Consultation Times:

Subject Coordinator	Dr Tianbing Xia
Telephone Number:	0242 21 3076
Email:	txia@uow.edu.au
Location:	3.205

Dr. Xia's consultation times during session:

Day	Time
Monday	9:30-11:30
Thursday	9:30-11:30

Subject Organisation:

Session:	Autumn Session 2016
Credit Points	6
Contact hours per week:	3 hours Lecture, 2 hours Comp Lab
Lecture Times & Location:	http://www.uow.edu.au/student/timetables/index.html
Tutorial Day, Time and Location can be found at:	http://www.uow.edu.au/student/timetables/index.html

Students should check the subject's web site regularly as important information, including details of unavoidable changes in assessment requirements will be posted from time to time via Moodle http://www.uow.edu.au/student/ . Any information posted to the web site is deemed to have been notified to all students.

Subject Description:

This subject investigates the major areas of modern database systems: 1. Design and programming of relational databases 2. Design and programming of semistructured databases (XML native database systems) 3. Design and programming of distributed database systems (NoSQL database systems) 4. Concurrency control and data recovery in database systems. The following topics are included: Introduction to conceptual modelling; Principles of relational database model; Processing relational databases with Structured Query Language (SQL) and its procedural extension (PL/SQL); Principles of semistructured database model; Processing of semistructured databases with XQuery and XPath; Design and implementation of distributed database systems; normalisation of relational databases; Transaction management and recovery in database systems.

Subject Learning Outcomes:

On successful completion of this subject, students will be able to:

1. Explain the principles of relational database model.
2. Design and implement a simple relational database.
3. Use relational database programming language SQL and its procedural extension PL/SQL.
4. Design and implement a simple semistructured database.
5. Use semistructured database programming languages XQuery and XPath.
6. Normalise a relational database.
7. Explain the principles of distributed databases.
8. Design a distributed database.
9. Implemented distributed NoSQL database system.
10. Explain the principles of transaction management and database recovery.

Graduate Qualities:

"Graduate Qualities" are the aspirational qualities that students will progressively develop through their learning experiences at UOW. These Graduate Qualities are not achieved in a single subject - their development is an ongoing process across an entire program of study. This subject will contribute to the following Graduate Qualities:
Informed
Independent learners
Problem solvers
Innovation design

Further information can be found at:
http://eis.uow.edu.au/future-students/graduate-qualities/index.html

Graduate Qualities Explained:

Graduate Qualities	Covered in	Assessed in
Innovation and design	Lectures, Lab exercises	Assignments, Lab exercises, Final exam
Informed	Lectures, Lab exercises	Assignments, Lab exercises, Final exam
Independent Learners	Lab exercises	Assignments, Lab exercises, Final exam
Problem Solvers	Lab exercises, Assessments	Assignments, Lab exercises, Final exam

Recent Improvements:

SCIT is committed to ongoing improvements and is constantly monitoring feed back from students and staff.

Attendance Requirements:

It is the responsibility of students to attend all lectures/tutorials/labs/seminars/ practical work for subjects for which you are enrolled. It should be noted that the amount of time spent on each 6 credit point subject should be at least 12 hours per week, which includes lectures/tutorials/labs etc.
Satisfactory attendance is deemed by the University, to be attendance at approximately 80% of the allocated contact hours.

Optional Attendence Statement:

Attendance rolls may be kept for lectures and laboratories. If you are present for less than 80% and would have otherwise passed you need to apply for student academic consideration, otherwise a TF (technical fail) grade may be recorded.

Method of Presentation:

In order to maximize learning outcomes, it is strongly recommended that students attend all lectures.

