



# MECH420

## Mechatronic Engineering Research Thesis A

S1 Day 2018

*Dept of Engineering*

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#### **Disclaimer**

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## General Information

### Unit convenor and teaching staff

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Wednesday, 2-4pm

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### Credit points

6

### Prerequisites

69cp at 100 level or above including (ELEC324 and ELEC326 and (MECH303 or MECH320))

### Corequisites

ELEC466 or MECH468

### Co-badged status

### Unit description

In this unit students will conduct the first half of an individual research thesis on a topic in the Mechatronic Engineering major under the direction of an academic supervisor. The focus of the work will be on the developing the project proposal, conducting the literature review and project planning and design.

## 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:

Ability to undertake a complex engineering specific research project involving the development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in

an effective written dissertation and oral presentation to a variety of audiences in research fora.

Ability to demonstrate an advanced knowledge of contextual factors, research direction, and underpinning information impacting the engineering discipline.

Ability to identify, formulate and solve engineering problems in an ethical manner, including complex and open-ended problems, using established engineering methods, processes, and procedures.

Ability to apply research principles, research methods, and technical standards as well as further learning to identify and provide solutions to complex problems with intellectual independence.

## 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).

For further details about grading, please refer below in the policies and procedures section.

### Hurdle Requirements

The Preliminary Thesis is a hurdle requirement. A grade of 50% or more in the Preliminary Thesis is a condition of passing this unit. If a student gets a mark of at least 40% in Preliminary Thesis, they will be given a second and final attempt to re-submit this task.

Regular meetings with thesis supervisor is a hurdle requirement. See details in assessment task description.

### Late submissions and Resubmissions

Late submissions will attract a penalty of 10% marks per day. Extenuating circumstances will be considered upon lodgement of a formal notice of disruption of studies.

Resubmissions of work are not allowed after due date.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<u>Preliminary Thesis</u>	70%	Yes	Week 13
<u>Presentation</u>	30%	No	TBA
<u>Meetings with Supervisor</u>	0%	Yes	Week 7 and Week 13

## Preliminary Thesis

Due: **Week 13**

Weighting: **70%**

**This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)**

Refer to iLearn for guidelines.

On successful completion you will be able to:

- Ability to undertake a complex engineering specific research project involving the development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in an effective written dissertation and oral presentation to a variety of audiences in research fora.
- Ability to demonstrate an advanced knowledge of contextual factors, research direction, and underpinning information impacting the engineering discipline.
- Ability to identify, formulate and solve engineering problems in an ethical manner, including complex and open-ended problems, using established engineering methods, processes, and procedures.
- Ability to apply research principles, research methods, and technical standards as well as further learning to identify and provide solutions to complex problems with intellectual independence.

## Presentation

Due: **TBA**

Weighting: **30%**

Refer to iLearn for guidelines and dates.

On successful completion you will be able to:

- Ability to undertake a complex engineering specific research project involving the development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in an effective written dissertation and oral presentation to a variety of audiences in research fora.
- Ability to demonstrate an advanced knowledge of contextual factors, research direction, and underpinning information impacting the engineering discipline.
- Ability to identify, formulate and solve engineering problems in an ethical manner,

including complex and open-ended problems, using established engineering methods, processes, and procedures.

- Ability to apply research principles, research methods, and technical standards as well as further learning to identify and provide solutions to complex problems with intellectual independence.

## Meetings with Supervisor

Due: **Week 7 and Week 13**

Weighting: **0%**

**This is a hurdle assessment task (see [assessment policy](#) for more information on hurdle assessment tasks)**

Students are expected to meet with their supervisor on a weekly basis after the project commences. Such weekly meetings would generally last at least 15 minutes or more. In order to pass this unit, students must attend at least 2 out of 4 meetings up to Week 7, and at least 3 out of 5 meetings between Week 8 to Week 12. Meetings do not necessarily need to be face-to-face, but may make use of communication technologies such as video conference, or detailed progress updates through Email.

On successful completion you will be able to:

- Ability to undertake a complex engineering specific research project involving the development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in an effective written dissertation and oral presentation to a variety of audiences in research fora.
- Ability to demonstrate an advanced knowledge of contextual factors, research direction, and underpinning information impacting the engineering discipline.
- Ability to identify, formulate and solve engineering problems in an ethical manner, including complex and open-ended problems, using established engineering methods, processes, and procedures.
- Ability to apply research principles, research methods, and technical standards as well as further learning to identify and provide solutions to complex problems with intellectual independence.

## Delivery and Resources

### Unit Delivery

This is a project-based unit and has no scheduled lectures or tutorial sessions. Special lectures may be organised and related announcements will be made via iLearn.

### Technology Used and Required

The students are required to discuss with their supervisor about the software/hardware resources required for analysis, simulation, testing and experiments related to their project. In addition, word processing software (MS Word, Latex etc.) will be required to produce the preliminary thesis and MS PowerPoint or equivalent software will be required for presentation slides.

