



# MECH204

## Mechanics of Solids

S2 Day 2015

*Dept of Engineering*

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## General Information

Unit convenor and teaching staff

Convenor, Lecturer

Shaokoon Cheng

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Contact via 98509063

E6B, 1.08

Tuesday, 1 - 3pm

Credit points

3

Prerequisites

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

Corequisites

Co-badged status

Unit description

This unit will examine free body diagrams. Stress-strain relations and elastic constants will be analysed in an engineering context. The unit will examine statically determinate stress systems, considering the impacts of direct stress, shear stress, bending stress, torsional stress in an engineering context. Bending moment diagrams, shear force diagrams and deflection of beams will be examined.

## 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 analyse forces in two and three dimensional structures.

Ability to demonstrate understanding on the mechanical properties of materials and analyse mechanical stress and strain of a structure.

Ability to identify and perform stress analysis on different types of mechanical failures in structures.

Ability to apply the concept of stress analysis in the design of structures.

Demonstrate self-learning, time-management, and project management.

## Assessment Tasks

Name	Weighting	Due
<u>Assignment</u>	20%	Week 5 and Week 11
<u>Quiz</u>	10%	Week 9
<u>Laboratory reports</u>	20%	Week 8 and Week 10
<u>Participation and Logging</u>	10%	Every week
<u>Final examination</u>	40%	TBA

### Assignment

Due: **Week 5 and Week 11**

Weighting: **20%**

There will be two assignments and each assignment is worth 10%. All assignments must be submitted with a cover sheet and as PDF documents online using ILEARN. Assignments that are not submitted with the afore-mentioned instructions will not be marked. Due date for the assignments are: Assignment 1: Week 5, Wednesday, 5pm. Assignment 2: Week 11, Wednesday, 5pm.

In the event that an 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.

On successful completion you will be able to:

- Ability to analyse forces in two and three dimensional structures.
- Ability to demonstrate understanding on the mechanical properties of materials and analyse mechanical stress and strain of a structure.
- Ability to identify and perform stress analysis on different types of mechanical failures in structures.
- Ability to apply the concept of stress analysis in the design of structures.

### Quiz

Due: **Week 9**

Weighting: **10%**

This quiz will be held during lecture.

On successful completion you will be able to:

- Ability to analyse forces in two and three dimensional structures.
- Ability to demonstrate understanding on the mechanical properties of materials and analyse mechanical stress and strain of a structure.
- Ability to identify and perform stress analysis on different types of mechanical failures in structures.

## Laboratory reports

Due: **Week 8 and Week 10**

Weighting: **20%**

There will be two laboratory reports and each report is worth 10%. All laboratory reports must be typewritten and must be submitted with a cover sheet and as PDF documents online using ILEARN. Reports that are not submitted with the afore-mentioned instructions will not be marked. Due date for the laboratory reports are: Laboratory report 1: Week 8, Thursday, 5pm. Laboratory report 2: Week 10, Thursday, 5pm.

In the event that a report 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.

On successful completion you will be able to:

- Ability to identify and perform stress analysis on different types of mechanical failures in structures.

## Participation and Logging

Due: **Every week**

Weighting: **10%**

Tutorial and laboratory attendance is compulsory at the enrolled tutorial time. Students who wish to change the tutorial time after the session commences may only do so with the written permission of the unit convener.

Attendance will only be given to students who attempt 2 of 6 of the tutorial questions before they attend the tutorial. Students with tutorial attendance less than 65% may not be allowed to sit for the final examination. Each student must have a bound notebook to be used as a laboratory/tutorial log (A4 size preferred, graph pages are not required). This logbook should also be used for any preliminary work. It should contain all results recorded during these sessions and student's comments in time order. On the completion of each session, log book entries must be signed and dated by a tutor. At the end of the semester the logbooks will be collected and marked to note the degree of importance of the recording of pertinent information.

Food and drink are not permitted in the laboratory. Students will not be permitted to enter the laboratory without appropriate footwear. Thongs and sandals are not acceptable.

On successful completion you will be able to:

- Demonstrate self-learning, time-management, and project management.

## Final examination

Due: **TBA**

Weighting: **40%**

Demonstrate knowledge on lecture and lab/practical material. 3 hour, closed book.

On successful completion you will be able to:

- Ability to analyse forces in two and three dimensional structures.
- Ability to demonstrate understanding on the mechanical properties of materials and analyse mechanical stress and strain of a structure.
- Ability to identify and perform stress analysis on different types of mechanical failures in structures.
- Ability to apply the concept of stress analysis in the design of structures.

## Delivery and Resources

Text book:

R.C. Hibbeler, "Mechanics of Materials." Pearson, 9th 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.html>

Grading Policy <http://mq.edu.au/policy/docs/grading/policy.html>

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

Grievance Management Policy [http://mq.edu.au/policy/docs/grievance\\_management/policy.html](http://mq.edu.au/policy/docs/grievance_management/policy.html)

Disruption to Studies Policy [http://www.mq.edu.au/policy/docs/disruption\\_studies/policy.html](http://www.mq.edu.au/policy/docs/disruption_studies/policy.html) *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

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>.

## 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>) 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>

## IT Help

For help with University computer systems and technology, visit <http://informatics.mq.edu.au/help/>.

When using the University's IT, you must adhere to the [Acceptable Use 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 apply the concept of stress analysis in the design of structures.

## 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:

## Assessment task

- Participation and Logging

## 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 outcome

- Demonstrate self-learning, time-management, and project management.

## 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 analyse forces in two and three dimensional structures.
- Ability to demonstrate understanding on the mechanical properties of materials and analyse mechanical stress and strain of a structure.
- Ability to identify and perform stress analysis on different types of mechanical failures in

structures.

- Ability to apply the concept of stress analysis in the design of structures.

## Assessment task

- Laboratory reports

## 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 forces in two and three dimensional structures.
- Ability to demonstrate understanding on the mechanical properties of materials and analyse mechanical stress and strain of a structure.
- Ability to identify and perform stress analysis on different types of mechanical failures in structures.
- Ability to apply the concept of stress analysis in the design of structures.

## Assessment tasks

- Assignment
- Quiz
- Laboratory reports
- 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 identify and perform stress analysis on different types of mechanical failures in structures.
- Ability to apply the concept of stress analysis in the design of structures.



## Assessment tasks

- Assignment
- Laboratory reports
- Participation and Logging

## 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:

## Assessment tasks

- Assignment
- Laboratory reports
- Participation and Logging