



## UNSW Course Outline

# COMP9434 Robotic Software Architecture - 2024

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## General Course Information

**Course Code :** COMP9434

**Year :** 2024

**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 :** In Person

**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

An introduction to Intelligent agent design. Picking actions using planning, learning or engineered control. Both practical and theoretical components. Practical component: Re-implement parts of a real agent architecture on a robot. Assignment based. Emphasis on engineering a working

system. Theoretical component: Introduction to a variety of research agent architectures including classical planning and reinforcement learning. Lecture and lab based.

## Course Learning Outcomes

Course Learning Outcomes
CLO1 : Experience with the details of one robot architecture
CLO2 : An overview of a range of other architectures and decision making systems
CLO3 : An understanding of the practicalities of programming physical robots as opposed to purely software systems
CLO4 : An understanding of a robot as a complete system, as well as its component parts

Course Learning Outcomes	Assessment Item
CLO1 : Experience with the details of one robot architecture	• Assignment
CLO2 : An overview of a range of other architectures and decision making systems	• Assignment • Final Report
CLO3 : An understanding of the practicalities of programming physical robots as opposed to purely software systems	• Assignment
CLO4 : An understanding of a robot as a complete system, as well as its component parts	• Final Report

## Learning and Teaching Technologies

Moodle - Learning Management System | WebCMS

## Learning and Teaching in this course

There is no textbook that covers all the topics at the right level of detail for this course, so there is no set text, but there are recommended references below and a lot of online material

The assignments are all group-work. Furthermore, the assignments are graded in a style more like a design class than a computer science class: you demonstrate your robot doing what it does, and then the class discusses why it behaved that way and whether that is, on balance, a good thing. You will also write a final report to accompany your main project.

# Assessments

## Assessment Structure

Assessment Item	Weight	Relevant Dates
Assignment Short Extension: Yes (5 days)	40%	Start Date: 10/09/2024 12:00 AM Due Date: Week 5: 07 October - 13 October
Assignment	20%	Start Date: 13/10/2024 12:00 AM Due Date: 09/10/2024 12:00 AM
Final Report Short Extension: Yes (7 days)	40%	Start Date: 14/10/2024 12:00 AM Due Date: 17/10/2024 12:00 AM

## Assessment Details

### Assignment

#### Assessment Overview

Not specified

#### Course Learning Outcomes

- CL02 : An overview of a range of other architectures and decision making systems
- CL03 : An understanding of the practicalities of programming physical robots as opposed to purely software systems

#### Assignment submission Turnitin type

Not Applicable

#### Generative AI Permission Level

#### Assistance with Attribution

This assessment requires you to write/create a first iteration of your submission yourself. You are then permitted to use generative AI tools, software or services to improve your submission in the ways set out below.

Any output of generative AI tools, software or services that is used within your assessment must be attributed with full referencing.

If outputs of generative AI tools, software or services form part of your submission and are not appropriately attributed, your Convenor will determine whether the omission is significant. If so, you may be asked to explain your submission. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.

For more information on Generative AI and permitted use please see [here](#).

## Assignment

### Assessment Overview

Not specified

### Course Learning Outcomes

- CL01 : Experience with the details of one robot architecture

### Detailed Assessment Description

Project demonstration

### Assignment submission Turnitin type

Not Applicable

### Generative AI Permission Level

#### Planning/Design Assistance

You are permitted to use generative AI tools, software or services to generate initial ideas, structures, or outlines. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e., what is generated by the tool, software or service should not be a part of your final submission. You should keep copies of your iterations to show your Course Authority if there is any uncertainty about the originality of your work.

If your Convenor has concerns that your answer contains passages of AI-generated text or media that have not been sufficiently modified you may be asked to explain your work, but we recognise that you are permitted to use AI generated text and media as a starting point and some traces may remain. If you are unable to satisfactorily demonstrate your understanding of your submission you may be referred to UNSW Conduct & Integrity Office for investigation for academic misconduct and possible penalties.

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## Final Report

### Assessment Overview

Not specified

### Course Learning Outcomes

- CL02 : An overview of a range of other architectures and decision making systems
- CL04 : An understanding of a robot as a complete system, as well as its component parts

### Assignment submission Turnitin type

Not Applicable

### Generative AI Permission Level

#### Planning/Design Assistance

You are permitted to use generative AI tools, software or services to generate initial ideas, structures, or outlines. However, you must develop or edit those ideas to such a significant extent that what is submitted is your own work, i.e., what is generated by the tool, software or service should not be a part of your final submission. You should keep copies of your iterations to show your Course Authority if there is any uncertainty about the originality of your work.

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## General Assessment Information

### Grading Basis

Standard

## Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 9 September - 15 September	Lecture	Introduction to Robotics and ROS programming.
Week 2 : 16 September - 22 September	Lecture	ROS Programming; Navigation and mapping
	Laboratory	
Week 3 : 23 September - 29 September	Lecture	ROS Programming; Robot Vision
	Laboratory	
Week 4 : 30 September - 6 October	Lecture	ROS Programming; Transforms
Week 5 : 7 October - 13 October	Lecture	ROS Programming; Packages, Launch Files and Colcon build
	Laboratory	
Week 6 : 14 October - 20 October	Other	Flexibility week
Week 7 : 21 October - 27 October	Laboratory	Project work
Week 8 : 28 October - 3 November	Laboratory	Project work
Week 9 : 4 November - 10 November	Laboratory	Project work
Week 10 : 11 November - 17 November	Laboratory	Final demo

# Attendance Requirements

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

# Course Resources

## Recommended Resources

[TurtleBot3 Online Manual](#) ; Robotis

[Artificial Intelligence: A Modern Approach](#) ; S. Russell and P. Norvig

This is a good overview textbook for artificial intelligence in general. If you were going to get one book on AI, this would be the one I'd choose.

[Probabilistic Robotics](#) ; S. Thrun, W. Burgard and D. Fox

This is a newer textbook covering "perception and control in the face of uncertainty". It covers those areas well, but doesn't have quite the breadth of this course.

## Course Evaluation and Development

The course is highly interactive since students are mentored through the laboratories. Lecturers and tutors get direct feedback through this interaction. The main change this year, as a result of feedback, is that we are providing more programming examples that will help in the project work.

## Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
	Claude Sammut					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 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 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.

## 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 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.