CIVL2301
Structural Analysis
Session 2, In person-scheduled-weekday, North Ryde 2023
School of Engineering

Contents

General Information 2
Learning Outcomes 3
General Assessment Information 3
Assessment Tasks 6
Delivery and Resources 8
Unit Schedule 8
Policies and Procedures 8

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## General Information

### Unit convenor and teaching staff

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### Credit points

10

### Prerequisites

CIVL1001

### Corequisites

Co-badged status
Unit description
In this unit, students will be introduced to different aspects of mechanics of solids and structural analysis of trusses, beams and frames. This provides the students with the skills to analyse structures as a foundation skill for different structural designs. Students will develop their understanding of the physical performance of structural members, which are associated with a variety of structural systems in Civil Engineering. They also gain an understanding of the theory and application of structural analysis as it applies to trusses, beams and frames. Specific topics include basic concepts of deformation compatibility; stresses and strains in structural elements, states of stress such as shear, bending, and torsion, displacements and deformations, energy methods for bar and beam structures; simple buckling; deformation of simple frames and beams, the response of linear elastic structures under different mechanical and environmental effects, and structural behaviour considering the distribution of internal forces.

This unit provides an essential foundation for subsequent structural design subjects such as the design of steel, timber and concrete structures in the third year.

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**: Convey a sound knowledge of the theory, concepts, and principles in solid mechanics
- **ULO2**: Analyse reactions, axial forces, bending moments, shear forces, deflection, and stresses in structural elements and systems
- **ULO3**: Perform qualitative and quantitative structural analysis and structural behaviour of different vertical and lateral loads
- **ULO4**: Report the structural analysis process and outcomes to a professional standard in both oral and written forms

General Assessment Information

General Assessment Information

Student Responsibilities
Be familiar with University policy and College procedures and act in accordance with those policies 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.

The student is to perform the required due diligence for their assessment grade and rectify as soon as possible upon finding any errors.

**Late Assessment Submission Penalty**

From 1 July 2022, Students enrolled in Session-based units with written assessments will have the following university standard late penalty applied. Please see [https://students.mq.edu.au/study/assessment-exams/assessments](https://students.mq.edu.au/study/assessment-exams/assessments) for more information.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of ‘0’ will be awarded even if the assessment is submitted. Submission time for all written assessments is set at 11:55 pm. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for [Special Consideration](#).

**Practical Component**

Attendance of practical classes is mandatory before submitting the lab report. Lab reports submitted without attending the practical session will get a grade of ‘0’ even if the assessment is submitted by the due date. A special consideration request must be submitted and approved if any student is unable to attend a practical session to organize alternative arrangements.

**Resubmission option**

Resubmission of any assessment task is not allowed under any circumstances.

**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 one week before their submission date. Submissions will not be accepted if the solution is posted.

**Assignment submissions and plagiarism policies**

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

**Grading and passing requirements for unit**

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

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).

The unit will be graded according to the Macquarie University Grading policy. The following grades will be used according to the listed numerical range:

**ASSESSMENT GRADES AND STATUS**

<table>
<thead>
<tr>
<th>GRADE</th>
<th>RANGE</th>
<th>STATUS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD</td>
<td>85-100</td>
<td>Pass</td>
<td>Provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality, insight, or creativity in identifying, generating, and communicating competing arguments, perspectives or problem-solving approaches; critical evaluation of problems, their solutions, and their implications; creativity in the application as appropriate to the program.</td>
</tr>
<tr>
<td>D</td>
<td>75-84</td>
<td>Pass</td>
<td>Provides evidence of integration and evaluation of critical ideas, principles, and theories, distinctive insight, and ability in applying relevant skills and concepts in relation to learning outcomes. There is a demonstration of frequent originality or creativity in defining and analyzing issues or problems and providing solutions; and the use of means of communication appropriate to the program and the audience.</td>
</tr>
<tr>
<td>CR</td>
<td>65-74</td>
<td>Pass</td>
<td>Provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is a demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; convincing argumentation with appropriate coherent justification; communication of ideas fluently and clearly in terms of the conventions of the program.</td>
</tr>
<tr>
<td>P</td>
<td>50-64</td>
<td>Pass</td>
<td>Provides sufficient evidence of the achievement of learning outcomes. There is a demonstration of understanding and application of fundamental concepts of the program; routine argumentation with acceptable justification; communication of information and ideas adequately in terms of the conventions of the program. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.</td>
</tr>
<tr>
<td>F</td>
<td>0-49</td>
<td>Fail</td>
<td>Does not provide evidence of attainment of learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; missing, undeveloped, inappropriate or confusing argumentation; incomplete, confusing, or lacking communication of ideas in ways that give little attention to the conventions of the program.</td>
</tr>
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**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).
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.

### Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid session quiz</td>
<td>20%</td>
<td>No</td>
<td>Week 8</td>
</tr>
<tr>
<td>Regular problem sets</td>
<td>20%</td>
<td>No</td>
<td>(1) in-class problems every week, (2) quizzes to be notified</td>
</tr>
<tr>
<td>Practical Report</td>
<td>20%</td>
<td>No</td>
<td>Spread across different weeks</td>
</tr>
<tr>
<td>Final Examination</td>
<td>40%</td>
<td>No</td>
<td>TBC</td>
</tr>
</tbody>
</table>

#### Mid session quiz

Assessment Type: Quiz/Test  
Indicative Time on Task: 14 hours  
Due: **Week 8**  
Weighting: **20%**

Mid-session quiz will be run.

On successful completion you will be able to:

- Convey a sound knowledge of the theory, concepts, and principles in solid mechanics
- Analyse reactions, axial forces, bending moments, shear forces, deflection, and stresses in structural elements and systems
- Perform qualitative and quantitative structural analysis and structural behaviour of different vertical and lateral loads

#### Regular problem sets

Assessment Type: Problem set  
Indicative Time on Task: 14 hours  
Due: (1) in-class problems every week, (2) quizzes to be notified
Students will be provided with regular questions to complete (minimum of five in total).

On successful completion you will be able to:

- Convey a sound knowledge of the theory, concepts, and principles in solid mechanics
- Analyse reactions, axial forces, bending moments, shear forces, deflection, and stresses in structural elements and systems
- Perform qualitative and quantitative structural analysis and structural behaviour of different vertical and lateral loads

**Practical Report**
Assessment Type 1: Lab report
Indicative Time on Task 2: 14 hours
Due: Spread across different weeks
Weighting: 20%

Report on the practical work will need to be submitted.

On successful completion you will be able to:

- Convey a sound knowledge of the theory, concepts, and principles in solid mechanics
- Analyse reactions, axial forces, bending moments, shear forces, deflection, and stresses in structural elements and systems
- Perform qualitative and quantitative structural analysis and structural behaviour of different vertical and lateral loads
- Report the structural analysis process and outcomes to a professional standard in both oral and written forms

**Final Examination**
Assessment Type 1: Examination
Indicative Time on Task 2: 28 hours
Due: TBC
Weighting: 40%
The final examination will assess the students’ performance on the content delivered throughout the session.

On successful completion you will be able to:

- Convey a sound knowledge of the theory, concepts, and principles in solid mechanics
- Analyse reactions, axial forces, bending moments, shear forces, deflection, and stresses in structural elements and systems
- Perform qualitative and quantitative structural analysis and structural behaviour of different vertical and lateral loads

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**

Structural Analysis: Understanding Behavior, Bryant G. Nielson (Wiley Publication)

Limited user, e-version is purchased and is available through the library.

**Unit Schedule**

As per the iLearn.

**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
Student Support

• 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 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
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/](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.