



Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	Solid Mechanics
Unit ID:	ENGRG2301
Credit Points:	15.00
Prerequisite(s):	(ENGRG1003) OR (Enrolled in EZ9 Master of Engineering Technology degree)
Co-requisite(s):	Nil
Exclusion(s):	ENGIN2301
ASCED:	030701

Description of the Unit:

This unit introduces the basics of stress and strain analysis in mechanics of solids. Students learn about different types of stress and strain, explore how materials behave under load, and conduct experiments relevant to the field of solid mechanics. They also apply their understanding to solve engineering problems. By the end, students have a solid foundation in stress and strain principles and their practical application in engineering.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience: Student is not undertaking work experience in industry.

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment

Course Level:

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Learning Outcomes:

On successful completion of the unit the students are expected to be able to:

Knowledge:

- K1.** Describe the fundamental principles of mechanics of solids, including stress, strain, and deformation.
- K2.** Recognize different types of loads and their effects on solid materials.

Skills:

- S1.** Apply mathematical equations and formulas to calculate stress, strain, and deflection in solid structures under various loading conditions.
- S2.** Perform laboratory experiments to validate theoretical predictions.
- S3.** Solve engineering problems related to the design and analysis of solid components and structures

Application of knowledge and skills:

- A1.** Apply principles of mechanics of solids to solve real-world engineering problems encountered in engineering.
- A2.** Communicate and present engineering concepts and solutions effectively using appropriate technical terminology and visualization techniques

Unit Content:

Topics may include:

- Axial stress and axial strain
- Shear stress and shear strain
- General beam bending theory
- Beam subjected to combined bending and axial loads
- Composite beams
- Shear stresses in beams
- Torsion of circular bars and tubes
- Stress transformation equations and Mohr`s circle
- Stress analysis under plane stress conditions
- Deflection of beams
- Buckling of columns

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, S1, S3, A2	Participation in all learning activities including attendance and participation in lectures and tutorials, exercises, recommended and supplementary readings or other activities. Undertake problem solving of engineering problems relevant to mechanics of solids in both invigilated and non-invigilated settings.	Assessed tutorials, Quizzes, Oral Assessments	40 -60%
K1, K2, S1, S3, A1	Relates fundamental knowledge of mechanics of solids to observations in a controlled environment and/or to solve a design oriented based problem.	Presentation or design report	15 - 35%
S2, A2	Undertake an experiment relevant to mechanics of solids to validate the application of theory in practice	Lab report	15 - 35%

Adopted Reference Style:

IEEE

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