

## Liverpool John Moores University

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Title: STRUCTURAL ANALYSIS AND DESIGN  
Status: Definitive  
Code: **4217BEHN** (119867)  
Version Start Date: 01-08-2016

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

Team	Leader
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**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	9
Tutorial	15

**Grading Basis:** BTEC

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Report	AS1		30	
Exam	AS2		70	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	1	6		
Exam	2	3	4	5

## **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, 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 structures. Learners will carry out the design of common structural elements to the appropriate British Standard, Code of Practice or European Code of Practice.