

## Liverpool John Moores University

Title: ADVANCED STRUCTURAL DESIGN  
Status: Definitive  
Code: **6029BEUG** (102809)  
Version Start Date: 01-08-2016

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

Team	Leader
Hassan Al Nageim	Y

**Academic Level:** FHEQ6      **Credit Value:** 24      **Total Delivered Hours:** 51  
**Total Learning Hours:** 240      **Private Study:** 189

### Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Tutorial	24

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	open book	70	3
Test	AS2	in class assessment	30	

### Aims

*To develop and consolidate the structural application, design, evaluation and analysis introduced in the Level 2 with more advanced application to steel, masonry, pavement for roads and highways and concrete building elements/structures, using the current codes of practice including the EC code of practices.*

*To develop the ability to design and analyse highways and pavement structure in accordance with the current codes of practices.*

## Learning Outcomes

After completing the module the student should be able to:

- 1 Critically analyse the design process and apply it to complex structural elements using different building materials and under different environmental and loading conditions.
- 2 Produce safe and economical designs in accordance with the current codes of practice including the EC code of practices.
- 3 Design more advanced structural elements in reinforced and prestressed concrete, masonry and steel structures.
- 4 Evaluate and use computer applications in the design process.
- 5 Produce safe and economical designs of bituminous road and highways pavements in accordance with the current codes of practice.

## Learning Outcomes of Assessments

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

EXAM	1	2	3	5	
IN CLASS ASSESSMENT	1	2	3	4	5

## Outline Syllabus

*Reinforced concrete work to BS8110 - Frame analysis; design and detailing. Design of; ribbed floor slabs, flat slabs and slender columns. Crack-width and deflection calculations, Prestressed concrete; Pre-tensioned and Post-tensioned flexural members, losses of pre-stress.*

*Steelwork to BS 5950 & EU 3; Compound (plated) beams, plate girders, cased columns and cased beams.*

*Load bearing masonry to BS 5628; Solid and cavity walls, design of masonry columns and lateral strength.*

*Computer aided design - Use of computer software in the design and detailing of structures.*

*Design and analyses of roads and highways pavements. Testing road materials for strength and stiffness. Testing includes, Stiffness Modulus for bituminous materials, binder's viscosity, and deformations.*

## Learning Activities

Combination of lectures, Laboratory testing samples/specimens, tutorials and project works supported by video and slides. The module contains laboratory experimental and practical problems solving that should develop a competence in understanding structure behaviors under different loading environment. Supportive materials in the form of British Standards and the European codes of practices and case studies from practical consultancy work will be used and the students can see the relevance of the subject to the building team in the construction industry.

## **Notes**

This module is intended to extend, develop and consolidate the structural design introduced at Level 2, with particular reference to the use of Codes of Practice and other Standards in practical and more advanced design levels using different loading and environmental conditions.