

CIVL2130: Structural Analysis 1

Singapore BCA and Callaghan
Semester 1 - 2024



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

OVERVIEW

Course Description CIVL2130 introduces students to mechanics of structures under static loading conditions. The course forms the second of the sequence dealing with structural engineering and geotechnics for Civil and Environmental engineering students.

Specifically, the course objective is to teach students the methods and techniques outlined in the syllabus such that they can solve the type of problems as outlined in the lectures, in the lecture notes and as discussed in tutorials.

Academic Progress Requirements Nil

Assumed Knowledge Content covered in CIVL1100 Fundamentals of Engineering Mechanics (formerly GENG1001 Introductory Mechanics).

Contact Hours
Singapore BCA
Lecture
Face to Face On Campus
2 hour(s) per week(s) for 13 week(s) starting Week 1
Plus informal student consultation.

Tutorial
Face to Face On Campus
3 hour(s) per week(s) for 13 week(s) starting Week 1

Callaghan
Lecture
Face to Face On Campus
2 hour(s) per week(s) for 13 week(s) starting Week 1
Plus informal student consultation.

Tutorial
Face to Face On Campus
3 hour(s) per week(s) for 13 week(s) starting Week 1

Unit Weighting Workload 10
Students are required to spend on average 120-140 hours of effort (contact and non-contact) including assessments per 10 unit course.

COURSE OUTLINE

CONTACTS

Course Coordinator **Singapore BCA and Callaghan**
Dr Md Akhtar Hossain
Akhtar.A.Hossain@newcastle.edu.au
(02) 49854115
Consultation: Scheduling an appointment through email is advised

Teaching Staff Other teaching staff will be advised on the course Canvas site.

School Office **School of Engineering**
EAG02
EA Building
Callaghan
School of Engineering (Callaghan)
SENG-ADMIN@newcastle.edu.au
9.00am-1.00pm and 2.00pm-5.00pm (Monday to Friday)

SYLLABUS

Course Content

- Basic assumptions of theory of structures: ideal materials, small deflections.
- Stress, strain, extension of bars.
- Thermal stresses, thin shells.
- Bending moment and shear force diagrams for beams and simple frames.
- Properties of areas.
- Stresses due to bending normal and shear.
- Beam deflection: integration and unit-load theorem.
- Stability: column buckling.
- Shear centre, torsion of circular sections.
- Principle of work and energy.

Course Learning Outcomes

On successful completion of this course, students will be able to:

1. Formulate complex problems from Theory of Structures into analytical forms
2. Apply appropriate solution techniques from Theory of Structures to mechanical problems
3. Formulate, analyse and calculate the mechanical behaviour of simple structures
4. Recognize and describe analytical limitations used in Theory of Structures

Course Materials

Lecture Materials:

- Power Point lecture slides will be made available on the Canvas course site.

Multi-Media Resource:

- Recordings for lectures will be available via the Canvas course site.

Other Resources:

- Mechanics For optional further reading, the following might be consulted: 1. Mechanics of Materials, 8th Edition SI Units, Ferdinand P. Beer, E. Russell Johnston Jr., John T. DeWolf, David F. Mazurek, McGraw Hill 2. Mechanics of Materials Tenth Edition in SI Units, Russell C. Hibbeler, Pearson Education Inc.

ASSESSMENTS

This course has 3 assessments. Each assessment is described in more detail in the sections below.

	Assessment Name	Due Date	Involvement	Weighting	Learning Outcomes
1	Weekly Quiz	Available in Canvas after each lecture until the beginning of the next lecture	Individual	30%	1, 2, 3, 4
2	Mid-Semester Test	In class in Week 8	Individual	20%	1, 2, 3, 4
3	Formal Examination	Formal exam period	Individual	50%	1, 2, 3, 4

Late Submissions The mark for an assessment item submitted after the designated time on the due date, without an approved extension of time, will be reduced by 10% of the possible maximum mark for that assessment item for each day or part day that the assessment item is late. Note: this applies equally to week and weekend days.

Assessment 1 - Weekly Quiz

Assessment Type	Quiz
Description	The main purpose and benefit of weekly quizzes are to provide the students with regular feedback on student learning progress. Feedback is via quiz grade achieved. These tests will highlight areas of concern and should stimulate discussion with tutor (s) and lecturer. Multiple attempts are allowed.
Weighting	30%
Due Date	Available in Canvas after each lecture until the beginning of the next lecture
Submission Method	Online Multiple attempts are allowed
Assessment Criteria	Full marks for correct answers, no marks for incorrect answers, partial marks for multiple choice/answer questions.
Return Method	Ongoing Assessment
Feedback Provided	In Class - . General feedback will be provided in class before each lecture.

Assessment 2 - Mid-Semester Test

Assessment Type	In Term Test
Description	90 minutes (1 hour, 30 minutes) closed book exam will be held during the lecture. The content of the exam will be the course content covered during the first 6 weeks of lectures.
Weighting	20%
Due Date	In class in Week 8
Submission Method	In Class Exam paper to be submitted at the completion of the exam
Assessment Criteria	Marks for questions will be weighted according to the time taken/steps involved. Partial marks will be awarded for correct working even if the final answer is incorrect
Return Method	Not Returned
Feedback Provided	In Class -. Feedback is via mark achieved. Students WILL NOT be given the opportunity to reattempt this assessment

