



# MECH203

## Mechanical Design 1

S2 Day 2017

*Dept of Engineering*

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Unit convenor and Lecturer

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E6B, Department of Engineering

Wednesday, 10 - 12pm

Lecturer

Sammy Diasinos

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Credit points

3

Prerequisites

(ENGG150 or ENGG170 or ELEC170(P)) and (MATH132 or MATH135(P)) and ((PHYS106 and PHYS107) or (PHYS140(P) and PHYS143(P)))

Corequisites

Co-badged status

Unit description

In this unit students will develop their skills in machine drawing and engineering design. The unit will demonstrate to students the processes involved in the selection of machine elements and machine assembly design in an engineering context. The unit will introduce students to the principles of computer-aided design and manufacture.

## 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 identify the usage of different types of permanent and non-permanent joints.

Ability to produce manufacturing drawings that meet industrial standards.

Ability to analyse power transmission, losses and speed reduction ratio in a mechanical engineering system.

Ability to analyse forces and perform stress analysis accurately to design the members of machines and structures.

Ability to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogs and specify appropriate manufacturing techniques for the elements.

Ability to present design concepts effectively and professionally.

## **General Assessment Information**

### **Student Responsibilities**

All students are required to be familiar with University policy and College procedures and act in accordance with those policy and procedures. It is the responsibility of the student to retain a copy of any work submitted. Students must produce these documents upon request. Copies should be retained until the end of the grade appeal period each term. Student is to perform the required due diligent for their assessment grade and rectify as soon as possible upon finding any errors.

### **Notifications**

Formal notification of assessment tasks, grading rubrics and due dates will be posted on iLearn. Although all reasonable measures to ensure the information is accurate, The University reserves the right to make changes without notice. Each student is responsible for checking iLearn for changes and updates.

### **Report and Assignment Tasks**

Assignment Problems will be posted on iLearn at least two weeks before their submission date.

### **Assignment submissions and plagiarism policies**

All assignments and reports must be submitted electronically through iLearn (in pdf format). Submissions may undergo plagiarism checkers using the turnitin software and any work deemed to have 30% or higher similarity score may incur academic penalty. For more details on the policies of academic penalties relating to academic honesty, please refer to the policies and procedures section below. Markers WILL NOT grade poorly organized or illegible scans or drafts. The expected workload includes preparation of final copies and clear diagrams.

### **Late submissions**

Late submissions or absences from tutorials and laboratories will not be accepted without prior arrangement made at least one week before the submission date. Extenuating circumstances will be considered upon lodgement of a formal notice of disruption of studies made before the assessment tasks.

### **Grading and passing requirement for unit**

There is no hurdle assessment for this unit. However, students are required to attain an overall grade that is not lesser than 50% to pass this unit. For further details about grading, please refer below in the policies and procedures section. In order to pass this unit, students are

## Final Examinations

Final examinations will typically take place at the end of the semester. For further information, please refer to the Examination Timetable website on [www.mq.edu.au](http://www.mq.edu.au)

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Diagnostic Quiz</a>	5%	No	Week 2
<a href="#">CAD tests</a>	10%	No	Week 4 and week 7
<a href="#">Quiz</a>	5%	No	Week 10
<a href="#">Design report</a>	15%	No	Week 11
<a href="#">In class assignments</a>	10%	No	Week 8, 9, 12 and 13
<a href="#">Final examination</a>	55%	No	TBA

### Diagnostic Quiz

Due: **Week 2**

Weighting: **5%**

Attendance for this quiz is compulsory. Quiz will be held during lecture. Students will be tested on the Mechanical related contents taught in ENGG150 and also basic mathematics.

On successful completion you will be able to:

- Ability to analyse forces and perform stress analysis accurately to design the members of machines and structures.

### CAD tests

Due: **Week 4 and week 7**

Weighting: **10%**

There will be two tests (5% each) on computer aided drawing (CAD) using the CREO software.

On successful completion you will be able to:

- Ability to produce manufacturing drawings that meet industrial standards.

### Quiz

Due: **Week 10**

Weighting: **5%**

Attendance for this quiz is compulsory. Students will be tested on materials covered in Lectures 1 – 9.

On successful completion you will be able to:

- Ability to identify the usage of different types of permanent and non-permanent joints.
- Ability to analyse forces and perform stress analysis accurately to design the members of machines and structures.
- Ability to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogs and specify appropriate manufacturing techniques for the elements.

## Design report

Due: **Week 11**

Weighting: **15%**

This design report must be well-written and submitted online only. In the event that this assessment task is submitted late, the following penalties will apply; 0 to 24 hours -25%, 24 hours to 48 hours -50%, greater than 48 hours will result in no mark being awarded. Any acts of plagiarisms such as similarities in design report layout, content (e.g. design solutions) and manufacturing drawings will incur academic penalty.