Unit Webpage: Access from the online iLearn System at <http://ilearn.mq.edu.au>

### **Required and Recommended Texts/Materials**

There is not set textbook for this unit. The students are required to discuss with their supervisor regarding required/recommended reading materials, as suited to individual project needs.

### **Logbook**

This unit requires a logbook. The students should maintain an individual logbook which should contain a dated log of day-to-day activities undertaken in relation to the project.

## **Policies and Procedures**

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

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

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

### **Student Code of Conduct**

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

## Results

Results shown in *iLearn*, 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](#).

## Student Support

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

## Learning Skills

Learning Skills ([mq.edu.au/learningskills](http://mq.edu.au/learningskills)) provides academic writing resources and study strategies to improve your marks and take control of your study.

- [Workshops](#)
- [StudyWise](#)
- [Academic Integrity Module for Students](#)
- [Ask a Learning Adviser](#)

## Student Services and Support

Students with a disability are encouraged to contact the [Disability Service](#) who can provide appropriate help with any issues that arise during their studies.

## Student Enquiries

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](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.

## Graduate Capabilities

### Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

## Learning outcomes

- Ability to undertake a complex engineering specific research project involving the development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in an effective written dissertation and oral presentation to a variety of audiences in research fora.
- Ability to demonstrate an advanced knowledge of contextual factors, research direction, and underpinning information impacting the engineering discipline.
- Ability to identify, formulate and solve engineering problems in an ethical manner, including complex and open-ended problems, using established engineering methods, processes, and procedures.
- Ability to apply research principles, research methods, and technical standards as well as further learning to identify and provide solutions to complex problems with intellectual independence.

## Assessment tasks

- Preliminary Thesis
- Presentation
- Meetings with Supervisor

## Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

## Learning outcomes

- Ability to undertake a complex engineering specific research project involving the development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in an effective written dissertation and oral presentation to a variety of audiences in research fora.
- Ability to demonstrate an advanced knowledge of contextual factors, research direction, and underpinning information impacting the engineering discipline.
- Ability to identify, formulate and solve engineering problems in an ethical manner,



including complex and open-ended problems, using established engineering methods, processes, and procedures.

- Ability to apply research principles, research methods, and technical standards as well as further learning to identify and provide solutions to complex problems with intellectual independence.

## **Assessment tasks**

- Preliminary Thesis
- Presentation
- Meetings with Supervisor

## **Commitment to Continuous Learning**

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

## **Learning outcomes**

- Ability to undertake a complex engineering specific research project involving the development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in an effective written dissertation and oral presentation to a variety of audiences in research fora.
- Ability to demonstrate an advanced knowledge of contextual factors, research direction, and underpinning information impacting the engineering discipline.
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- Ability to apply research principles, research methods, and technical standards as well as further learning to identify and provide solutions to complex problems with intellectual independence.

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## Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

### Learning outcomes

- Ability to undertake a complex engineering specific research project involving the development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in an effective written dissertation and oral presentation to a variety of audiences in research fora.
- Ability to demonstrate an advanced knowledge of contextual factors, research direction, and underpinning information impacting the engineering discipline.
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- Ability to apply research principles, research methods, and technical standards as well as further learning to identify and provide solutions to complex problems with intellectual independence.

### Assessment tasks

- Preliminary Thesis
- Presentation
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## Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

## Learning outcomes

- Ability to undertake a complex engineering specific research project involving the development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in an effective written dissertation and oral presentation to a variety of audiences in research fora.
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## Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

## Learning outcomes

- Ability to undertake a complex engineering specific research project involving the development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in an effective written dissertation and oral presentation to a variety of audiences in research fora.
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- Ability to apply research principles, research methods, and technical standards as well as further learning to identify and provide solutions to complex problems with intellectual independence.

## **Assessment tasks**

- Preliminary Thesis
- Presentation
- Meetings with Supervisor

## **Effective Communication**

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

## **Learning outcomes**

- Ability to undertake a complex engineering specific research project involving the development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in an effective written dissertation and oral presentation to a variety of audiences in research fora.
- Ability to demonstrate an advanced knowledge of contextual factors, research direction, and underpinning information impacting the engineering discipline.
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## Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

### Learning outcomes

- Ability to undertake a complex engineering specific research project involving the development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in an effective written dissertation and oral presentation to a variety of audiences in research fora.
- Ability to demonstrate an advanced knowledge of contextual factors, research direction, and underpinning information impacting the engineering discipline.
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- Ability to apply research principles, research methods, and technical standards as well as further learning to identify and provide solutions to complex problems with intellectual independence.

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## Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

### Learning outcomes

- Ability to undertake a complex engineering specific research project involving the

development of new knowledge, using appropriate technical laboratory skills, data management and synthesis, critical analysis and interpretation of results; culminating in an effective written dissertation and oral presentation to a variety of audiences in research fora.

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