UNSW Course Outline

ZEIT3600 Structural Analysis - 2024

Published on the 12 Feb 2024

General Course Information

Course Code : ZEIT3600
Year : 2024
Term : Semester 1
Teaching Period : Z1
Is a multi-term course? : No
Faculty : UNSW Canberra
Academic Unit : School of Engineering and Technology
Delivery Mode : In Person
Delivery Format : Standard
Delivery Location : UNSW Canberra at ADFA
Campus : UNSW Canberra
Study Level : Undergraduate
Units of Credit : 6

Useful Links

Handbook Class Timetable

Course Details & Outcomes

Course Description

Fundamental to structural engineering is the ability to make predictions about how structures will behave when they are subject to some actions. For example, when the Sydney Harbour Bridge was designed by engineers, they needed to be able to predict how it would behave so that they could be confident that it would not fail when loaded by cars, trucks and trains. Making such

predictions is never easy. There are however a range of mathematically based analytical techniques which can be used to make reliable and accurate predictions.

Course Aims

The course aims to introduce the students to some of the methods used in structural analysis. The course covers the fundamental theorems of structural analysis and serves as an introduction to more advanced structural analysis methods.

Relationship to Other Courses

Prerequisite: ZEIT2504 Mechanics of Solids. This course covers the fundamental concepts of stress and strain, which are necessary in structural analysis. Therefore, this course is considered a pre-requisite for ZEIT2600

Course Learning Outcomes

Course Learning Outcomes	Engineers Australia - Engineering Technologist (Stage 1), Engineers Australia - Professional Engineer (Stage 1)
CLO1 : Evaluate and construct shear force, normal force, and bending moment diagrams for beams and frames	• PEE2.3 : Application of systematic engineering synthesis and design processes
CLO2 : Calculate deflections in structures	• PEE2.1 : Application of established engineering methods to complex engineering problem solving
CLO3 : Apply the force method to analyse statically indeterminate structures	• PEE2.2 : Fluent application of engineering techniques, tools and resources
CLO4 : Apply moment distribution method to analyse statically indeterminate structures	• PEE1.1 : Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline
CLO5 : Apply matrix structural analysis to analyse complex indeterminate structures using computer tools	• ET1.3 : In-depth understanding of specialist bodies of knowledge within the technology domain

Course Learning Outcomes	Assessment Item
CLO1 : Evaluate and construct shear force, normal force, and bending moment diagrams for beams and frames	• Practical Lab Reports • Final Exam • Assignments
CLO2 : Calculate deflections in structures	• Practical Lab Reports • Final Exam • Assignments
CLO3 : Apply the force method to analyse statically indeterminate structures	• Practical Lab Reports • Final Exam • Assignments
CLO4 : Apply moment distribution method to analyse statically indeterminate structures	• Practical Lab Reports • Final Exam • Assignments
CLO5 : Apply matrix structural analysis to analyse complex indeterminate structures using computer tools	• Final Exam • Assignments

Learning and Teaching Technologies

Moodle - Learning Management System | Echo 360

Learning and Teaching in this course

Teaching face-to-face through lectures, tutorials, and lab classes. Lectures notes and lecture recordings will be posted on Moodle.

The Learning Management System

Moodle is the Learning Management System used at UNSW Canberra. All courses have a Moodle site which will become available to students at least one week before the start of semester. Please find all help and documentation (including Blackboard Collaborate) at the Moodle Support page.

UNSW Moodle supports the following web browsers:

» Google Chrome 50+
» Safari 10+
** Internet Explorer is not recommended

** Addons and Toolbars can affect any browser's performance.

Operating systems recommended are:

Windows 7, 10, Mac OSX Sierra, iPad IOS10

For further details about system requirements click here.

Log in to Moodle here.

