



## UNSW Course Outline

# COMP9727 Recommender Systems - 2024

Published on the 21 May 2024

## General Course Information

**Course Code :** COMP9727

**Year :** 2024

**Term :** Term 2

**Teaching Period :** T2

**Is a multi-term course? :** No

**Faculty :** Faculty of Engineering

**Academic Unit :** School of Computer Science and Engineering

**Delivery Mode :** In Person

**Delivery Format :** Standard

**Delivery Location :** Kensington

**Campus :** Sydney

**Study Level :** Postgraduate, Undergraduate

**Units of Credit :** 6

### Useful Links

[Handbook Class Timetable](#)

## Course Details & Outcomes

### Course Description

Recommender systems are information filtering and search tools for providing personalized user interaction and navigation through a complex space of products or services. The aim is to address information overload by providing users with items that better meet their needs and

support their decision making. Recommender systems are important commercial tools that are widely used by e-commerce and social media companies to drive sales and user engagement. This course will cover the basic types of recommender system, the main recommendation algorithms, and machine learning and natural language processing techniques used to support recommender systems.

## Course Aims

This course aims to introduce the basic types of recommender system, the main recommendation algorithms, and machine learning and natural language processing techniques needed to support recommender systems. Emphasis will be placed on understanding the strengths and weaknesses of different approaches, user interface design for recommender systems, and evaluation of recommender systems using a variety of metrics and user evaluation styles.

## Relationship to Other Courses

This course complements COMP9417 Machine Learning and Data Mining and COMP9444 Neural Networks and Deep Learning by providing an introduction to some topics in Machine Learning, and context for these courses through discussion of realistic applications.

# Course Learning Outcomes

| Course Learning Outcomes   |
|--|
| CLO1 : Understand the basic types of recommender system and the main recommendation algorithms |
| CLO2 : Design a suitable recommender system for a specific application                         |
| CLO3 : Implement a prototype recommender system that addresses a realistic problem             |
| CLO4 : Evaluate a recommender system from multiple perspectives using appropriate metrics      |

| Course Learning Outcomes   | Assessment Item   |
|--|---|
| CLO1 : Understand the basic types of recommender system and the main recommendation algorithms | <ul style="list-style-type: none"><li>• Assignment</li><li>• Project Design</li><li>• Prototype System</li><li>• Project Evaluation</li></ul> |
| CLO2 : Design a suitable recommender system for a specific application                         | <ul style="list-style-type: none"><li>• Project Design</li><li>• Prototype System</li></ul>   |
| CLO3 : Implement a prototype recommender system that addresses a realistic problem             | <ul style="list-style-type: none"><li>• Prototype System</li></ul>  |
| CLO4 : Evaluate a recommender system from multiple perspectives using appropriate metrics      | <ul style="list-style-type: none"><li>• Assignment</li><li>• Project Evaluation</li><li>• Project Design</li></ul>                            |

## Learning and Teaching Technologies

Moodle - Learning Management System | Echo 360 | EdStem

## Other Professional Outcomes

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

# Assessments

## Assessment Structure

| Assessment Item                                     | Weight | Relevant Dates                                  |
|---|--------|---|
| Assignment<br>Assessment Format: Individual         | 30%    | Start Date: Not Applicable<br>Due Date: Week 4  |
| Project Design<br>Assessment Format: Individual     | 20%    | Start Date: Not Applicable<br>Due Date: Week 5  |
| Prototype System<br>Assessment Format: Group        | 30%    | Start Date: Not Applicable<br>Due Date: Week 10 |
| Project Evaluation<br>Assessment Format: Individual | 20%    | Start Date: Not Applicable<br>Due Date: Week 11 |

## Assessment Details

### Assignment

#### Assessment Overview

Students write a report of around 15 pages evaluating a number of recommendation algorithms for a given scenario using a variety of metrics. More detail of what should be included in this assignment and the assessment criteria are given in the assessment specification. The assignment will be submitted online and marked against the assessment criteria. Students will receive feedback and marks online.

#### Course Learning Outcomes

- CLO1 : Understand the basic types of recommender system and the main recommendation algorithms
- CLO4 : Evaluate a recommender system from multiple perspectives using appropriate metrics

#### Detailed Assessment Description

Details are on the [course website](#)

#### Assessment Length

Around 15 pages

#### Assignment submission Turnitin type

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

# Project Design

## Assessment Overview

Students write a report of around 10 pages that outlines a proposed a recommender system, including datasets, potential recommendation algorithms, mechanisms for obtaining and using user feedback to adapt recommendations dynamically, and an informal user interface mockup. More detail of what should be included in this report and the assessment criteria are given in the assessment specification. The report will be submitted online and marked against the assessment criteria. Students will receive feedback and marks online. Students will "pitch" their idea to their peers in class in order to form project teams and choose a topic for the project.

