



MTRN3026

Mechatronic Systems

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

School of Engineering

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Disclaimer

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General Information

Unit convenor and teaching staff

Mohsen Asadnia

mohsen.asadnia@mq.edu.au

9 Wally's Walk Room 320

Tuesday 1pm-3pm

Credit points

10

Prerequisites

MTRN2060 and completion of 130cp

Corequisites

Co-badged status

Unit description

This unit builds on foundational knowledge from previous coursework in Mechatronics, Electrical Circuits, and Signals, while introducing essential concepts in power actuators and their control. Topics covered include magnetics, DC motors, induction machines, power electronic inverter drives, programmable logic controllers (PLCs), and pneumatics. You will gain hands-on experience with PLCs through industry-standard software and hardware. The unit's practical component strengthens your technical and problem-solving skills, while also enhancing your teamwork and communication abilities.

Learning in this unit enhances your understanding of global challenges identified by the United Nations Sustainable Development Goals (UNSDGs) Quality Education; Affordable and Clean Energy; Industry, Innovation and Infrastructure.

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: Describe and differentiate the components of mechatronic systems

ULO2: Demonstrate an understanding of Programme Logic Controllers (PLC)

ULO3: Demonstrate the design and development of a PLC based project including input

and output devices with programming

ULO4: Analyse the performance of AC motor drives and controller

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
Practical demonstration	20%	No	Week 5		No	
Final examination	50%	No	TBC		No	
Practical assessment	30%	No	Week 13		No	

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:

Assessment for practical activity

On successful completion you will be able to:

- Describe and differentiate the components of mechatronic systems
- Demonstrate an understanding of linear and induction motors.
- Analyse the performance of AC motor drives and controller

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:

On successful completion you will be able to:

- Describe and differentiate the components of mechatronic systems
- Demonstrate an understanding of Programme Logic Controllers (PLC)
- Demonstrate the design and development of a PLC based project including input and output devices with programming
- Analyse the performance of AC motor drives and controller

Practical assessment

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:

Students will be assessed through a demonstration which will take place at the end of the semester.

On successful completion you will be able to:

- Describe and differentiate the components of mechatronic systems
- Demonstrate an understanding of Programme Logic Controllers (PLC)

- Demonstrate the design and development of a PLC based project including input and output devices with programming
- Analyse the performance of AC motor drives and controller

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
Final Exam	50%	No	Exam period	Individual	No	Observed
Practical demonstration	30%	No	Week 5	Individual	No	Observed
Practical assessment	20%	No	Week 13	Individual	No	Observed

Final Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 38 hours

Due: **Exam period**

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:

- Describe and differentiate the components of mechatronic systems
- Demonstrate an understanding of Programme Logic Controllers (PLC)
- Demonstrate the design and development of a PLC based project including input and output devices with programming
- Analyse the performance of AC motor drives and controller

Practical demonstration

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 25 hours

Due: **Week 5**

Weighting: **30%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

Assessment for practical activity

On successful completion you will be able to:

- Describe and differentiate the components of mechatronic systems
- Demonstrate an understanding of Programme Logic Controllers (PLC)
- Demonstrate the design and development of a PLC based project including input and output devices with programming
- Analyse the performance of AC motor drives and controller

Practical assessment

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 20 hours

Due: **Week 13**

Weighting: **20%**

Groupwork/Individual: Individual

Short extension ³: No

AI Approach: Observed

You will be assessed through a demonstration which will take place at the end of the semester.

On successful completion you will be able to:

- Describe and differentiate the components of mechatronic systems
- Demonstrate an understanding of Programme Logic Controllers (PLC)

- Demonstrate the design and development of a PLC based project including input and output devices with programming
 - Analyse the performance of AC motor drives and controller
-

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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.s.mq.edu.au) (<https://policies.s.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.

Changes from Previous Offering

This unit has been redesigned to align with Macquarie University's EPIC educational approach, which emphasises engaging, student-centred learning experiences that connect theory with authentic industry and real-world applications. The approach encourages students to actively participate in their learning, develop professional skills, and apply knowledge to practical engineering challenges.

As part of this redesign, a project-based learning (PBL) component has been integrated into the lecture program. Students will be provided with a comprehensive project document on iLearn at the beginning of the semester. Throughout the session, students will progressively work on different stages of this project during lecture time.

Each week's project activities are directly linked to the concepts and techniques introduced in the corresponding lecture. Approximately half of each lecture will be dedicated to the delivery of core theoretical content, while the remaining time will be used for guided project work, discussion, design activities, and problem-solving exercises.

The project has been designed to simulate a realistic mechatronics and automation engineering challenge. By progressively applying the knowledge gained each week, students will develop

and refine a complete engineering solution that addresses a real-world automation scenario. This approach aims to strengthen students' technical understanding, systems-thinking abilities, teamwork, problem-solving skills, and readiness for industry practice.

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