Assessment 3 - Formal Examination

Assessment Type	Formal Examination
Description	The final formal examination is designed to test the individual student's knowledge of the course material and their ability to describe, analyse and hypothesise from the material. The exam will cover all course content from Week 1 to Week 12. The exam will be a closed book, but a summary of all major formulae will be provided with the examination paper.
Weighting	50%
Due Date	Formal exam period
Submission Method	Formal Exam Exam paper to be submitted at the completion of the exam
Assessment Criteria	Assessment criteria are available on the Canvas site. Marks for questions will be weighted according to the time taken/steps involved. Partial marks will be awarded for correct working

Return Method even if the final answer is incorrect.
Not Returned
Feedback Provided No Feedback - . Feedback is via mark achieved

ADDITIONAL INFORMATION

Grading Scheme

This course is graded as follows:

Range of Marks	Grade	Description
85-100	High Distinction (HD)	Outstanding standard indicating comprehensive knowledge and understanding of the relevant materials; demonstration of an outstanding level of academic achievement; mastery of skills*; and achievement of all assessment objectives.
75-84	Distinction (D)	Excellent standard indicating a very high level of knowledge and understanding of the relevant materials; demonstration of a very high level of academic ability; sound development of skills*; and achievement of all assessment objectives.
65-74	Credit (C)	Good standard indicating a high level of knowledge and understanding of the relevant materials; demonstration of a high level of academic achievement; reasonable development of skills*; and achievement of all learning outcomes.
50-64	Pass (P)	Satisfactory standard indicating an adequate knowledge and understanding of the relevant materials; demonstration of an adequate level of academic achievement; satisfactory development of skills*; and achievement of all learning outcomes.
0-49	Fail (FF)	Failure to satisfactorily achieve learning outcomes. If all compulsory course components are not completed the mark will be zero. A fail grade may also be awarded following disciplinary action.

*Skills are those identified for the purposes of assessment task(s).

Communication Methods

Communication methods used in this course include:

- Canvas Course Site: Students will receive communications via the posting of content or announcements on the Canvas course site.
- Email: Students will receive communications via their student email account.

Course Evaluation

Each year feedback is sought from students and other stakeholders about the courses offered in the University for the purposes of identifying areas of excellence and potential improvement.

Oral Interviews (Vivas)

As part of the evaluation process of any assessment item in this course an oral examination (viva) may be conducted. The purpose of the oral examination is to verify the authorship of the material submitted in response to the assessment task. The oral examination will be conducted in accordance with the principles set out in the [Oral Examination \(viva\) Procedure](#). In cases where the oral examination reveals the assessment item may not be the student's own work the case will be dealt with under the [Student Conduct Rule](#).

Academic Misconduct

All students are required to meet the academic integrity standards of the University. These standards reinforce the importance of integrity and honesty in an academic environment. Academic Integrity policies apply to all students at the University in all modes of study and in all locations. For the Student Academic Integrity Policy, refer to <https://policies.newcastle.edu.au/document/view-current.php?id=35>.

Adverse Circumstances

The University acknowledges the right of students to seek consideration for the impact of allowable adverse circumstances that may affect their performance in assessment item(s). Applications for special consideration due to adverse circumstances will be made using the online Adverse Circumstances system where:

1. the assessment item is a major assessment item; or

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2. the assessment item is a minor assessment item, and the Course Co-ordinator has specified in the Course Outline that students may apply the online Adverse Circumstances system;
 3. you are requesting a change of placement; or
 4. the course has a compulsory attendance requirement.

Before applying you must refer to the Adverse Circumstance Affecting Assessment Items Procedure available at:

<https://policies.newcastle.edu.au/document/view-current.php?id=236>

Important Policy Information

The Help button in the Canvas Navigation menu contains helpful information for using the Learning Management System. Students should familiarise themselves with the policies and procedures at <https://www.newcastle.edu.au/current-students/respect-at-uni/policies-and-procedures> that support a safe and respectful environment at the University.

Graduate Profile Statements

This course builds students' capacity in the following University of Newcastle Bachelor of Engineering Graduate Profile Statements (based on 2011 Engineers Australia revised Stage 1 Competency Standards for Professional Engineers):

UON Att.	University of Newcastle Bachelor of Engineering Graduate Profile Statements/ Engineers Australia Stage 1 competency statements	Taught	Practised	Assessed	Skill Level (1-4)
	Professional Attributes				
11	3.1. Ethical conduct and professional accountability				
12	3.2. Effective oral and written communication in professional and lay domains.		✓	✓	2
13	3.3. Creative, innovative and pro-active demeanour.		✓	✓	2
14	3.4. Professional use and management of information.				
15	3.5. Orderly management of self, and professional conduct.				
16	3.6. Effective team membership and team leadership.		✓	✓	2
	Engineering Ability				
7	2.1. Application of established engineering methods to complex engineering problem solving.	✓	✓	✓	2
8	2.2. Fluent application of engineering techniques, tools and resources.	✓	✓	✓	2
9	2.3. Application of systematic engineering synthesis and design processes.				
10	2.4. Application of systematic approaches to the conduct and management of engineering projects.				
	Knowledge Base				
1	1.1. Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.	✓	✓	✓	2
2	1.2. Conceptual understanding of mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.				
3	1.3. In-depth understanding of specialist bodies of knowledge within the engineering discipline.	✓	✓	✓	2
4	1.4. Discernment of knowledge development and research directions within the engineering discipline.				
5	1.5. Knowledge of contextual factors impacting the engineering discipline.				
6	1.6. Understanding of the scope, principles, norms, accountabilities and bounds of contemporary engineering practice in the specific discipline.				

This course outline was approved by the Head of School on the 29/01/2024. No alteration of this course outline is permitted without Head of School approval. If a change is approved, students will be notified and an amended course outline will be provided in the same manner as the original.

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