MTRN3026

Mechatronic Systems

Session 2, In person-scheduled-weekday, North Ryde 2024

School of Engineering

Contents

General Information

Unit convenor and teaching staff

Convenor
Leonardo Callegaro
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Contact via email
44 Waterloo Rd, Level 1
Wed 2-4pm (upon email appointment)

Lecturer
Subhas Mukhopadhyay
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Contact via email
44 Waterloo Rd, Room 134
Mon 9-11am (upon email appointment)

Teaching staff (practicals)
Waqas Afridi
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Credit points
10

Prerequisites
(MTRN2060 or ELEC260) and completion of 130cp

Corequisites

Co-badged status
MTRN6026

Unit description
This unit builds on foundational knowledge completed in 1000 and 2000 level learning, related to Mechatronics, Electrical Circuits, and Signals. The unit emphasises on the Programmable Logic Circuits (PLC), interfacing of input and output devices, program it for using those devices. It also introduces a number of mechatronic specific topics including pneumatics, hydraulics, transformer, AC electric motors and inverter drives. The unit has practical project components that provide students with the opportunity to develop hands-on skills.

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 hurdle requirments.

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 submissions and Resubmissions

Online quizzes, in-class activities, or scheduled tests and exam must be undertaken at the time indicated in the unit guide. All other assessments must be submitted by 12:00 pm on their due date. Should either of these assessments be missed due to illness or misadventure, students should apply for Special Consideration.

Assessments not submitted by the due date will receive a mark in accordance with the late submission policy as follows: A 12-hour grace period will be given after which the following deductions will be applied to the awarded assessment mark: 12 to 24 hours late = 10% deduction; for each day thereafter, an additional 10% per day or part thereof will be applied until five days beyond the due date. After this time, a mark of zero (0) will be given. For example, an assessment worth 20% is due 5 pm on 1 September. Student A submits the assessment at 1 pm, 3 September. The assessment received a mark of 15/20. A 20% deduction is then applied to the mark of 15, resulting in the loss of three (3) marks. Student A is then awarded a final mark of 12/20.

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
Minor Project Report #1	10%	No	Week 5
Mid-term Test	10%	No	Week 8
Minor Project Report#2	10%	Yes	Week 9
Major Project Report	35%	Yes	Week 13
Final Exam	35%	Yes	Exam Period

Minor Project Report #1

Assessment Type [1]: Report
Indicative Time on Task [2]: 10 hours
Due: **Week 5**
Weighting: **10%**

The students will conduct a minor project as part of the pracs activities and write a report on the 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)

Mid-term Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 10 hours
Due: **Week 8**
Weighting: **10%**

Test#2 will be on the topics from Week#1 to Week#6

On successful completion you will be able to:

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

Minor Project Report#2

Assessment Type [1]: Report
Indicative Time on Task [2]: 10 hours
Due: **Week 9**
Weighting: **10%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

The students will conduct 2nd minor project and write a report on the first activity.

On successful completion you will be able to:

- Describe and differentiate the components of mechatronic systems

Major Project Report

Assessment Type [1]: Report
Indicative Time on Task [2]: 30 hours
Due: **Week 13**
Weighting: **35%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Students will contribute to the major project in a team capacity using Programmable Logic Controller (PLC). The assessment's group component will be based on demonstrated collaboration, application of skill and theoretical approach towards the project. The assessment's individual component will be based on the report submitted by each student detailing the project's process, outcomes and findings

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

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 20 hours
Due: **Exam Period**
Weighting: **35%**
This is a hurdle assessment task (see assessment policy for more information on hurdle assessment tasks)

Final Exam covering all unit content

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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[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

Please consult iLearn to access all teaching related materials.

Unit Schedule

A detailed schedule is available on the iLearn page. Classroom activity will start in week1. Note that there will be ***NO PRACTICAL CLASSES in week 1*** *(practical classes start from week 2).*

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/

The Writing Centre

The Writing Centre 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

- The assessment structure has been simplified compared to previous offerings. This year there is one mid-term test only, rather that two tests during the term.
- The unit convenor has been changed from previous year.

Engineers Australia (EA) Competency Standards Mapping

EA Competency Standard		Unit Learning Outcomes
Knowledge and Skill Base	1.1 Comprehensive, theory-based understanding of the underpinning fundamentals applicable to the engineering discipline.	ULO1, ULO2
	1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing.	
	1.3 In-depth understanding of specialist bodies of knowledge	ULO1, ULO2, ULO3, ULO4
	1.4 Discernment of knowledge development and research directions	ULO2
	1.5 Knowledge of engineering design practice	ULO4
	1.6 Understanding of scope, principles, norms, accountabilities of sustainable engineering practice.	
Engineering Application Ability	2.1 Application of established engineering methods to complex problem solving	ULO2, ULO3
	2.2 Fluent application of engineering techniques, tools and resources.	ULO2, ULO3, ULO4
	2.3 Application of systematic engineering synthesis and design processes.	
	2.4 Application of systematic approaches to the conduct and management of engineering projects.	
Professional and Personal Attributes	3.1 Ethical conduct and professional accountability.	ULO4
	3.2 Effective oral and written communication in professional and lay domains.	ULO1, ULO2
	3.3 Creative, innovative and pro-active demeanour.	
	3.4 Professional use and management of information.	
	3.5 Orderly management of self, and professional conduct.	ULO4
	3.6 Effective team membership and team leadership	

Unit information based on version 2024.03 of the Handbook