



Module Descriptor Form

Civil and Environmental Engineering

EO106 - Structural Analysis 1

Module Code	EO106	Module Title	Structural Analysis 1				
Module Registrar	Cochrane, Mr Neil A						
Other Staff Involved	Dr James M Leak (Lecturer)						
Credit Weighting	20	Semester	2	Elective	No	Academic Level	1
Pre-requisites	EO105						
Required for							

Module Format and Delivery (hours):

Lectures	Tutorials	Assignments	Labs	Private Study	Total
20	50	40	10	80	200

Educational Aim

This module aims to:

This module aims to provide a basic introduction to structural engineering, including the concepts of equilibrium, internal forces, pin-jointed trusses. These lay the foundation for subsequent classes in structures.

Syllabus

This module will teach the following:

Equilibrium

- Concept of force and moment
- Equilibrium of a particle
- Equilibrium of a rigid body
- Equilibrium of multipart structures

Analysis of pin-jointed trusses

- Internal forces in pin-jointed frame systems
- Method of joints
- Method of sections

Internal actions

- Axial force, shear force, and bending moments
- Internal action diagrams for statically determinate structures

Learning Outcomes

On Completion of the module, the student is expected to be able to:

LO: 1	Find the resultant & equilibrant of a system of forces
LO: 2	Understand the equilibrium of rigid bodies and multi-part structures
LO: 3	Resolve forces in pin-jointed frames in two dimensions
LO: 4	Calculate internal action diagrams for statically determinate structures

(UK SPEC suggests no more than 4 learning outcomes per module. Statements must be broad and be syllabus free and link in with the intended learning outcomes on the programme specifications.)

Assessment of Learning Outcomes - Criteria

Learning Outcome: 1

	Criteria
1	Ability to plot forces, moments, and resultants
2	Ability to apply Newton's laws of motion
3	Ability to describe the equilibrium condition for concurrent and coplanar forces

Learning Outcome: 2

	Criteria
1	Ability to evaluate if a structure is statically determinate
2	Ability to evaluate the support reactions in statically determinate structures
3	Ability to use trigonometry and geometry to draw the free body diagram of forces acting on rigid bodies of systems of rigid bodies.

Learning Outcome: 3

	Criteria
1	Ability to use the method of joints to compute internal forces in pin-jointed frames
2	Ability to use the method of sections to compute internal forces in pin-jointed frames.

Learning Outcome: 4

	Criteria
1	Ability to use free-body diagram to calculate shear forces and bending moment.
2	Ability to take equilibrium at any location to predict the math expressions for BM and SF
3	Ability to draw internal force diagrams and validate the results by using different methods
4	Ability to evaluate internal force diagrams for basic structures

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

To Pass the module, students need to gain a summative mark of: 40%

Description	Semester	Start Week	Duration	Weight	Submission Week	Linked Criteria
SA11: Online Test – Support Reactions	2	3		5%	5	LO 1: C1, C2, C3
SA12: Lab A – Equilibrium	2	4		15%	6	LO 1: C1, C2, C3 LO 2: C1, C2, C3
SA12: Online Test – Multi-Part Structure	2	4		5%	7	LO 2: C1, C2, C3
SA14: Methods of Joints and Sections	2	6		10%	8	LO 2: C3 LO 3: C1, C2
SA15: Lab B – Trusses	2	8		15%	9	LO 2: C3 LO 3: C1, C2
SA17: Examination. Closed Book	2		2.00	40%	E	LO 1: C1, C2, C3 LO 2: C1, C2, C3 LO 3: C1, C2 LO 4: C1, C2, C3, C4
SA16: Internal Forces	2	11		10%	E	LO 4: C1, C2, C3, C4

Principles of Assessment Feedback

- The assessment of the module has been designed to encourage student engagement and understanding of this topic . Four different assessment methods are used: examination, online quizzes, peer analysis and verification, and lab report submission. The first two are at individual level, the latter are a group submission.
- Assessments and methods are clearly explained to students at the start of the course .
- All assessments are marked in an appropriate , fair and transparent way with pre-specified marking criteria.
- Timely, constructive, and supportive feedback is given to students to help them understand the extent to which they have fulfilled the assessment criteria and support future development of their work.
- Tutorial classes are held regularly for one-to-one interaction between instructors and students and timely feedback.
- The course is reviewed every year , based on feedback from students collected in the form of a mid-term and one end-term questionnaire. Any recommended changes are reviewed and implemented in the next academic year.

Additional Information**Resit Procedure**

Students must gain a summative mark of 40% to pass the module. Attendance at the end of semester exam is a requirement of this module. Absence from the final exam will result in an 'absent' mark being returned . Students who fail the module at the first attempt will be re-examined during the August diet. No marks from any previous attempts at the exam or coursework will be transferred to overall grade returned after the resit examination.

Recommended Reading

978-1292247236 – Hibbeler, R.C. (2020) Structural analysis

978-0081025871 – Megson, T.H.G. (2019) Structural and stress analysis

978-0333677605 – Williams, M. & Todd, J.D. (2020) Structures: theory and analysis

978-0582256323 – Hannah, J. & Hillier, M.J., (1995) Applied mechanics

978-1111577742 – Gere, J.M. & Goodno, B.J. (2013) Mechanics of materials

978-1315652139 – Millais, M. (2017) Building structures

978-0955631108 – Bohn, D. (2005) Understanding structural analysis

978-0333962558 – Smith, P (2001) An introduction to structural mechanics

978-0306812835 – Gordon, J.E (1991) Structures, or, Why things don't fall down

978-0140135978 – Gordon, J.E (1991) The new science of strong materials: or, Why you don't fall through the floor

Module Timetable

Week	Semester 1	Semester 2
0		
1		
2		
3		
4		
5		Submission 5%
6		Submission 15%
7		Submission 5%
8		Submission 10%
9		Submission 15%
10		
11		
E		Submission 10%, Examination 40%

Date of Last Modification

28-08-2025