If you need further assistance with Moodle:

For enrolment and login issues please contact:
IT Service Centre
Email: itservicecentre@unsw.edu.au
Phone: (02) 9385-1333
International: +61 2 9385 1333

For all other Moodle issues please contact:
External TELT Support
Email: externalteltsupport@unsw.edu.au
Phone: (02) 9385-3331

International: +61 2 938 53331

Opening hours:
Monday – Friday 7:30am – 9:30 pm
Saturday & Sunday 8:30 am – 4:30pm

Other Professional Outcomes

Understand and apply engineering science to solve complex engineering problems

Additional Course Information

Referencing

In this course, students are required to reference following the APA 7 / Chicago NB referencing style. Information about referencing styles is available at: https://guides.lib.unsw.adfa.edu.au/c.php?g=472948&p=3246720

Study at UNSW Canberra

https://www.unsw.adfa.edu.au/study

Study at UNSW Canberra has lots of useful information regarding:

- Where to get help
- Administrative matters
- Getting your passwords set up
- How to log on to Moodle
- Accessing the Library and other areas.

Additional Information as required

CRICOS Provider no. 00098G
The University of New South Wales Canberra.

Assessments

Assessment Structure

Assessment Item	Weight	Relevant Dates	Australian Institute of Project Management (AIPM), Engineers Australia - Engineering Technologist (Stage 1), Engineers Australia - Professional Engineer (Stage 1)
Practical Lab Reports Assessment Format: Individual	30%	Start Date: Dates will be advised. Due Date: Week 3, Week 5, Week 8, week 11	• PM1 : The program aims, and program-level learning outcomes are to be aligned to the PMBOK® Guide 7th Edition (2021) OR relevant alternative standard or professional reference • ET1.1 : Systematic, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the technology domain • PEE1.2 : Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences which underpin the engineering discipline
Final Exam Assessment Format: Individual	50%	Start Date: Exam period Due Date: Not Applicable	• PM2 : The program must collectively covers all 47 project processes across the ten PMBOK® Guide knowledge areas; and/or the five PMBOK® Guide process groups • ET1.1 : Systematic, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the technology domain • PEE1.3 : In-depth understanding of specialist bodies of knowledge within the engineering discipline
Assignments	20%	Start Date: Week 2	• PM1 : The program aims,

Assessment Format: Individual		Due Date: Week 6 and Week 13	and program-level learning outcomes are to be aligned to the PMBOK® Guide 7th Edition (2021) OR relevant alternative standard or professional reference • ET1.1 : Systematic, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the technology domain • PEE1.3 : In-depth understanding of specialist bodies of knowledge within the engineering discipline

Assessment Details

Practical Lab Reports

Assessment Overview

4 Reports, 1 & 2 worth 5% each, 3 & 4 worth 10% each

Course Learning Outcomes

- CLO1 : Evaluate and construct shear force, normal force, and bending moment diagrams for beams and frames
- CLO2 : Calculate deflections in structures
- CLO3 : Apply the force method to analyse statically indeterminate structures
- CLO4 : Apply moment distribution method to analyse statically indeterminate structures

Detailed Assessment Description

The students are required to attend four lab sessions in the Structural Lab. Afer each practical session, they are required to submit individual reports. Reports 1 & 2 are worth 5% each, while 3 & 4 are worth 10% each.

Assessment information

Students are to submit individual reports.

Assignment submission Turnitin type

Not Applicable

Final Exam

Assessment Overview

n/a

Course Learning Outcomes

- CLO1 : Evaluate and construct shear force, normal force, and bending moment diagrams for beams and frames
- CLO2 : Calculate deflections in structures
- CLO3 : Apply the force method to analyse statically indeterminate structures
- CLO4 : Apply moment distribution method to analyse statically indeterminate structures
- CLO5 : Apply matrix structural analysis to analyse complex indeterminate structures using computer tools

Detailed Assessment Description

The final exam carries 50% of the total mark.

