COMP9311 Database Systems - 2024

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General Course Information

Course Code : COMP9311
Year : 2024
Term : Term 1
Teaching Period : T1
Is a multi-term course? : No
Faculty : Faculty of Engineering
Academic Unit : School of Computer Science and Engineering
Delivery Mode : Multimodal
Delivery Format : Standard
Delivery Location : Kensington
Campus : Sydney
Study Level : Postgraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

Large data resources are critical to the functioning of just about every significant modern computer application, and so knowledge of how to manage them is clearly important in the industry. One very important platform for this is relational database management systems

(RDBMSs).

This course explores in-depth the practice of developing database applications and the theory behind RDBMSs. The course focuses on database design and querying, as well as analysis of database schemas. It will also give an overview of the technologies used in implementing database management systems and the past, present, and future of database systems and database research.

Course Aims

This course aims to give students a solid grounding in the use of relational database management systems.

In the context of further study, understanding how to use databases effectively provides a foundation for further study in advanced database topics, such as COMP9315 Database Systems Implementation and COMP9318 Data Mining. Database concepts are also relevant in courses such as COMP9319 Web Data Compression and Search and COMP6714 Information Retrieval and Web Search.

Course Learning Outcomes

Course Learning Outcomes
CLO1 : Develop accurate, non-redundant data models
CLO2 : Realise data models as relational database schemas
CLO3 : Formulate efficient and effective queries via the full range of SQL constructs
CLO4 : Use stored procedures and triggers to extend DBMS capabilities
CLO5 : Understand the overall architecture of relational DBMSs
CLO6 : Understand the concepts behind transactions and concurrency control
CLO7 : Appreciate the past, present, and future of database technology

Course Learning Outcomes	Assessment Item
CLO1 : Develop accurate, non-redundant data models	• Assignment 1 • Assignment 2 • Final Exam
CLO2 : Realise data models as relational database schemas	• Assignment 1 • Assignment 2 • Final Exam
CLO3 : Formulate efficient and effective queries via the full range of SQL constructs	• Project 1 • Final Exam
CLO4 : Use stored procedures and triggers to extend DBMS capabilities	• Project 1 • Final Exam
CLO5 : Understand the overall architecture of relational DBMSs	• Assignment 2 • Final Exam
CLO6 : Understand the concepts behind transactions and concurrency control	• Assignment 2 • Final Exam
CLO7 : Appreciate the past, present, and future of database technology	• Final Exam

Learning and Teaching Technologies

Moodle - Learning Management System | Blackboard Collaborate | Echo 360 | EdStem | WebCMS

Other Professional Outcomes

https://www.unsw.edu.au/engineering/student-life/student-resources/program-design

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Assignment 1 Assessment Format: Individual	12%	Due Date: Week 4: 04 March - 10 March
Project 1 Assessment Format: Individual	25%	Due Date: Week 7: 25 March - 31 March
Assignment 2 Assessment Format: Individual	13%	Due Date: Week 10: 15 April - 21 April
Final Exam Assessment Format: Individual	50%	Due Date: TBA during Exam Week

Assessment Details

Assignment 1

Assessment Overview

This assignment involves database design and writing relational algebra expressions to extract data.

Marking will be against specific criteria in a marking guide and formal feedback on your assessment task will be provided within 21 days of the relevant submission date through the Learning Management System

Course Learning Outcomes

- CLO1 : Develop accurate, non-redundant data models
- CLO2 : Realise data models as relational database schemas

Detailed Assessment Description

Details are on the WebCMS course website.

Project 1

Assessment Overview

This project requires students to devise SQL queries and functions on a non-trivial database.

Marking will be against specific criteria in a marking guide and formal feedback on your assessment task will be provided within 21 days of the relevant submission date through the Learning Management System

Course Learning Outcomes

- CLO3 : Formulate efficient and effective queries via the full range of SQL constructs
- CLO4 : Use stored procedures and triggers to extend DBMS capabilities

Detailed Assessment Description

Details are on the WebCMS course website.

Assignment 2

Assessment Overview

This assignment involves exercises in schema analysis, query processing and analysis of concurrency scenarios.

Marking will be against specific criteria in a marking guide and formal feedback on your assessment task will be provided within 21 days of the relevant submission date through the Learning Management System

Course Learning Outcomes

- CLO1 : Develop accurate, non-redundant data models
- CLO2 : Realise data models as relational database schemas
- CLO5 : Understand the overall architecture of relational DBMSs
- CLO6 : Understand the concepts behind transactions and concurrency control

Detailed Assessment Description

Details are on the WebCMS course website.

