



UNSW Course Outline

COMP3311 Database Systems - 2023

Course Code : COMP3311
Year : 2023
Term : Term 3
Teaching Period : T3
Delivery Mode : multimodal
Delivery Format : Standard
Delivery Location : Kensington

General Course Information

Course Code : COMP3311
Year : 2023
Term : Term 3
Teaching Period : T3
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 : Undergraduate
Units of Credit : 6

Useful Links

[Handbook Class Timetable](#)

Course Details & Outcomes

Course Description

This course aims to explore in depth the practice of developing database applications and the

theory behind relational database systems. It will also give a very brief overview of the technologies used in implementing database management systems and the past, present and future of database systems.

Large data resources are critical to the functioning of just about every significant modern computer application. Hence, knowledge of how to manage them is clearly important to the IT industry. In the context of further study, COMP3311 also provides a foundation for further study in advanced database topics, such as [COMP9312](#) Graph Data Analytics, and [COMP9315](#) Database Systems Implementation. Database concepts are also relevant in courses such as [COMP9319](#) Web Data Compression and Search and [COMP6714](#) Information Retrieval and Web Search.

By the end of this course, we want you to be capable of building high-quality (correct and efficient) applications based on relational databases, to have a sound understanding of issues in managing relational database management systems, and an overview of how they work internally.

Course Aims

This course aims to explore in depth the practice of developing database applications and the theory behind relational database management systems (RDBMSs). 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 Learning Outcomes

Course Learning Outcomes
CL01 : develop accurate, non-redundant data models
CL02 : realise data models as relational database schemas
CL03 : Formulate queries via the full range of SQL constructs
CL04 : Write stored procedures and triggers to extend DBMS capabilities
CL05 : Write applications in Python that interact effectively with databases
CL06 : Analyse performance issues in relational database applications
CL07 : Understand the overall architecture of relational DBMSs
CL08 : Understand the concepts behind transactions and concurrency control;

Course Learning Outcomes	Assessment Item
CL01 : develop accurate, non-redundant data models	<ul style="list-style-type: none"> • Quizzes - All topics • Final Exam - All topics
CL02 : realise data models as relational database schemas	<ul style="list-style-type: none"> • Quizzes - All topics • Final Exam - All topics

CLO3 : Formulate queries via the full range of SQL constructs	<ul style="list-style-type: none"> • Assignment 1 - SQL/ PLpgSQL • Quizzes - All topics • Final Exam - All topics
CLO4 : Write stored procedures and triggers to extend DBMS capabilities	<ul style="list-style-type: none"> • Assignment 1 - SQL/ PLpgSQL • Quizzes - All topics • Final Exam - All topics
CLO5 : Write applications in Python that interact effectively with databases	<ul style="list-style-type: none"> • Assignment 2 - Python/ SQL • Quizzes - All topics • Final Exam - All topics
CLO6 : Analyse performance issues in relational database applications	<ul style="list-style-type: none"> • Quizzes - All topics • Final Exam - All topics
CLO7 : Understand the overall architecture of relational DBMSs	<ul style="list-style-type: none"> • Quizzes - All topics • Final Exam - All topics
CLO8 : Understand the concepts behind transactions and concurrency control;	<ul style="list-style-type: none"> • Quizzes - All topics • Final Exam - All topics

Learning and Teaching Technologies

Webcms3 | Echo 360

Additional Course Information

The official pre-requisite for this course is that students have taken either [COMP2521](#) or [COMP1927](#).

Whatever the formal pre-reqs, we assume primarily that students have some experience with procedural programming and some knowledge of data structures. Additionally, knowing a little Python and knowing regular expressions would help.

A perpetual problem for COMP3311 is that around half of the class has already covered basic data modelling techniques (specifically ER diagrams) and/or basic SQL in courses such as [INFS1603](#) Introduction to Business Databases or [COMP1531](#) Software Engineering Fundamentals. On the other hand, half of the class hasn't seen this material before, so we need to cover it. Those who have seen it before should treat this as revision. Don't make the mistake of thinking "I know all this stuff"; we will definitely cover these areas in more depth than you have seen them previously.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates
Assignment 1 - SQL/PLpgSQL Assessment FormatIndividual	12%	Start Date- Due DateWeek 5
Assignment 2 - Python/SQL Assessment FormatIndividual	16%	Due DateWeek 9
Quizzes - All topics Assessment FormatIndividual	12%	Start DateWeekly Due DateWeekly
Final Exam - All topics Assessment FormatIndividual	60%	Start DateTBA during Exam Week Due DateNot Applicable

Assessment Details

Assignment 1 - SQL/PLpgSQL

Assessment Overview

Students must solve problems by developing queries and functions on a supplied schema and database.

Assignments are auto-marked for correctness and tested for efficiency.

We provide testing harnesses for the assignments so that you can determine whether your code is producing the correct output. The supplied tests will use one instance of the database; the auto-marking will use these same tests, but will also run tests using one or more different database instances.

Detailed Assessment Description

Details are on the [course website](#).

