



MECH1001

Introduction to Mechanical Engineering

Session 1, In person-scheduled-weekday, North Ryde 2024

School of Engineering

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General Information

Unit convenor and teaching staff

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Credit points

10

Prerequisites

(PHYS1510 or PHYS140) and (MATH135 or MATH132 or 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.

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.

Hurdle Requirement

Participation in workshop sessions is a hurdle requirement, and students are required to attend at least 10/12 workshop sessions to pass this unit. Note that workshops will start from Week 2 and be held on campus. Students are requested to contact the convenor as soon as possible if they are unable to get back to campus in time.

Late submissions

Online Quizzes, in-class activities, or scheduled tests and exams 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.

All other assessments must be submitted by 11:55 PM on their due date.

Should 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 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

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 |
|---|-----------|--------|-----------------------------------|
| Weekly Practice-based Tasks | 20% | Yes | Every Week (Week 2-8 & Week 9-13) |
| Online quiz | 20% | No | Week 4, Week 8, Week 11, Week 13 |
| Assignments | 10% | No | Week 7, Week 12 |
| Final Exam | 50% | No | TBA |

Weekly Practice-based Tasks

Assessment Type ¹: Practice-based task

Indicative Time on Task ²: 12 hours

Due: **Every Week (Week 2-8 & Week 9-13)**

Weighting: **20%**

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

This is a hurdle assessment task. Development of knowledge and skills requires continual practice at authentic problems and datasets. During each weekly workshop, you will need to complete a set task which will be marked in class. Each week will be worth 2 marks out of a total of 20, and you must achieve a minimum of 16 marks to pass this hurdle assessment. As 12 weekly classes are held and you must achieve a minimum of 16/20 marks, there will be several opportunities to reach the minimum.

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.

Online quiz

Assessment Type ¹: Quiz/Test

Indicative Time on Task ²: 24 hours

Due: **Week 4, Week 8, Week 11, Week 13**

Weighting: **20%**

There will be four online quizzes, each worth 5%. The quiz will be open for a specific time and all students must take the quiz during that time. All students are to ensure that they have their own resources (Computers, tablet, smart phone etc) to take part in the quiz.

On successful completion you will be able to:

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Assignments

Assessment Type ¹: Quantitative analysis task

Indicative Time on Task ²: 16 hours

Due: **Week 7, Week 12**

Weighting: **10%**

There will be two assignments, each worth 5%. A portion of the available grades will be awarded for presentation of work. Markers WILL NOT grade poorly organized or illegible scans or drafts. Well presented work is highly legible, annotated, well structured, and presented with page numbers and student IDs on every page.

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.

Final Exam

Assessment Type ¹: Examination

Indicative Time on Task ²: 20 hours

Due: **TBA**

Weighting: **50%**

This is a close book exam. The final exam will test fundamental mechanical engineering concepts.

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.

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

Textbook(s):

"Vector Mechanics for Engineers: Statics and Dynamics - 12th Edition" by Beer, Johnston, Mazurek, Cornwell, and Self.

Online Platform:

The McGraw-Hill Online platform will provide both in-class and after-class activities. In addition, it

will host all the online quizzes 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:

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.

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

Unit Schedule

Lectures (Wednesday, 9-11 AM): Online Zoom Class

Workshops (Group 1: Monday, 9 AM- 12 PM): 01CC 106 Groupwork Learning Space

Workshops (Group 2: Monday, 2-5 PM): 01CC 106 Groupwork Learning Space

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](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 \(https://students.mq.edu.au/support/study/policies\)](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 \(https://policies.mq.edu.au\)](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

- The classes will be held online via Zoom rather than F2F.
- The topics "Frames and Machines" will also be discussed in the analysis of structures.
- Quiz 2 will now occur in Week 8 instead of Week 7.
- Quiz 3 will be conducted in Week 11, as opposed to the previously planned Week 10.
- The final quiz has been moved to Week 13 rather than Week 12.
- The assignment 1 deadline has been moved to Week 7 instead of Week 6.

This revised schedule ensures an adequate interval for learning and revision between lectures and Quizzes.

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 2024.02 of the [Handbook](#)