On successful completion you will be able to:

- Ability to identify the usage of different types of permanent and non-permanent joints.
- Ability to produce manufacturing drawings that meet industrial standards.
- Ability to analyse power transmission, losses and speed reduction ratio in a mechanical engineering system.
- Ability to analyse forces and perform stress analysis accurately to design the members of machines and structures.
- Ability to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogs and specify appropriate manufacturing techniques for the elements.
- Ability to present design concepts effectively and professionally.

## In class assignments

Due: **Week 8, 9, 12 and 13**

Weighting: **10%**

There are four in-class assignments (2.5% each). Students are required to produce accurate solutions of their design and manufacturing drawings that meet industrial standards in some of

these assignments. Students are expected to be punctual for these tutorials and marks will only be awarded for assignments that are submitted during the tutorial. Students who are late for these tutorials may not have their assignments marked. No marks will be awarded for attendance.

Any acts of plagiarisms such as similarities in design solution and manufacturing drawings between students in the tutorial class will incur academic penalty.

On successful completion you will be able to:

- Ability to produce manufacturing drawings that meet industrial standards.
- Ability to analyse power transmission, losses and speed reduction ratio in a mechanical engineering system.
- Ability to analyse forces and perform stress analysis accurately to design the members of machines and structures.
- Ability to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogs and specify appropriate manufacturing techniques for the elements.

## Final examination

Due: **TBA**

Weighting: **55%**

This is a closed book exam. Attendance is compulsory for all students. The exam includes multiple choice questions and specific design tasks where accurate solutions of the design analysis are expected.

On successful completion you will be able to:

- Ability to identify the usage of different types of permanent and non-permanent joints.
- Ability to analyse power transmission, losses and speed reduction ratio in a mechanical engineering system.
- Ability to analyse forces and perform stress analysis accurately to design the members of machines and structures.
- Ability to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogs and specify appropriate manufacturing techniques for the elements.

## Delivery and Resources

Richard G Budynas, "Shigley's Mechanical Engineering Design." McGrawHill, 9th Edition. A.W. Boundy, "Engineering drawing." McGrawHill, 5th Edition.

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](#). Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy [http://mq.edu.au/policy/docs/academic\\_honesty/policy.html](http://mq.edu.au/policy/docs/academic_honesty/policy.html)

Assessment Policy [http://mq.edu.au/policy/docs/assessment/policy\\_2016.html](http://mq.edu.au/policy/docs/assessment/policy_2016.html)

Grade Appeal Policy <http://mq.edu.au/policy/docs/gradeappeal/policy.html>

Complaint Management Procedure for Students and Members of the Public [http://www.mq.edu.au/policy/docs/complaint\\_management/procedure.html](http://www.mq.edu.au/policy/docs/complaint_management/procedure.html)

Disruption to Studies Policy (in effect until Dec 4th, 2017): [http://www.mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://www.mq.edu.au/policy/docs/disruption_studies/policy.html)

Special Consideration Policy (in effect from Dec 4th, 2017): <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

In addition, a number of other policies can be found in the [Learning and Teaching Category](#) of 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/support/student\\_conduct/](https://students.mq.edu.au/support/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](http://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 outcome

- Ability to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogs and specify appropriate manufacturing techniques for the elements.

#### Assessment task

- Design report

### 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:

#### Assessment task

- Design report

### 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 identify the usage of different types of permanent and non-permanent joints.
- Ability to produce manufacturing drawings that meet industrial standards.
- Ability to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogs and specify appropriate manufacturing techniques for the elements.

## **Assessment tasks**

- Diagnostic Quiz
- CAD tests
- Quiz
- Design report
- In class assignments
- Final examination

## **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 analyse power transmission, losses and speed reduction ratio in a mechanical engineering system.
- Ability to analyse forces and perform stress analysis accurately to design the members of machines and structures.
- Ability to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogs and specify appropriate manufacturing techniques for the elements.

## Assessment tasks

- Diagnostic Quiz
- Quiz
- Design report
- In class assignments
- Final examination

## 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 analyse forces and perform stress analysis accurately to design the members of machines and structures.
- Ability to analyse, design and select machine elements (e.g. belts and pulleys, chain and sprockets, bearings) off-the-shelf using commercial available catalogs and specify appropriate manufacturing techniques for the elements.

## Assessment task

- Design report

## 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 outcome

- Ability to present design concepts effectively and professionally.

## Assessment tasks

- Quiz
- Design report

- In class assignments
- Final examination