Lecture Schedule:

Week	Topic	Reading
1	**Course information:** Database Management Systems (DBMS) what is it and why do we need it? **Database design:** conceptual modeling.	Database textbook chapters: 1, 2, 7
2	**Database design:** conceptual modeling (cont.) relational database model, logical modeling.	Database textbook, chapters: 3, 7, 8, 9, 10 Laboratory 1: Conceptual modeling with Rational Rose
3	**SQL:** Data definition statements, data entry statements, data manipulation statements, system catalogue (data dictionary)	Database textbook, chapter: 4 Laboratory 2: Accessing Oracle 12c servers and using SQL*Plus
4	**SQL:** Queries, Subquery factoring	Database textbook, chapter: 5 Laboratory 3: Using data definition and basic data manipulation statements of SQL
5	**SQL:** Relational views, Advanced DML statements, Indexing, Access control	Database textbook, chapters: 5, 17, 25 Laboratory 4: Using SELECT statement (1)
6	**PL/SQL:** data structures, control structures, programming with cursors	Oracle documentation: PL/SQL Language Reference Laboratory 5: Using SELECT statement (2), creating relationa views
7	**XML Databases:** Basics, Design principles, Logical modelling, DTD	Database textbook, chapter: 11 XML textbook. chapters: 2, 4 Laboratory 6: Using SELECT statement (3), implementaing advanced data manipulations, granting access rights
8	**XML Databases:** XML Schema, XQuery, XPath	Database textbook, chapter: 11 XML textbook chapters: 3, 6 Laboratory 7: Implementation of PL/SQL programs, stored PL/SQL procedures and functions
9	**Concurrency control in database systems:** database transactions, serializability,2 phase locking protocol, optimistic protocols, isolation levels,	Database textbook, chapters: 20, 21 Laboratory 8: Modeling XML documents and validating XML documents
10	**Concurrency control in database systems:** isolation levels **Database recovery:** database recovery protocol	Database textbook, chapter: 22 Laboratory 9: Querying XML documents with XPAth and XQuery
11	**Distributed database systems:** architecture, concurrency control, NoSQL database systems	Database textbook, chapters: 22, 26 NoSQL textbook: chapters 1- 9 Laboratory 10: Controlling database transactions

12	**Database design:** anomalies, functional dependencies, normal forms	Database textbook, chapters: 14, 15 Laboratory 11: Using distributed database systems and NoSQL database systems
13	**Database design:** database design based on data dependencies	Database textbook, chapters: 14, 15 Laboratory 12: Normalizing relational databases

Subject Materials:

Any readings/references are recommended only and are not intended to be an exhaustive list.
Students are encouraged to use the library catalogue and databases to locate additional readings.

Textbook(s):

Database textbook:
Thomas Connolly and Carolyn Begg, Database systems - A Practical Approach to Design, Implementation, and Management, Sixth Edition, The Pearson Education Inc, 2015.
Other database textbooks:
Elmasri R. and Navathe S. B., Database Systems Models, Languages, and Application Programming, 6th ed., The Person Education Inc, 2011
Garcia-Molina H., Ullman J. D., and Widom J. D., *Database Systems:The Complete Book*. Prentice Hall International Limited, 2002
Ramakrishnan R. and Gehrke J., *Database Management Systems*, 3rd ed. Mc Graw-Hill, 2003
Silberschatz A., Korth H. F. and Sudarshan S., *Database System Concepts*, 4th ed., McGraw-Hill , 2002
SQL textbooks (in the increasing order of complexity and sophistication):
Earp R. and Bagui S., *Learning SQL A Step-by-Step Guide Using Oracle*, Addison-Wesley, 2003.
Shah N., *Database Systems Using Oracle A Simplified Guide to SQL and PL/SQL*, 2nd ed. Pearson Education International, 2005.
Mishra S. and Beaulieu A., *Mastering Oracle SQL*, O'Reilly, 2002.
Cumming A. and Russel G., *SQL Hack Tips &Tools for Digging into Your Data*, O?Reilly, 2007
Tropashko V., *SQL design Patterns Expert Guide to SQL Programming*, Rampant TechPress, 2006
XML textbook:
Moller A., Schwartzbach M., An Introduction to XML and Web Technology, Addison Wesley, 2006
NoSQL textbook:
Tiwari S. Professional NoSQL, John Wiley & Sons, 2011
Oracle 12c DBMS documentation library is available at:
http://www.oracle.com/pls/db121/homepage
Other Oracle DBMS textbooks available on Safari Bookshelf (O'Reilly Network), access through a link to Proquest Safari website
All other materials are available through Moodle.

Assessment:

This subject has the following assessment components.