## Course Learning Outcomes

- CLO1 : Understand the basic types of recommender system and the main recommendation algorithms
- CLO2 : Design a suitable recommender system for a specific application
- CLO4 : Evaluate a recommender system from multiple perspectives using appropriate metrics

## Detailed Assessment Description

Details are on the [course website](#)

## Assessment Length

Around 10 pages

## Assignment submission Turnitin type

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

# Prototype System

## Assessment Overview

Students work in teams of 3 to produce a prototype recommender system for a chosen scenario, which includes realistic datasets and algorithms, and a basic simulation of user interaction with the system and how user interaction is used in providing and adapting recommendations. More detail of what should be included in this project and the assessment criteria are given in the assessment specification. The project will be submitted online and marked against the assessment criteria. Students will present their projects in a demonstration and receive feedback verbally and marks online.

## Course Learning Outcomes

- CLO1 : Understand the basic types of recommender system and the main recommendation

algorithms

- CLO2 : Design a suitable recommender system for a specific application
- CLO3 : Implement a prototype recommender system that addresses a realistic problem

#### Detailed Assessment Description

Details are on the [course website](#)

#### Assessment Length

N/A

#### Assignment submission Turnitin type

Not Applicable

### **Project Evaluation**

#### Assessment Overview

Students write a report of around 15 pages evaluating their prototype recommender system from a variety of perspectives using a variety of metrics, reflecting on their work and proposing possible extensions to the project based on material covered in the second half of this course. More detail of what should be included in this report and the assessment criteria are given in the assessment specification. The report will be submitted online and marked against the assessment criteria. Students will receive feedback and marks online.

#### Course Learning Outcomes

- CLO1 : Understand the basic types of recommender system and the main recommendation algorithms
- CLO4 : Evaluate a recommender system from multiple perspectives using appropriate metrics

#### Detailed Assessment Description

Details are on the [course website](#)

#### Assessment Length

Around 15 pages

#### Assignment submission Turnitin type

This assignment is submitted through Turnitin and students do not see Turnitin similarity reports.

## **General Assessment Information**

#### Grading Basis

Standard

# Course Schedule

| Teaching Week/Module         | Activity Type | Content   |
|------------------------------|---------------|---|
| Week 0 : 20 May - 26 May     | Web           | Review Linear Algebra (Matrices and Vectors)  |
| Week 1 : 27 May - 2 June     | Topic         | Lecture: Introduction to Recommender Systems<br>Tutorial: Evaluation of Recommender Systems                     |
| Week 2 : 3 June - 9 June     | Topic         | Lecture: Content-Based Recommender Systems<br>Tutorial: Topic Classification                                    |
| Week 3 : 10 June - 16 June   | Topic         | Lecture: Collaborative Filtering<br>Tutorial: Collaborative Filtering   |
| Week 4 : 17 June - 23 June   | Topic         | Lecture: Knowledge-Based Recommender Systems<br>Tutorial: Association Rule Mining<br>Assessment: Assignment Due |
| Week 5 : 24 June - 30 June   | Topic         | Lecture: Social Recommender Systems<br>Tutorial: Sentiment Analysis<br>Assessment: Project Design Due           |
| Week 6 : 1 July - 7 July     | Topic         | Flexibility Week: No classes  |
| Week 7 : 8 July - 14 July    | Topic         | Lecture: Social Network Analysis<br>Tutorial: Project Feedback  |
| Week 8 : 15 July - 21 July   | Topic         | Lecture: Sequential Recommender Systems<br>Tutorial: Project Feedback   |
| Week 9 : 22 July - 28 July   | Topic         | Lecture: Context-Aware Recommender Systems<br>Tutorial: Project Feedback  |
| Week 10 : 29 July - 4 August | Topic         | Lecture: Large Language Models for Recommender Systems<br>Tutorial: Project Feedback<br>Assessment: Project Due |

## Attendance Requirements

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

## Course Resources

### Recommended Resources

The following book (available online at UNSW Library) gives a good overview of the topics:

- Aggarwal, C.C. [Recommender Systems: The Textbook](#). Springer, Cham, 2016.

The longer "handbook" gives a more extensive overview of the topics:

- Ricci, F., Rokach, L. & Shapira, B. (Eds) [Recommender Systems Handbook](#). Third Edition. Springer, Cham, 2022.

The course draws on Python AI packages including [NLTK](#) (Natural Language Toolkit) and [Scikit Learn](#).

## Course Evaluation and Development

Computer Science and Engineering courses are evaluated by student survey each time they are

taught. The survey includes standard questions asked of all comparable courses so that it is possible to compare a course with other relevant UNSW courses, and also includes space for free-form comments. Survey responses are anonymous. The completed survey forms are analysed statistically by someone independent of the course staff, and the results, including free-form comments, are made available to the lecturer in charge *after* grades have been reported and released.

This course was thoroughly revised in 2023. Students generally agreed that the course was well taught. However, the main problem in 2023 was that because the course was being developed throughout the term, course material was not available much in advance, causing some stress around assessment deadlines. This will not be an issue in 2024, now that the course material has been developed. The main change to the content for 2024 will be more discussion on Large Language Models.

## Staff Details

| Position | Name         | Email | Location | Phone | Availability  | Equitable Learning Services Contact | Primary Contact |
|----------|--------------|-------|----------|-------|---------------|-------------------------------------|-----------------|
| Convenor | Wayne Wobcke |       |          |       | Working hours | Yes                                 | Yes             |
|          | COURSE EMAIL |       |          |       |               | 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.](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 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](http://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](http://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](mailto: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](mailto: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.