Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	STRUCTURAL ENGINEERING 1
Unit ID:	ENGPG9103
Credit Points:	15.00
Prerequisite(s):	Nil
Co-requisite(s):	Nil
Exclusion(s):	(ENGRG2104)
ASCED:	030999

Description of the Unit:

In this unit students will develop their ability and skills in structural analysis with applications to real structural engineering situations covering the linear analysis of planar structures at the element level (beams and columns) and the whole structure level (trusses and frames). It also covers the analysis of indeterminate structures using both manual methods and an industry-standard computer program.

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						
Intermediate			✔			
Advanced						

Learning Outcomes:

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

Knowledge:

K1. Understand the internal forces and their intensities in structures

K2. Develop a comprehensive understanding of theoretical principles of structural analysis

K3. Differentiate between the complexities and methods by which determinate and indeterminate structural systems are analysed.

Skills:

S1. Model, analyse and evaluate structures at both member level and structure level.

S2. Analyse structural systems using computer software.

S3. Summarize processes of structural analysis professionally including details of manual or computer modelling, along with outcomes and conclusions.

Application of knowledge and skills:

A1. Analyse structures for the purpose of obtaining results necessary for structural design.

A2. Model and analyse real structures using an existing industry-standard computer program, interpret the results and perform manual checks to validate the results.

Unit Content:

Topics may include:

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- Internal Forces: Shear Force and Bending Moment Diagrams
- Centroid and second Moment of Area (Moment of Inertia)
- Analysis of statically determinate structures (frames and trusses)
- Stress transformation equations and Mohr`s circle
- Bending stresses and shear stresses
- Buckling of columns
- Deflections of beams
- Introduction to analysis of statically indeterminate structures
- Analysis of indeterminate Structures: The Slope-deflection method
- Introduction to computer analysis of structures and Space Gass

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
S1, S2, S3, A1, A2	An assignment based around a laboratory or design task in structural analysis	Report	30 - 40%
K1, K2	Mid-semester class test	Open book or close book test	10 - 20%
K1, K2, K3	An examination on any or all of the material covered in the unit.	Exam	30 - 50%

Adopted Reference Style:

IEEE

Refer to the [library website](#) for more information

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