

Liverpool John Moores University

Title: STRUCTURAL ANALYSIS AND DESIGN
Status: Definitive
Code: **5110BEHN** (118148)
Version Start Date: 01-08-2016

Owning School/Faculty: Civil Engineering
Teaching School/Faculty: Civil Engineering

Team	Leader
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Academic Level: FHEQ5 **Credit Value:** 24 **Total Delivered Hours:** 89
Total Learning Hours: 240 **Private Study:** 151

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	48
Practical	15
Tutorial	24

Grading Basis: BTEC

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1	Report	30	
Exam	AS2	Exam	70	2

Aims

To provide learners an opportunity to develop the skills required to analyse and design statically determinate and indeterminate structures in compliance with current Codes of practices and standards.

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 and indeterminate 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 continuous beams 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	1	6		
Exam	2	3	4	5

Outline Syllabus

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

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

Bending moments and shear forces: cantilevers and supported beams; point loads; uniformly distributed loads; bending moment diagrams; shear force diagrams; two span beams using moment distribution, bending moment and shear force envelopes.

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, classification of Universal beam and Universal Column sections; moment capacity, shear resistance and deflection, 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, tutorials, laboratory practicals.

Notes

This module focuses on the skills required to analyse construction designs and appraise statically determinate and indeterminate structures. Learners will carry out the design of common structural elements to the appropriate British Standard, Code of Practice or European Code of Practice.