MECH1001

Introduction to Mechanical Engineering

Session 1, In person-scheduled-weekday, North Ryde 2025

School of Engineering

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General Information

Unit convenor and teaching staff
Unit Convenor and Lecturer
Christopher Pastras
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Contact via Contact via Email
3 Management Drive (3 MD), Room 240
Thursday 2-3PM

Credit points
10

Prerequisites
PHYS1510 and (MATH1010 or MATH1015)

Corequisites

Co-badged status
CIVL1001 – Introduction to Civil Engineering

Unit description
The unit introduces the broad field of Mechanical engineering concepts. It will cover fundamental mechanics knowledge that is required to analyse forces in both static and dynamic physical system and also to perform fundamental fluid mechanics analysis. At the end of the unit, students are expected to demonstrate the ability to analyse and solve basic mechanics problems fluently.

Learning in this unit enhances student understanding of global challenges identified by the United Nations Sustainable Development Goals (UNSDGs) Industry, Innovation and Infrastructure; Sustainable Cities and Communities

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: Perform structural analysis of three-dimensional machine frames and structures.

ULO2: Demonstrate proficiency in applying mathematical knowledge to solve fundamental engineering dynamic problems.

ULO3: Solve problems in both static and dynamic systems.

ULO4: Demonstrate proficiency in the presentation of introductory level mechanical engineering solutions.

General Assessment Information

Grading and passing requirements for unit

In order to pass this unit, students must obtain a mark of 50 or more for the unit (i.e. obtain a passing grade of P/ CR/ D/ HD).

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

If you receive special consideration for the final exam, a supplementary exam will be scheduled by the faculty during a supplementary exam period, typically about 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

Assessments must be undertaken at the time indicated in the unit guide. Should these activities be missed due to illness or misadventure, students may 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 at 5 pm on 1 January. Student A submitted the assessment at 1 pm on 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.

Resubmission of work is not allowed.

Log book

It is crucial students' attend weekly workshops to complete their log books on an ongoing basis, which will be assigned in Week 1. Students' work will be discussed and evaluated weekly based on their work performances, which is to be neatly documented in the logbook. This will be marked in a single submission at the end of session.

Final Examinations

Final examinations will take place at the end of the semester. For further information, please refer to the Examination Timetable website on www.mq.edu.au

Assessment Tasks

Name	Weighting	Hurdle	Due	Groupwork/Individual	Short Extension	AI Approach
Final Exam	40%	No	Exam Period		No	
Problem set	30%	No	Week 8		No	
Log book	30%	No	Week 13		No	

Final Exam

Assessment Type [1]: Examination
Indicative Time on Task [2]: 20 hours
Due: **Exam Period**
Weighting: **40%**
Groupwork/Individual:
Short extension [3]: No
AI Approach:

The final exam will be closed book and will test fundamental mechanical engineering concepts on any topic covered in this unit of learning

On successful completion you will be able to:

- Perform structural analysis of three-dimensional machine frames and structures.
- Demonstrate proficiency in applying mathematical knowledge to solve fundamental engineering dynamic problems.
- Solve problems in both static and dynamic systems.
- Demonstrate proficiency in the presentation of introductory level mechanical engineering solutions.

Problem set

Assessment Type [1]: Problem set
Indicative Time on Task [2]: 20 hours
Due: **Week 8**
Weighting: **30%**
Groupwork/Individual:
Short extension [3]: No
AI Approach:

Students will complete a single submission online problem set assessment, based on topics

covered during the session.

On successful completion you will be able to:

- Perform structural analysis of three-dimensional machine frames and structures.
- Demonstrate proficiency in applying mathematical knowledge to solve fundamental engineering dynamic problems.
- Solve problems in both static and dynamic systems.
- Demonstrate proficiency in the presentation of introductory level mechanical engineering solutions.

Log book

Assessment Type [1]: Log book
Indicative Time on Task [2]: 30 hours
Due: **Week 13**
Weighting: **30%**
Groupwork/Individual:
Short extension [3]: No
AI Approach:

Students must keep a log book of their workshop activities which will be marked in a single submission at the end of session.

On successful completion you will be able to:

- Perform structural analysis of three-dimensional machine frames and structures.
- Demonstrate proficiency in applying mathematical knowledge to solve fundamental engineering dynamic problems.
- Solve problems in both static and dynamic systems.
- Demonstrate proficiency in the presentation of introductory level mechanical engineering solutions.

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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
- Academic Success 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.

[3] An automatic short extension is available for some assessments. Apply through the Service Connect Portal.

Delivery and Resources

Textbook(s):

1. "Vector Mechanics for Engineers: Statics and Dynamics" McGraw-Hill, 12th Edition by Beer, Johnston, Mazurek, Cornwell, and Self.
2. "Engineering Mechanics: Statics" Wiley, Volume 1, 8th Edition by J.L. Meriam, L.G. Kraige, J N Bolton.
3. "Engineering Mechanics: Statics" Pearson, 14th Edition by R.C Hibbeler.

Online Platform:

The McGraw-Hill Online platform will provide both in-class and after-class activities. In addition, it will host all the formative online problems and a single problem-set assessment related to the course content.

Course Materials:

For the workshop sessions, it is compulsory to bring a logbook. Please note that the teaching staff will only consider the solutions in this logbook for marking purposes.

Equipment Required:

Ensure you procure these resources and familiarise yourself with the online platform before our first class for an optimal learning experience.

1. **Scientific Calculator:** A high-quality scientific calculator is essential for this course. You are also expected to familiarise yourself with its various functions and operations.
2. **Personal Device (Laptop/Tablet/Mobile Phone):** A personal device, such as a laptop, tablet, or mobile phone, is necessary for accessing the iLearn and McGraw-Hill resources. These devices will also be utilised to complete in-class activities. Make sure your chosen device can efficiently run these platforms.

Unit Schedule

Lectures (Monday, 3-5 PM): Online Zoom Class

Workshop Group 1 (Tuesday, 9 AM - 12 PM): 01CC 115 Groupwork Learning Space

Workshop Group 2 (Tuesday,1 PM - 4 PM): 01CC 115 Groupwork Learning Space

Workshop Group 3 (Thursday, 1 PM - 4 PM): 01CC 107 Groupwork Learning Space

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/

Academic Success

Academic Success 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

This offering will include 13 workshop sessions, starting from Week 1 instead of Week 2. The final session will be dedicated to reviewing and preparing for the final exam.

This offering will include 3 assessments, and no hurdle components.

Engineers Australia Competency 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.	ULO2, ULO3
	1.2 Conceptual understanding of underpinning maths, analysis, statistics, and computing.	ULO1, ULO2, ULO3
	1.3 In-depth understanding of specialist bodies of knowledge	
	1.4 Discernment of knowledge development and research directions	
	1.5 Knowledge of engineering design practice	
	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	ULO1, ULO3
	2.2 Fluent application of engineering techniques, tools and resources.	
	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.	
	3.2 Effective oral and written communication in professional and lay domains.	ULO4
	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.	

Unit information based on version 2024.03 of the Handbook

Unit information based on version 2025.06 of the Handbook