ASSESSMENT ITEMS & FORMAT	% OF FINAL MARK	GROUP/ INDIVIDUAL	DUE DATE	SUBJECT LEARNING OUTCOMES
Assignment 1 The tasks of this assignment include: conceptual modeling and application of CASE system to logical database design, implementation of relational database	4%	Individual	Due by week 4 Electronic submission	1, 2
Assignment 2 Data definition statements of SQL, data manipulation statements of SQL, SELECT statement.	8%	Individual	Due by week 7 Electronic submission	1, 2, 3, 4
Assignment 3 Creating relational views, implementaing advanced data manipulations, granting access rights, creating PL/SQL stored functions and procedures	8%	Individual	Due by week 10 Electronic submission	1, 2, 3, 4, 5
Assignment 4 Design and implementation of XML documents, querying XML documents, using distributed database systems, using NoSQL database systems	8%	Individual	Due by week 13 Electronic submission	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Implementation of laboratory tasks	12%	Individual	Week 2-13 1% per lab	1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Final Examination	60%	Individual	Examination Period	1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Notes on Assessment:

All assignments and lab tasks are expected to be completed independently. Plagiarism may result in a FAIL grade being recorded for that assignment.

Electronic Submission of Assessment Items:
Unless otherwise notified by the subject coordinator, all written assignments and lab tasks must be submitted electronically.

Assessment General:

Submission of assessment items via email will not be accepted. All email submissions will result with immediate 0.0 (zero) mark granted for the respective coursework component.

Other Procedures for the submission of assessment items:
In addition to the solutions students are required to submit execution results for the assignments and lab tasks when they are applicable (See the specifications for more details).
All assignments will be returned within 2 weeks of their submission.

Electronic release of Assessment Items
Specifications of all assignments will be released in electronic format **ONLY**. There will be **NO** printed hard copies distributed during lecture or lab classes. The students should check Moodle site for the subject regularly.

Remarks on Assessment
(a) As assignments are to assess a student's understanding of course material, each assignment must be solved using only material covered up to that point in the course (unless otherwise stated in the question).
(b) Students who copy an assignment will receive no marks for that assignment. This also covers assignments which may be the product of community effort by several students. Working together is acceptable, but the final assignment must be the work of the individual student, as assessment is a measure of your ability.
(c) Programs that do not compile due to the syntax errors will receive no marks, and may still be commented upon. Proper documentation and program style are needed in the assignments to receive the full marks.
(d) The specifications of assignments and sample solutions will be available on Moodle.
(e) Students should check the web page regularly for changes and updates to subject information together with assessment marks.

Technical Fail
To be eligible for a Pass in this subject a student must achieve a mark of at least 40% in the final examination *(24 marks or above)*. Students who fail to achieve this minimum mark & would have otherwise passed may be given a TF (Technical Fail) for this subject.

Supplementary Exams
1. A student whose overall performance results in a TF will only be granted a supplementary assessment task (e.g. a supplementary exam or a supplementary assignment) if approved by the school assessment committee.

2. A student who achieves a mark of 48-49% will normally be eligible for a grade of WS and a supplementary exam organised by the University. In this case, the maximum grade attainable is PS (Pass Supplementary) and a mark of 50%.

3. A student who has successfully applied for academic consideration will receive either:

a. A WD - Withheld Deferred Exam - and be allowed to sit only a supplementary exam, which will be supervised by the University or

b. A WH ? Withheld ? and be allowed to sit a supplementary exam not supervised by the University or complete some other supplementary task

4. If a student is being investigated for misconduct and the investigation cannot be completed before the grades are released the student will receive a grade of WH until a mark is declared.
Calculators will not be allowed in the final exam.

Procedure for the return of assessment items:

All assignments will be returned within 2 weeks of their submission.
The enquiries about the assignment marks can only be made to the tutors during laboratory class times or to the lecturer during the lecturer?s office hours. The enquiries about the assignment marks can only be made in a period of time of maximum 2 weeks after the evaluation of an assignment is published. After 2 week of ?enquiry period?, no more marks will be changed. The assignment marks will be available on SOLS on the assignment return day.

Penalties for late submission of assessment items:

Penalties apply to all late work, except if student academic consideration has been granted. Late submissions will attract a penalty of 25% of the assessment mark.

This amount is per day including weekends.

Work more than 3 days late will be awarded a mark of zero.