Submission notes

give cs3311 ass1 ass1.sql

Assignment 2 - Python/SQL

Assessment Overview

Devise small application programs in Python that interact with a supplied database.

Assignments are auto-marked for correctness and tested for efficiency.

We provide testing harnesses for the assignments so that you can determine whether your code is producing the correct output. The supplied tests will use one instance of the database; the auto-marking will use these same tests, but will also run tests using one or more different database instances.

Detailed Assessment Description

Details are on the [course website](#).

Submission notes

give cs3311 ass2 *.py *.sql

Assignment submission Turnitin type

This is not a Turnitin assignment

Quizzes - All topics

Assessment Overview

Starting in Week 2, there will be online quizzes on topics from previous weeks. This gives you a chance to review what you've learned on those topics. Quizzes are released on Monday mornings and are due before midnight on the following Friday (i.e. 5 days later). Each quiz will have 4 questions. Quizzes are automatically marked.

Detailed Assessment Description

Details are on the [course website](#).

Submission notes

Quizzes are on Webcms3

Assignment submission Turnitin type

This is not a Turnitin assignment

Final Exam - All topics

Assessment Overview

Exam conducted in the CSE labs in a closed environment, covering all aspects of the course. Students will be expected to write queries on a supplied database, perform data modelling, analyse aspects of a schema/database, etc.

Submission notes

Submit via Give

Hurdle rules

Must score more than 40% on the Final Exam in order to pass the course.

General Assessment Information

Grading Basis

Standard

Requirements to pass course

quizzes = mark for on-line quizzes (out of 12)
ass1 = mark for assignment 1 (out of 12)
ass2 = mark for assignment 2 (out of 16)
exam = mark for final exam (out of 60)
okExam = exam >= 24 (after scaling)
mark = ass1 + ass2 + quizzes + exam

grade = HD|DN|CR|PS if mark >= 50 && okExam
= FL if mark < 50
= UF if !okExam

Course Schedule

Attendance Requirements

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

General Schedule Information

1. **Lecture:** Course intro, Data Modelling, ER diagrams
Tutorial: none
Prac Work: Set up PostgreSQL server, SQLite
2. **Lecture:** Relational Model, SQL DDL, Mapping ER to SQL
Tutorial: Data modelling, ER
Prac Work: Defining a database
Quiz #1
3. **Lecture:** SQL queries
Tutorial: ER -> SQL
Prac Work: SQL queries
Assignments: Ass1 released
Quiz #2
4. **Lecture:** PLpgSQL
Tutorial: SQL
Prac Work: Stored functions
Quiz #3
5. **Lecture:** Triggers, Aggregates
Tutorial: Stored functions
Prac Work: Aggregates
Assignments: Ass1 due (fri)
6. Flexibility Week ... no lectures, no tutorials
7. **Lecture:** DB/PL interaction, Python, Psycopg2
Tutorial: Triggers
Prac Work: Python meets SQL
Assignments: Ass 2 released
Quiz #4
8. **Lecture:** Functional dependencies, normalization
Tutorial: Psycopg2
Quiz #5
9. **Lecture:** Relational Algebra, Query Execution
Tutorial: Normalization
Assignments: Ass 2 due (fri)
10. **Transactions, Concurrency, Database Futures, Course Review**

Course Resources

Recommended Resources

- [Fundamentals of Database Systems](#), Elmasri and Navathe, 7th edition, 2016, Addison-Wesley
- [Database System Concepts](#), Silberschatz, Korth, Sudarshan, 6th edition, 2010, McGraw-Hill
- [Database Systems: The Complete Book](#), Garcia-Molina, Ullman, Widom, 2nd edition, 2008, Prentice-Hall
- [Database Systems: An Application-Oriented Approach](#) Kifer, Berstein, Lewis, 2nd edition (Complete Version), 2006, Addison-Wesley

Course Evaluation and Development

Feedback on the course as a whole will be acquired via the end-of-term MyExperience instrument.

Feel free to email me about about any issues during the term that you think require fixing.

When I last took the course (23T1) students said that

- *the second assignment was too complex*; it will be more straightforward this time
- *the course needs labs*; we'll get the tutors to focus more on practical aspects, and continue to provide prac exercises, which are effectly lab exercises

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	John Shepherd	jas@cse.unsw.edu.au	K17-410		mail cs3311@cse	Yes	No
Administrator	Dylan Brotherston	d.brotherston@unsw.edu.au			mail cs3311@cse	No	No
	COMP3311 Class Account	cs1521@cse.unsw.edu.au			email	No	Yes

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 / Submit rule, which means that if you sit an exam or

submit a piece of assessment, 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 policies. 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.

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 Plagiarism

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 courses 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)

You should **never** contact any of the following people directly:

- Vice Chancellor

- Pro-vice Chancellor Education (PVCE)

- Head of School

- CSE administrative staff

- CSE teaching support staff

They will simply bounce the email to one of the above, thereby creating an unnecessary level of indirection and a delay in the response.