Final Exam

Assessment Overview

The exam is 2-hours long and will be held in the UNSW exam period. It involves short-answer, data modelling, schema analysis and relational algebra.

Marking will be against specific criteria in a marking guide and no formal feedback will be provided

Course Learning Outcomes

- CLO1 : Develop accurate, non-redundant data models
- CLO2 : Realise data models as relational database schemas
- CLO3 : Formulate efficient and effective queries via the full range of SQL constructs
- CLO4 : Use stored procedures and triggers to extend DBMS capabilities
- CLO5 : Understand the overall architecture of relational DBMSs
- CLO6 : Understand the concepts behind transactions and concurrency control

- CLO7 : Appreciate the past, present, and future of database technology

General Assessment Information

Below is the maximum mark you can get for each assessment and how the final mark is calculated.

- Assignment 1 - Data Modeling + Relational Algebra (full mark 24)
- Assignment 2 - DB design Theory + Transaction (full mark 26)
- Project 1 - SQL (Full mark 50)
- Final Exam (Full mark 100)

Late Submission Penalties for Assignments and Project 1:

- 5% reduction of the full mark for each day, up to 5 days

The final mark is calculated using the geometric mean:

- Final Mark = sqrt ((ass1 + ass2 + proj1) * Final Exam)

Marking will be against specific criteria in a marking guide and formal feedback on your assessment task will be provided

Grading Basis

Standard

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 12 February - 18 February	Lecture	Course Introduction & Conceptual DB Design (ER)
Week 2 : 19 February - 25 February	Lecture	Relational Data Model & Relational Algebra
	Laboratory	Lab01 - Setting up a database server
	Assessment	Assignment 1: Data Modelling and Relational Algebra
Week 3 : 26 February - 3 March	Lecture	SQL
	Laboratory	Lab02 – Schema definition and data constraints
Week 4 : 4 March - 10 March	Lecture	SQL and PLpgSQL programming
	Laboratory	Lab03 – SQL practice
	Assessment	Assignment 1 due
Week 5 : 11 March - 17 March	Lecture	Functional Dependencies, Normal Forms
	Laboratory	Lab04 – SQL queries with view definitions
	Assessment	Project 1: SQL
Week 7 : 25 March - 31 March	Lecture	Relational DB Design & Disks, Files, Index
	Laboratory	Lab05 - SQL functions and PLpgSQL functions
	Assessment	Project 1 Due
Week 8 : 1 April - 7 April	Lecture	Transaction Management
	Laboratory	Lab06 - Database triggers
	Assessment	Assignment 2: DB Design Theory, Database Storage Structures and Transaction
Week 9 : 8 April - 14 April	Lecture	Advanced Topics: Graph Database
	Laboratory	Lab07 - Relational design theory
Week 10 : 15 April - 21 April	Lecture	Advanced Topics (Guest Lecture) & Revision
	Laboratory	Lab08 - A practice on SQLite (an alternative DB)
	Assessment	Assignment 2 Due

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

General Schedule Information

The table summarises the planned weekly activities for the course. These are tentative. Please refer to the relevant sections of the course homepage for the most up-to-date information about the weekly schedule throughout the course delivery period.

Course Resources

Recommended Resources

Textbook:

- Fundamentals of Database Systems by Elmasri & Navathe, 7th edition, Addison-Wesley, UNSW Bookshop , eBook (Pearson)

Other References:

- A First Course in Database Systems by Jeffery D. Ullman, Jennifer Widom, a recent edition, Prentice Hall
- Database Management Systems by R. Ramakrishan, 3rd edition, McGraw-Hill, 2003
- The Theory of Relational Databases by D. Maier, 1st edition, Computer Science Press, 1983

Course Evaluation and Development

Students can give their feedback by sending emials to the course contact, and this course is evaluated using the **myExperience** system.

In the previous offering of this course, some students reported that more examples are expected during the course. In this term, some contents will be rescheduled with more detailed examples.

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Lecturer	Xiaoyang Wang		K17 501D		working hour	Yes	Yes
Administrator	Xingyu Tan				working hour	No	No

Other Useful Information
Academic Information

I. Special consideration and supplementary assessment

If you have experienced an illness or misadventure beyond your control that will interfere with your assessment performance, you are eligible to apply for Special Consideration prior to, or within 3 working days of, submitting an assessment or sitting an exam.