Assessment Length

Two hours

Assignment submission Turnitin type

Not Applicable

Assignments

Assessment Overview

Two assignments carrying each 10% of the total mark - Wk6 & Wk13

Course Learning Outcomes

- CLO1 : Evaluate and construct shear force, normal force, and bending moment diagrams for beams and frames
- CLO2 : Calculate deflections in structures
- CLO3 : Apply the force method to analyse statically indeterminate structures
- CLO4 : Apply moment distribution method to analyse statically indeterminate structures
- CLO5 : Apply matrix structural analysis to analyse complex indeterminate structures using computer tools

Detailed Assessment Description

Two assignments carrying each 10% of the total mark;

General Assessment Information

There will be a non-graded assessment before the census date so students can get written

feedback.

Late Submission of Assessment

Unless prior arrangement is made with the lecturer or a formal application for special consideration is submitted, a penalty of 5% of the total available mark for the assessment will apply for each day that an assessment item is late up to a maximum of 5 days (120 hours) after which an assessment can no longer be submitted and a grade of 0 will be applied.

Use of Generative AI in Assessments

It is prohibited to use any software or service to search for or generate information or answers. If its use is detected, it will be regarded as serious academic misconduct and subject to the standard penalties, which may include 00FL, suspension and exclusion.

Grading Basis

Standard

Requirements to pass course

To be assured of receiving a passing grade a student must achieve at least 50% of the total weighted marks available for the course.

Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 26 February - 1 March	Lecture	
Week 2 : 4 March - 8 March	Tutorial	Shear Force Bending Moment diagrams (Revision)
Week 3 : 11 March - 15 March	Lecture	Deflections of statically determinate structures;
	Assessment	Lab report 1
Week 4 : 18 March - 22 March	Tutorial	Deflections of statically determinate structures;
Week 5 : 25 March - 29 March	Lecture	The force method
	Assessment	Lab report 2
Week 6 : 1 April - 5 April	Tutorial	The force method
	Assessment	Assignment 1
Week 7 : 22 April - 26 April	Lecture	Moment distribution
Week 8 : 29 April - 3 May	Tutorial	Moment distribution
	Assessment	Lab report 3
Week 9 : 6 May - 10 May	Tutorial	Moment distribution
Week 10 : 13 May - 17 May	Lecture	Matrix structural analysis
Week 11 : 20 May - 24 May	Lecture	Matrix structural analysis
	Assessment	Lab report 4
Week 12 : 27 May - 31 May	Tutorial	Matrix structural analysis
Week 13 : 3 June - 7 June	Tutorial	Matrix structural analysis
	Assessment	Assignment 2

Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

General Schedule Information

Canberra Day	Mon 11 Mar	Monday lost
Good Friday	Fri 29 Mar	Friday lost
Easter Monday	Mon 1 Apr	Monday lost
Military Training Day	Wed 24 Apr	Wednesday lost
ANZAC Day Holiday	Thu 25 Apr	Thursday lost
Military Training Day	Fri 10 May	Friday lost
Reconciliation Day	Mon 27 May	Compensation Day: Monday 27 May classes to be delivered on Tuesday 28 May. Tuesday 28 May lost.
King's Birthday	Mon 10 Jun	No compensation (Study week)

Course Resources

Prescribed Resources

The presentation will follow the contents of the required textbook “Structural Analysis” by R.C. Hibbeler. Eight Edition in SI units. Pearson Prentice Hall. This textbook is recommended as it contains many worked examples.

Recommended Resources

In its second part, this course will involve programming in MATLAB. Students are required to bring to class a personal computer capable of running MATLAB. A MATLAB student license can be purchased from:
https://au.mathworks.com/pricing-licensing.html?prodcode=ML&intendeduse=student

Course Evaluation and Development

One of the key priorities in the 2025 Strategy for UNSW is a drive for academic excellence in education. One of the ways of determining how well UNSW is progressing towards this goal is by

listening to our own students. Students will be asked to complete the myExperience survey towards the end of this course.

Students can also provide feedback during the semester via: direct contact with the lecturer, the "On-going Student Feedback" link in Moodle, Student-Staff Liaison Committee meetings in schools, informal feedback conducted by staff, and focus groups. Student opinions really do make a difference. Refer to the Moodle site for this course to see how the feedback from previous students has contributed to the course development.

