

# Structural Analysis and Design I

## Module Information

2022.02, Approved

### Summary Information

Module Code	4301CIV
Formal Module Title	Structural Analysis and Design I
Owning School	Civil Engineering and Built Environment
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 4
Grading Schema	40

### Teaching Responsibility

LJMU Schools involved in Delivery
Civil Engineering and Built Environment

### Learning Methods

Learning Method Type	Hours
Lecture	44
Practical	6
Tutorial	22

### Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-CTY	CTY	January	12 Weeks

### Aims and Outcomes

Aims	To introduce structural mechanics and provide an understanding of the basic concepts and techniques, with emphasis on the application of these to the solution of statically determinate structures. To apply mathematical and geometrical calculations to the determination of structural properties of sections. To design and detail simple structural elements in compliance with current codes of practice and standards with due consideration for sustainability.
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**After completing the module the student should be able to:**

### Learning Outcomes

Code	Number	Description
MLO1	1	Perform structural analysis for determinate trusses and beams.
MLO2	2	Analyse various shapes of cross section to determine: cross sectional area, centre of gravity, second moment of area and section modulus.
MLO3	3	Design Simple Structural Steel Elements.
MLO4	4	Design Simple Reinforced Concrete Elements
MLO5	5	Perform laboratory experiments safely and interpret experimental data to deduce structural behaviour.

### Module Content

Outline Syllabus	Analysis component: principles of equilibrium, load paths, axial forces, resolution of forces, analysis of pin-jointed frames, free body diagrams, actions, shear force and bending moment relationships, cantilevers and simply supported beams, properties of sections, use of standard formulae or manufacturer's published tables in steel. Design component: concept of limit state design, design of reinforced concrete and steel beams, classification of Universal Beam and Universal Column sections, moment capacity, shear resistance and deflection, concrete beam design for bending moment and shear, detailing and reinforcing requirements, design of columns. Health and Safety, both in terms of experimental laboratory work and the use of materials on site.
Module Overview	
Additional Information	The module prepares students to achieve an understanding of and be familiar with structural analysis of statically determinate structures. It will demonstrate how simple representative engineering problems can be formulated and solved. Students should develop a competence in using scientific equipment adopting an active learning approach. Learners will carry out the design of common structural elements to the appropriate Code of Practice or European Code of Practice. Laboratory work will have an emphasis on the manipulation, interpretation and analysis of the data, which should allow students to assess whether theoretical assumptions are supported by laboratory observations.

### Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	Practical based report	30	0	MLO4, MLO5, MLO3
Centralised Exam	Examination	70	2	MLO4, MLO2, MLO1, MLO3

### Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Yaser Jemaa	Yes	N/A

**Partner Module Team**

Contact Name	Applies to all offerings	Offerings
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