



MTRN3060

Robotics and Automation

Session 2, In person-scheduled-weekday, North Ryde 2026

School of Engineering

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General Information

Unit convenor and teaching staff

Lecturer

Mohsen Asadnia

mohsen.asadnia@mq.edu.au

9 Wally's Walk, Room 320

Wednesday 1 pm-3 pm

Credit points

10

Prerequisites

MTRN2060

Corequisites

Co-badged status

Unit description

In this unit, you will explore the principles and practice of industrial robotics and automation, developing the knowledge and skills needed to design and control robotic systems used in modern industry. You will build an understanding of how mathematical models underpin robot motion, sensing, and control, and how these foundations support real-world robotic applications.

You will learn to describe spatial relationships, perform coordinate transformations, and analyse the kinematics and dynamics of industrial robots. Using this knowledge, you will engage with the end-to-end design process for robotic systems and gain hands-on experience programming robots to perform purposeful, repetitive tasks. You will also apply a range of control techniques to automate processes representative of contemporary industrial practice.

Learning in this unit is project-based and experiential, allowing you to integrate theory with practice as you design, program, and control robotic and automated systems. This unit provides a foundation for further study in robotics and automation and supports career pathways in mechatronics, manufacturing, and industrial automation.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at <https://www.mq.edu.au/study/calendar-of-dates>

Learning Outcomes

On successful completion of this unit, you will be able to:

ULO1: Compute coordinates' spatial descriptions and transformations

ULO2: Compute an industrial robot's kinematics and dynamics

ULO3: Describe an industrial robot's design process

ULO4: Write a program to complete a relevant task by the robot

ULO5: Use different control techniques for an industrial robot to automate a relevant task

General Assessment Information

General Assessment Information

Grading and passing requirement for unit

In order to pass this unit a student must obtain a mark of 50 or more for the unit (i.e. obtain a passing grade P/ CR/ D/ HD), and meet two hurdle requirements (below).

Supplementary Exam: If you receive special consideration for the final exam, a supplementary exam will be scheduled by the faculty during a supplementary exam period. This is typically 3 to 4 weeks after the normal exam period. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

Late Assessment Submission Penalty

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark of the task) will be applied for each day a written report or presentation assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. The submission time for all uploaded assessments is **11:55 pm**. A 1-hour grace period will be provided to students who experience technical concerns. For any late submission of time-sensitive tasks, such as scheduled tests/ exams, performance assessments/presentations, and/or scheduled practical assessments/labs, please apply for Special Consideration. For example, if the assignment is worth 8 marks (of the entire unit) and your submission is late by 19 hours (or 23 hours 59 minutes 59 seconds), 0.4 marks (5% of 8 marks) will be deducted. If your submission is late by 24 hours (or 47 hours 59 minutes 59 seconds), 0.8 marks (10% of 8 marks) will be deducted, and so on.

Assessments where Late Submissions will be accepted

Minor Project- Yes, Standard Late Penalty applies

Major Project-NO, unless Special Consideration is Granted

Resubmissions of work are not allowed.

Special Consideration

The [Special Consideration Policy](#) aims to support students who have been impacted by short-term circumstances or events that are serious, unavoidable and significantly disruptive, and which may affect their performance in assessment. If you experience circumstances or events that affect your ability to complete the assessments in this unit on time, please inform the convenor and submit a Special Consideration request through ask.mq.edu.au.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/ Individual	Short Extension	AI Approach
Final examination	50%	No	TBC		No	
Practical assessment which involves hands-on tasks	30%	No	Week 13		No	
Practical demonstration	20%	No	Week 5		No	

Final examination

Assessment Type [1](#): Examination Indicative Time on Task [2](#): 38 hours

Due: **TBC** Weighting: **50%** Groupwork/Individual: Short extension [3](#): No AI Approach:

The final exam will assess your overall understanding of the unit content, with a focus on applying key concepts covered throughout the semester.