Important note: Students are reminded that any feedback provided should be constructive and professional and that they are bound by the Student Code of Conduct Policy

https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf

Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Convenor	Amar Khennane		B20	+61 2 5114 5165	Monday to Friday	Yes	Yes
Demonstrator	Kasun Wijesooriya					No	No

Other Useful Information

Academic Information

Course Evaluation and Development

One of the key priorities in the 2025 Strategy for UNSW is a drive for academic excellence in education. One of the ways of determining how well UNSW is progressing towards this goal is by listening to our own students. Students will be asked to complete the myExperience survey towards the end of each course.

Students can also provide feedback during the semester via: direct contact with the lecturer, the "On-going Student Feedback" link in Moodle, Student-Staff Liaison Committee meetings in schools, informal feedback conducted by staff, and focus groups (where applicable). Student opinions really do make a difference. Refer to the Moodle site for your course to see how the feedback from previous students has contributed to the course development.

Important note: Students are reminded that any feedback provided should be constructive and professional and that they are bound by the Student Code of Conduct.

https://www.gs.unsw.edu.au/policy/documents/studentcodepolicy.pdf

Equitable Learning Services (ELS)

Students living with neurodivergent, physical and/or mental health conditions or caring for someone with these conditions may be eligible for support through the Equitible Learning Services team. Equitable Learning Services is a free and confidential service that provides practical support to ensure your mental or physical health conditions do not adversely affect your studies.

Our team of dedicated **Equitable Learning Facilitators** (ELFs) are here to assist you through this process. We offer a number of services to make your education at UNSW easier and more equitable.

Further information about ELS for currently enrolled students can be found at: https://www.student.unsw.edu.au/equitable-learning

Academic Honesty and Plagarism

UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. All students are expected to adhere to UNSW's Student Code of Conduct. Find relevant information at: Student Code of Conduct (unsw.edu.au)

Plagiarism undermines academic integrity and is not tolerated at UNSW. It is defined as using the words or ideas of others and passing them off as your own, and can take many forms, from deliberate cheating to accidental copying from a source without acknowledgement.

For more information, please refer to the following:

https://student.unsw.edu.au/plagiarism

Submission of Assessment Tasks

Special Consideration

Special Consideration is the process for assessing and addressing the impact on students of short-term events, that are beyond the control of the student, and that affect performance in a specific assessment task or tasks.

Applications for Special Consideration will be accepted in the following circumstances only:

- Where academic work has been hampered to a substantial degree by illness or other cause;
- The circumstances are unexpected and beyond the student's control;
- The circumstances could not have reasonably been anticipated, avoided or guarded against by the student; and either:

(i) they occurred during a critical study period and was 3 consecutive days or more duration, or a total of 5 days within the critical study period; or

(ii) they prevented the ability to complete, attend or submit an assessment task for a specific date (e.g. final exam, in class test/quiz, in class presentation)

Applications for Special Consideration must be made as soon as practicable after the problem occurs and at the latest within three working days of the assessment or the period covered by the supporting documentation.

By sitting or submitting the assessment task the student is declaring that they are fit to do so and cannot later apply for Special Consideration (UNSW 'fit to sit or submit' requirement).

Sitting, accessing or submitting an assessment task on the scheduled assessment date, after applying for special consideration, renders the special consideration application void.

Find more information about special consideration at: https://www.student.unsw.edu.au/special/consideration/guide

Or apply for special consideration through your MyUNSW portal.

Late Submission of assessment tasks (other than examinations)

UNSW has a standard late submission penalty of:

- 5% per day,
- capped at five days (120 hours) from the assessment deadline, after which a student cannot submit an assessment, and
- no permitted variation.

Students are expected to manage their time to meet deadlines and to request extensions as early as possible before the deadline.

Electronic submission of assessment

Except where the nature of an assessment task precludes its electronic submission, all assessments must be submitted to an electronic repository, approved by UNSW or the Faculty, for archiving and subsequent marking and analysis.

Release of final mark

All marks obtained for assessment items during the session are provisional. The final mark as published by the university following the assessment review group meeting is the only official mark.