

CIVL3180: Structural Analysis 2

Singapore BCA and Callaghan
Semester 1 - 2024



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

OVERVIEW

Course Description	In this course, you will apply advanced methods of structural analysis and explore the fundamental theory and concepts behind existing computer software used for the analysis of complex structural systems. You will also apply a comprehensive knowledge of the theoretical framework underpinning linear-elastic analysis of various types of structures (e.g. statically indeterminate trusses, beams and frames) encountered in civil engineering design work. You will be introduced to the principles of plasticity and non-linear analysis. The skills and knowledge gained in this course are essential for the design of structures.
Academic Progress Requirements	Nil
Assumed Knowledge	Content covered in course CIVL2130 Structural Analysis 1
Contact Hours	Singapore BCA Lecture Face to Face On Campus 3 hour(s) per week(s) for 13 week(s) starting Week 1 Tutorial Face to Face On Campus 2 hour(s) per week(s) for 13 week(s) starting Week 1 Callaghan Lecture Face to Face On Campus 3 hour(s) per week(s) for 13 week(s) starting Week 1 Tutorial Face to Face On Campus 2 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**
A/Prof. Klaus Thoeni
Klaus.Thoeni@newcastle.edu.au
(02) 4921 5735
Consultation: by appointment

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

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

SYLLABUS

Course Content

- Requirements for linear-elastic analysis
- Principle of superposition
- Qualitative analysis
- Statically indeterminate structures
- Force (flexibility) method
- Slope-deflection and moment distribution
- Displacement (stiffness) method
- Influence lines
- Introduction to plasticity theory and non-linear analysis

Course Learning Outcomes

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

1. Apply principles of structural analysis for linear-elastic and non-linear analysis.
2. Analyse complex structures using appropriate techniques.
3. Apply qualitative analysis skills to estimate the behaviour of structures.
4. Analyse complex structures using structural analysis software.
5. Critically analyse and correctly interpret results obtained from structural analysis software.
6. Critically review and present results with respect to design, sustainability and community expectations.

Course Materials

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	Written Assignments	Weeks 4, 6, 8, 10, 12	Individual	45%	1, 2, 3, 4, 5
2	Online Activities	Weeks 3, 13	Individual	10%	3, 6
3	Formal Examination	Exam Week	Individual	45%	1, 2, 3

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 - Written Assignments

Assessment Type Written Assignment
Description Relevant assignments on weekly topics.
Weighting 45%
Due Date Weeks 4, 6, 8, 10, 12
Submission Method Online
Assessment Criteria Assessment criteria are available on the course Canvas site.
Return Method Online
Feedback Provided Online - .
Opportunity to Reattempt Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 2 - Online Activities

Assessment Type Online Learning Activity
Description Online quiz and online discussion.
Weighting 10%
Due Date Weeks 3, 13
Submission Method Online
Assessment Criteria Assessment criteria are available on the course Canvas site.
Return Method Online
Feedback Provided Online - .
Opportunity to Reattempt Students WILL NOT be given the opportunity to reattempt this assessment.

Assessment 3 - Formal Examination

Assessment Type Formal Examination
Description Formal examination during exam period.
Weighting 45%
Due Date Exam Week
Submission Method Formal Exam
Assessment Criteria Assessment criteria are available on the course Canvas site.
Return Method Not Returned
Feedback Provided No Feedback - .
Opportunity to Reattempt Students WILL NOT be given the opportunity to reattempt this assessment.

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 of 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
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;

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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	X		X	2,3
12	3.2. Effective oral and written communication in professional and lay domains.		X		2,3
13	3.3. Creative, innovative and pro-active demeanour.				
14	3.4. Professional use and management of information.		X		2,3
15	3.5. Orderly management of self, and professional conduct.		X		2,3
16	3.6. Effective team membership and team leadership.		X		2,3
	Engineering Ability				
7	2.1. Application of established engineering methods to complex engineering problem solving.	X	X	X	4
8	2.2. Fluent application of engineering techniques, tools and resources.		X	X	4
9	2.3. Application of systematic engineering synthesis and design processes.	X	X	X	4
10	2.4. Application of systematic approaches to the conduct and management of engineering projects.		X		2,3
	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.	X	X	X	4
2	1.2. Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline.	X	X	X	4
3	1.3. In-depth understanding of specialist bodies of knowledge within the engineering discipline.	X	X	X	4
4	1.4. Discernment of knowledge development and research directions within the engineering discipline.	X	X		2,3
5	1.5. Knowledge of contextual factors impacting the engineering discipline.	X	X		2,3
6	1.6. Understanding of the scope, principles, norms, accountabilities and bounds of contemporary engineering practice in the specific discipline.	X	X		2,3

This course outline was approved by the Head of School on the 02/02/24. 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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