementation of a set of tasks. An execution session between the instructor and student may be allocated to provide the student an opportunity to execute their work and understand their performance. The execution data is available during the execution session.

On successful completion you will be able to:

- To explain the differences among database technologies such as Relational databases,

Object-Oriented database, Object-relational database and XML databases.
- To analyse given problems and implement solutions using procedural language extension for SQL (PL/SQL) in commercial Oracle.

Mid-semester Test

Due: **Week 7**
Weighting: **25%**

A written test is set out based the work covered from week 1 to week 6. Duration for the whole test is 1h 30 minutes (this includes 10 minutes reading).

On successful completion you will be able to:
- To explain the differences among database technologies such as Relational databases, Object-Oriented database, Object-relational database and XML databases.
- To analyse given problems and implement solutions using procedural language extension for SQL (PL/SQL) in commercial Oracle.

Exam

Due: **Exam Period**
Weighting: **50%**

A three-hour examination will be held during the usual University examination period. The topics for examination will be advised during the exam revision session.

On successful completion you will be able to:
- To explain the differences among database technologies such as Relational databases, Object-Oriented database, Object-relational database and XML databases.
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- To evaluate the most common but important analytical algorithms and apply them to mine large data set problems.using open source R

Delivery and Resources

Each week you should attend one to two hours of lectures, and one to two hours of practical labs or tutorials. For details of day, time and room, consult the timetables webpage.

Note that Practicals commence in week 2. Although attendance is not compulsory, you need to submit the completion of labs or tutorials in the following weeks before the lecture starts. Instructions of submission of your weekly work will be advised in the first lecture. The labs will allow you to practice the assigned tasks that are directly related to the weekly class topic. The weekly submission of work completion provides you an opportunity to practically learn what it has

been covered in the related topics.

The textbook for ITEC870 used this semester is: Connolly, T. and Begg, C., Database Systems - A Practical Approach to Design, Implementation and Management 5th Ed. Pearson Educational International. There is also a companion website by the publisher at www.pearsoned.com.au. This site contains links to example materials and more.

The following are supportive (i.e. recommended) readings for the course (across the 13 weeks). Material for the unit can be found at ILearn Oracle Technology Network - Database Reference Open source R

Unit Schedule

Week	Lectures	Reading
1	Introduction to Databases and Relational Model and Relational Algebra	Lecture notes Connolly & Begg chapters 1, 2, 4, 5 (optional)
2	Data Manipulation	Lecture notes Connolly & Begg chapters 6 (optional)
3	Functions, Procedures, Oracle PL/SQL	Lecture notes, samples. Reference material at Oracle 10g
4	Trigger and Exception	Lecture notes, samples. Reference material at Oracle 10g
5	Procedural Extension to SQL: Server Side Database Programing using PL/SQL	Lecture notes, samples. Refererence material at Oracle 10g
6	XML Databases: Basic Concepts and XML Enabled Databases	Lecture notes, samples. Reference technical papers
7	Mid-semester Test	
8-9	Object Relational Database	Lecture notes, samples. Reference technical papers
10-12	Data Mining with Relational/Non-relational Data	Lecture notes, samples. Reference technical papers

Learning and Teaching Activities

Week 4

Distributing Assignment 1

Week 6

Discussing questions and answers for mid-semester test

Week 7

Mid-semester test happens

Week 8-9

Assignment 1 execution test

Week 12

Discussing questions and answers for exam preparation

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy.html

Grading Policy http://mq.edu.au/policy/docs/grading/policy.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.html

Disruption to Studies Policy http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://informatics.mq.edu.au/help/.

When using the University's IT, you must adhere to the Acceptable Use Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Assessment tasks

- Mid-semester Test
- Exam

Learning and teaching activities

- Distributing Assignment 1
- Assignment 1 execution test
- Discussing questions and answers for exam preparation

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- To explain the differences among database technologies such as Relational databases, Object-Oriented database, Object-relational database and XML databases.
- To analyse given problems and implement solutions using procedural language extension for SQL (PL/SQL) in commercial Oracle.
- To design and implement functional database applications that feature advanced database system such as XML-Enabled Database using commercial Oracle

Assessment tasks

- Weekly Submission
- Assignment 1
- Mid-semester Test
- Exam

Learning and teaching activities

- Distributing Assignment 1
- Discussing questions and answers for mid-semester test
- Mid-semester test happens
- Assignment 1 execution test
- Discussing questions and answers for exam preparation

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- To explain the differences among database technologies such as Relational databases, Object-Oriented database, Object-relational database and XML databases.
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PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcomes

- To explain the differences among database technologies such as Relational databases, Object-Oriented database, Object-relational database and XML databases.
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PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcome

- To design and implement functional database applications that feature advanced database system such as XML-Enabled Database using commercial Oracle

Assessment tasks

- Mid-semester Test
- Exam

Learning and teaching activities

- Distributing Assignment 1
- Discussing questions and answers for mid-semester test
- Mid-semester test happens
- Assignment 1 execution test
- Discussing questions and answers for exam preparation

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Learning outcome

- To analyse given problems and implement solutions using procedural language extension for SQL (PL/SQL) in commercial Oracle.

Assessment tasks

- Mid-semester Test
- Exam

Learning and teaching activities

- Distributing Assignment 1
- Discussing questions and answers for mid-semester test
- Mid-semester test happens
- Assignment 1 execution test
- Discussing questions and answers for exam preparation

Standards

Grade	LO 1	LO 2	LO 3
HD	Display a depth of understanding of differences among database technologies.	Display an excellent level of utilizing skills and techniques in implementing database applications across the wide ranges of database technologies.	Display an excellent level of utilizing analytical skills and techniques in mining large data set problems.
D	Display a very good understanding of differences among database technologies.	Display a very good level of utilizing skills and techniques in implementing database applications across the wide ranges of database technologies.	Display a very good level of utilizing analytical skills and techniques in mining large data set problems.
CR	Display a better understanding of differences between database technologies.	Display an above average level of utilizing skills and techniques in implementing database applications across the wide ranges of database technologies.	Display an above average level of utilizing analytical skills and techniques in mining large data set problems.
P	Display a sound level of understanding of differences among database technologies.	Display an average level of utilizing skills and techniques in implementing database applications across the wide ranges of database technologies.	Display an average level of utilizing analytical skills and techniques in mining large data set problems.

Grading

At the end of the semester, you will receive a grade that reflects your achievement in the unit

- **Fail (F)**: does not provide evidence of attainment of all learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; and incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the discipline.
- **Pass (P)**: provides sufficient evidence of the achievement of learning outcomes. There is

demonstration of understanding and application of fundamental concepts of the field of study; and communication of information and ideas adequately in terms of the conventions of the discipline. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.

- **Credit (Cr)**: provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; plus communication of ideas fluently and clearly in terms of the conventions of the discipline.
- **Distinction (D)**: provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the discipline and the audience.
- **High Distinction (HD)**: provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application.

To obtain a grade of Pass (P) in this unit, students must:

- attempt and submit all assessment tasks;
- perform satisfactorily in all components;
- obtain a total mark of 50% or higher and a mark of 40% or higher in the final examination.

To obtain a grade higher than a Pass (P) in this unit will require students to obtain (in addition to the above):

- the required total marks of (Credit - 65, Distinction - 75, High Distinction - 85).