Please note that UNSW has a Fit to Sit rule, which means that if you sit an exam, you are declaring yourself fit enough to do so and cannot later apply for Special Consideration.

For details of applying for Special Consideration and conditions for the award of supplementary assessment, please see the information on UNSW's Special Consideration page.

II. Administrative matters and links

All students are expected to read and be familiar with UNSW guidelines and polices. In particular, students should be familiar with the following:

- [Attendance](#)
- [UNSW Email Address](#)
- [Special Consideration](#)
- [Exams](#)
- [Approved Calculators](#)
- [Academic Honesty and Plagiarism](#)
- [Equitable Learning Services](#)

III. Equity and diversity

Those students who have a disability that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of, their course, or with the Equity Officer (Disability) in the Equitable Learning Services. Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.

IV. Professional Outcomes and Program Design

Students are able to review the relevant professional outcomes and program designs for their streams by going to the following link: https://www.unsw.edu.au/engineering/student-life/student-resources/program-design.

Note: This course outline sets out the description of classes at the date the Course Outline is published. The nature of classes may change during the Term after the Course Outline is published. Moodle or your primary learning management system (LMS) should be consulted for the up-to-date class descriptions. If there is any inconsistency in the description of activities between the University timetable and the Course Outline/Moodle/LMS, the description in the Course Outline/Moodle/LMS applies.

Academic Honesty and Plagarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. *Plagiarism at UNSW is defined as using the words or ideas of others and passing them off as your own.*

Plagiarism is a type of intellectual theft. It can take many forms, from deliberate cheating to accidentally copying from a source without acknowledgement. UNSW has produced a website with a wealth of resources to support students to understand and avoid plagiarism, visit: student.unsw.edu.au/plagiarism. The Learning Centre assists students with understanding academic integrity and how not to plagiarise. They also hold workshops and can help students one-on-one.

You are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting and the proper referencing of sources in preparing all assessment tasks.

Repeated plagiarism (even in first year), plagiarism after first year, or serious instances, may also be investigated under the Student Misconduct Procedures. The penalties under the procedures can include a reduction in marks, failing a course or for the most serious matters (like plagiarism in an honours thesis or contract cheating) even suspension from the university. The Student Misconduct Procedures are available here:

www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Submission of Assessment Tasks

Work submitted late without an approved extension by the course coordinator or delegated authority is subject to a late penalty of five percent (5%) of the maximum mark possible for that assessment item, per calendar day.

The late penalty is applied per calendar day (including weekends and public holidays) that the assessment is overdue. There is no pro-rata of the late penalty for submissions made part way through a day. This is for all assessments where a penalty applies.

Work submitted after five days (120 hours) will not be accepted and a mark of zero will be awarded for that assessment item.

For some assessment items, a late penalty may not be appropriate. These will be clearly indicated in the course outline, and such assessments will receive a mark of zero if not completed by the specified date. Examples include:

- Weekly online tests or laboratory work worth a small proportion of the subject mark;
- Exams, peer feedback and team evaluation surveys;

- Online quizzes where answers are released to students on completion;
- Professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date; and,
- Pass/Fail assessment tasks.

Faculty-specific Information

Engineering Student Support Services – The Nucleus - enrolment, progression checks, clash requests, course issues or program-related queries

Engineering Industrial Training – Industrial training questions

UNSW Study Abroad – study abroad student enquiries (for inbound students)

UNSW Exchange – student exchange enquiries (for inbound students)

UNSW Future Students – potential student enquiries e.g. admissions, fees, programs, credit transfer

Phone

(+61 2) 9385 8500 – Nucleus Student Hub

(+61 2) 9385 7661 – Engineering Industrial Training

(+61 2) 9385 3179 – UNSW Study Abroad and UNSW Exchange (for inbound students)

School Contact Information

CSE Help! - on the Ground Floor of K17

- For assistance with coursework assessments.

The Nucleus Student Hub - https://nucleus.unsw.edu.au/en/contact-us

- Course enrolment queries.

Grievance Officer - grievance-officer@cse.unsw.edu.au

- If the course convenor gives an inadequate response to a query or when the course convenor does not respond to a query about assessment.

Student Reps - stureps@cse.unsw.edu.au

- If some aspect of a course needs urgent improvement. (e.g. Nobody responding to forum queries, cannot understand the lecturer)