On successful completion you will be able to:

- Compute coordinates' spatial descriptions and transformations
- Compute an industrial robot's kinematics and dynamics
- Describe an industrial robot's design process
- Write a program to complete a relevant task by the robot
- Use different control techniques for an industrial robot to automate a relevant task

Practical assessment which involves hands-on tasks

Assessment Type [1](#): Practice-based task Indicative Time on Task [2](#): 20 hours Due: **Week**

13 Weighting: **30%** Groupwork/Individual: Short extension [3](#): No AI Approach:

Practical assessment

On successful completion you will be able to:

- Compute coordinates' spatial descriptions and transformations
- Compute an industrial robot's kinematics and dynamics
- Write a program to complete a relevant task by the robot

Practical demonstration

Assessment Type ¹: Demonstration Indicative Time on Task ²: 25 hours Due: **Week 5** Weighting: **20%** Groupwork/Individual: Short extension ³: No AI Approach:

In-class demonstration for practical activity.

On successful completion you will be able to:

- Compute coordinates' spatial descriptions and transformations
- Compute an industrial robot's kinematics and dynamics
- Describe an industrial robot's design process
- Write a program to complete a relevant task by the robot

¹ If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- [Academic Success](#) for academic skills support.

² Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation.

³ An automatic short extension is available for some assessments. Apply through the [Service Connect Portal](#).

Generative AI:

In this unit, GenAI may be used as a learning support tool to assist with understanding concepts, debugging code, exploring engineering solutions, and developing professional skills. However, students are expected to demonstrate their own understanding of mechatronics, robotics, automation, and control systems. Reliance on GenAI-generated content without critical evaluation, verification, and proper attribution may constitute a breach of academic integrity requirements.

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Practical demonstration	20%	No	Week 5	Individual	No	Observed
Practical Assessment	30%	No	Week 13	Group	No	Observed
Final Exam	50%	No	Examination time	Individual	No	Observed

Practical demonstration

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 25 hours

Due: **Week 5**

Weighting: **20%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

Demonstrating practical competence is essential in robotics and automation practice. In this task, you will demonstrate your ability to operate and program a robotic or automated system to complete a defined activity. This assessment develops applied technical skills, precision, and the ability to translate theory into effective system operation.

On successful completion you will be able to:

- Compute coordinates' spatial descriptions and transformations
- Compute an industrial robot's kinematics and dynamics
- Describe an industrial robot's design process
- Write a program to complete a relevant task by the robot

Practical Assessment

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 20 hours

Due: **Week 13**

Weighting: **30%**

Groupwork/Individual: Group

Short extension ³: No

AI Approach: Observed

Hands-on problem-solving is central to professional mechatronics practice. In this assessment, you will design, implement, and test robotic or automated solutions through a range of practical tasks. This develops skills in system integration, programming, control, and critical evaluation of system performance.

On successful completion you will be able to:

- Compute coordinates' spatial descriptions and transformations
- Compute an industrial robot's kinematics and dynamics
- Write a program to complete a relevant task by the robot

Final Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 38 hours

Due: **Examination time**

Weighting: **50%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

You will undertake a final examination during the formal examination period.

On successful completion you will be able to:

- Compute coordinates' spatial descriptions and transformations
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- Describe an industrial robot's design process
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Delivery and Resources

1) Both lectures and practical classes commence in Week 1.

2) Unit announcements and important updates will be communicated through **iLearn** and your **Macquarie University email account**. Students are expected to check both regularly throughout the semester.

If you have any questions regarding the unit, please contact the Unit Convenor at mohsen.asadnia@mq.edu.au. When sending emails, please include the unit code in the subject line to help

ensure a timely response.

Please note that all official communication from the teaching team will be sent to your Macquarie University email address.

3) Full details about the resources will be available on ilearn page.

Unit Schedule

Full details about the resources will be available on ilearn page.

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in [eStudent](#). For more information visit connect.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the

expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

Student Support

Macquarie University provides a range of support services for students. For details, visit <http://students.mq.edu.au/support/>

Academic Success

[Academic Success](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Ask a Study Coach](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

Student Enquiries

Got a question? Ask us via the [Service Connect Portal](#), or contact [Service Connect](#).

IT Help

For help with University computer systems and technology, visit <https://students.mq.edu.au/support/technology/service-desk>.

When using the University's IT, you must adhere to the [Acceptable Use of IT Resources Policy](#).

The policy applies to all who connect to the MQ network including students.

Unit information based on version 2026.04 of the [Handbook](#)