

Liverpool John Moores University

Title: STRUCTURAL ANALYSIS AND DESIGN
Status: Definitive
Code: **4305CIVH** (123240)
Version Start Date: 01-08-2021

Owning School/Faculty: Civil Engineering and Built Environment
Teaching School/Faculty: Civil Engineering and Built Environment

Team	Leader
Yaser Jemaa	Y

Academic Level: FHEQ4
Credit Value: 20
Total Delivered Hours: 74
Total Learning Hours: 200
Private Study: 126

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	48
Practical	8
Workshop	16

Grading Basis: BTEC

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	REPORT <2000 WORDS	40	
Exam	AS2	EXAMINATION	60	2

Aims

To provide learners an opportunity to develop the skills required to analyse statically determinate structures in compliance with current codes of practice and standards and design and detail structural elements.

To demonstrate and explore structural behaviour through experimentation.

Learning Outcomes

After completing the module the student should be able to:

- 1 Analyse bending moments and shear forces for statically determinate structures.
- 2 Analyse bending deflections for statically determinate structures.
- 3 Appraise the behaviour of elastic columns subjected to axial loading.
- 4 Apply design methods and detail elements of a structure.
- 5 Design beams and columns in steel and reinforced concrete.
- 6 Undertake structural experimental procedures.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

REPORT <2000 WORDS	1	6					
EXAMINATION	1	2	3	4	5	6	

Outline Syllabus

Axial forces: Frames; resolution of joints; method of sections; horizontal, vertical and inclined members.

Bending moments and shear forces: cantilevers and supported beams; point loads; uniformly distributed loads; bending moment diagrams; shear force diagrams.

Properties of sections: sectional properties (simple beam sections); use of standard formulae or manufacturer's published tables in steel and in-situ reinforced concrete.

Bending deflections: bending deflection in beams (variety of materials for beam selection)

Bending stresses: variation across a section for simply supported beams and cantilevers; axial and bending stress on a column.

Axial load carrying capacity: elastic buckling, Euler's method, concept of effective length.

Design methods: steel beams and columns; concept of limit state design, classification of Universal Beam and Universal Column sections; moment capacity, shear resistance and deflection, Concrete beam and column reinforcing requirements, design status of column, columns under axial load with bending moments about one axis; timber beams and posts, masonry columns (square and rectangular only).

Learning Activities

Lectures, analysis and design workshops and practical sessions.

Notes

This module focuses on the skills required to analyse construction designs and appraise statically determinate structures. Learners will carry out the design of

common structural elements to the appropriate British Standard, Code of Practice or European Code of Practice.