MTRN8066

Advanced Mechatronic Engineering

Session 1, In person-scheduled-weekday, North Ryde 2025

School of Engineering

Contents

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General Information

Unit convenor and teaching staff
Unit Convenor and Lecturer
David Inglis
david.inglis@mq.edu.au
Contact via email
3MD-160
Tuesdays 9-10am @3MD-160

Credit points
10

Prerequisites
40cp at 6000 level or above including MTRN6026

Corequisites

Co-badged status

Unit description
This unit synthesizes prior expertise in a specialized engineering domain with problem-solving prowess, emerging technologies, and facets of engineering application, all within the framework of technical reporting and self-directed management. Its overarching goal is to equip students to function at a proficient professional level. The unit endeavors to tackle the application of foundational principles and advanced techniques within the realm of standards, practices, modeling, analysis, design, and pragmatic implementation. Additionally, the unit fosters competencies in scrutinizing information critically, assessing software reliability, identifying potential sources of error, and deploying experimental methodologies. Learning experiences encompass diverse methods, encompassing case studies, laboratories, presentations, group work, and conventional lecture formats. The specific thematic focus lies on contemporary advancements in the field, including microcontrollers, motor systems, control mechanisms, sensors, actuators, and electro-mechanical interfaces.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals (UNSDGs) 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: Design, numerically-model, implement, and test a digital motion control system for a non-linear problem

ULO2: Apply problem-solving, initiative, time management, and record keeping skills to complete a significant project in a proficient and timely manner.

ULO3: Research and evaluate, through advanced knowledge, the modelling and use of modern drive technology

ULO4: Apply and evaluate advanced mechatronic principles, such as convolutional neural networks, machine vision, and 3D printing, with critical insight and rigour.

ULO5: Demonstrate the integration of a convolutional neural network with machine control and automation

ULO6: Communicate and collaborate effectively by conveying and sharing knowledge and ideas proficiently using verbal, written, and digital mediums in a professional context.

General Assessment Information

To pass this unit you need to: Achieve a total mark equal to or greater than 50% across all aggregate of assessments.

We strongly encourage all students to actively **participate in all learning activities**. Regular engagement is crucial for your success in this unit, as these activities provide opportunities to deepen your understanding of the material, collaborate with peers, and receive valuable feedback from instructors, to assist in completing the unit assessments. Your active participation not only enhances your own learning experience but also contributes to a vibrant and dynamic learning environment for everyone.

Late Assessment Submission Penalty A 5% penalty (of the total possible mark of the task) will be applied for each day a written 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 a technical concern.

Assessment Tasks

Name	Weighting	Hurdle	Due
Project Reports	45%	No	4 times throughout session
Project Demonstration/Presentation	10%	No	Week 12
Log Book	10%	No	Week 12

Name	Weighting	Hurdle	Due
Final Exam	35%	No	Exam Period

Project Reports

Assessment Type [1]: Report
Indicative Time on Task [2]: 40 hours
Due: **4 times throughout session**
Weighting: **45%**

Project Reports

On successful completion you will be able to:

- Design, numerically-model, implement, and test a digital motion control system for a non-linear problem
- Apply problem-solving, initiative, time management, and record keeping skills to complete a significant project in a proficient and timely manner.
- Demonstrate the integration of a convolutional neural network with machine control and automation
- Communicate and collaborate effectively by conveying and sharing knowledge and ideas proficiently using verbal, written, and digital mediums in a professional context.

Project Demonstration/Presentation

Assessment Type [1]: Demonstration
Indicative Time on Task [2]: 10 hours
Due: **Week 12**
Weighting: **10%**

Demonstrate your system performance at the same time that you submit your report. Grade criteria posted to iLearn

On successful completion you will be able to:

- Design, numerically-model, implement, and test a digital motion control system for a non-linear problem
- Apply problem-solving, initiative, time management, and record keeping skills to

complete a significant project in a proficient and timely manner.

- Demonstrate the integration of a convolutional neural network with machine control and automation

- Communicate and collaborate effectively by conveying and sharing knowledge and ideas proficiently using verbal, written, and digital mediums in a professional context.

Log Book

Assessment Type [1]: Log book
Indicative Time on Task [2]: 10 hours
Due: **Week 12**
Weighting: **10%**

Assessment of record keeping in Log book

On successful completion you will be able to:

- Design, numerically-model, implement, and test a digital motion control system for a non-linear problem

- Apply problem-solving, initiative, time management, and record keeping skills to complete a significant project in a proficient and timely manner.

- Apply and evaluate advanced mechatronic principles, such as convolutional neural networks, machine vision, and 3D printing, with critical insight and rigour.

- Communicate and collaborate effectively by conveying and sharing knowledge and ideas proficiently using verbal, written, and digital mediums in a professional context.

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 40 hours
Due: **Exam Period**
Weighting: **35%**

Invigilated Final Exam

On successful completion you will be able to:

- Design, numerically-model, implement, and test a digital motion control system for a non-linear problem

- Apply problem-solving, initiative, time management, and record keeping skills to complete a significant project in a proficient and timely manner.
- Research and evaluate, through advanced knowledge, the modelling and use of modern drive technology
- Apply and evaluate advanced mechatronic principles, such as convolutional neural networks, machine vision, and 3D printing, with critical insight and rigour.
- Demonstrate the integration of a convolutional neural network with machine control and automation

[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
- the Writing Centre 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

Delivery and Resources

Workshop and Practical Classes commence in week 1, inlcuding 9am Feb 24 (week 1).

Methods of Communication: We will communicate with you via your university email and through announcements on iLearn. Queries to convenors can either be placed on the iLearn discussion board or sent to the unit convenor via the contact email on iLearn.

Unit Schedule

See iLearn for details

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (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). 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) 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.

- Workshops
- Chat with a WriteWISE peer writing leader
- 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 http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

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 is the first offereing of this unit; however, we value student feedback to be able to continually improve the way we offer our units. As such we encourage students to provide constructive feedback via student surveys, to the teaching staff directly, or via the FSE Student Experience & Feedback link in the iLearn page.

Unit information based on version 2025.02 of the [Handbook](#)