

Module code: MOD009161	Version: 2 Date Amended: 16/Apr/2024
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1. Module Title
Structural Mechanics

2a. Module Leader
Cacin Wong

2b. School
School of Engineering and the Built Environment

2c. Faculty
Faculty of Science and Engineering

3a. Level
4

3b. Module Type
Standard (fine graded)

4a. Credits
15

4b. Study Hours
150

5. Restrictions			
Type	Module Code	Module Name	Condition
Pre-requisites:	None		
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:			

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

The module is about static structural mechanics, which is also known as statics. It is a branch of mechanics that analyses forces and their effects on rigid bodies at rest or in equilibrium. It focuses on studying structures and systems under static loads, where the forces acting on the object are balanced and do not cause motion.

Static structural mechanics is an essential engineering discipline used in various engineering fields, including civil engineering and mechanical engineering. It is used to design and analyse structures, machines, and systems; thus, the principle is used to analyse the forces acting on structures such as bridges, buildings, and trusses.

In this module, you will learn about structures' support and internal reactions to ensure systems are balanced and in equilibrium, which helps designing safe and stable structures.

6b. Outline Content

Structural Analysis and Design:

- Introduction to fundamental and derived units.
- Introduction to the concepts of mass and force.
- Resolution of forces.
- Equilibrium, supports, and reactions.
- Section properties: Derivation of the centroid, first and second moment of area.
- Shear force and bending moment diagrams.
- Stresses and strains.
- Bending and shearing stresses in beams.
- Design philosophy and process of permissible stress method applied to member design.

6c. Key Texts/Literature

The reading list to support this module is available at: <https://readinglists.aru.ac.uk/>

6d. Specialist Learning Resources

Laboratory equipment for Statics

7. Learning Outcomes (threshold standards)

No.	Type	On successful completion of this module the student will be expected to be able to:
1	Knowledge and Understanding	Understand the mechanical behaviours of structural members in respect to various loads
2	Knowledge and Understanding	Demonstrate the knowledge of static mechanics to reach substantiated conclusions using the first principles of mathematics and engineering principles
3	Intellectual, practical, affective and transferrable skills	Employ practical laboratory skills to investigate mechanical behaviours and the effects of external factors on structures
4	Intellectual, practical, affective and transferrable skills	Implement appropriate mechanical analysis to evaluate the structure's performance,

8a. Module Occurrence to which this MDF Refers				
Year	Occurrence	Period	Location	Mode of Delivery
2026/7	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	Hours	Learning Outcomes	Details of Duration, frequency and other comments
Lectures	24	1-4	Two 2 hour sessions per week of lecture and/or computer workshops
Other teacher managed learning	12	1-4	Two 1 hour sessions per week of tutorial and/or computer workshops
Student managed learning	114	1-4	Autonomous study and individual learning activities.
TOTAL:	150		

9. Assessment for the above Module Occurrence					
Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
010	Coursework	3-4	50 (%)	Fine Grade	30 (%)
1500-word equivalent report on structural analysis and design. This element is aligned with the C12 Engineering Council's AHEP4 Learning Outcomes					
Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
011	Examination	1,2,4	50 (%)	Fine Grade	30 (%)
Exam (2 hours) This element is aligned with the C2 Engineering Council's AHEP4 Learning Outcomes					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:

(a) achieve the qualifying mark for each element of fine graded assessment as specified above

(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]