MTRN3060

Robotics and Automation

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

School of Engineering

Contents

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General Information

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Tutor
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Credit points
10

Prerequisites
MTRN2060 or ELEC260

Corequisites

Co-badged status

Unit description
The unit will build up based on the study of MTRN2060 Introduction to Mechatronics and will cover automation and industrial robotics, their components and systems. The unit will cover different subsystems which will be integrated following a systems approach to the design of Industrial robotic applications with consideration of programming, control and process design. This course uses projects that allow students to integrate multiple mechatronic and robotic systems capable of automating specific, repetitive tasks such as those commonly found in industry. A hands-on practical, project based course.

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

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 requirments (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 submissions and Resubmissions

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 am 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 January. Student A submits the assessment at 1 pm, 3 January. 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
Final examination	40%	No	TBC
In session tests	10%	No	Weekly
Practical assessment	50%	No	TBC

Final examination

Assessment Type [1]: Examination
Indicative Time on Task [2]: 25 hours
Due: **TBC**
Weighting: **40%**

Final examination

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

In session tests

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

In class activities

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]: 25 hours
Due: **TBC**
Weighting: **50%**

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

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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

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

Unit Schedule

Refer to ilearn.

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 ask.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 AskMQ, 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

Major changes applied from the previous offering are as below

1) Contents of practicals have changed to cover more materials on industry-based robots and mobile robots

Engineers Australia Competency Mapping (custom)

A Competency Standard	Unit Learning Outcomes

Knowledge and Skill Base	1.1 Comprehensive, theory-based understanding of the underpinning fundamentals applicable to the engineering discipline.	1, 2, 4
	1.2 Conceptual understanding of underpinning maths, analysis, statistics, computing.	1, 2
	1.3 In-depth understanding of specialist bodies of knowledge	1,2,3,4,5
	1.4 Discernment of knowledge development and research directions	2,5
	1.5 Knowledge of engineering design practice	3,4,5
	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	2,3,5
	2.2 Fluent application of engineering techniques, tools and resources.	2,3,4,5
	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.	3,4,5
	3.2 Effective oral and written communication in professional and lay domains.	3,4,5
	3.3 Creative, innovative and pro-active demeanour.	
	3.4 Professional use and management of information.	2,3,4
	3.5 Orderly management of self, and professional conduct.	4,5
	3.6 Effective team membership and team leadership	

Unit information based on version 2024.04 of the Handbook