

Liverpool John Moores University

Title: ADVANCED STRUCTURAL DESIGN
Status: Definitive
Code: **6102BEUG** (117898)
Version Start Date: 01-08-2021

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

| Team | Leader |
|------------------|--------|
| Michaela Gkantou | Y |

Academic Level: FHEQ6
Credit Value: 24
Total Delivered Hours: 103
Total Learning Hours: 240
Private Study: 137

Delivery Options

Course typically offered: Standard Year Long

| Component | Contact Hours |
|-----------|---------------|
| Lecture | 72 |
| Practical | 4 |
| Tutorial | 12 |
| Workshop | 12 |

Grading Basis: 40 %

Assessment Details

| Category | Short Description | Description | Weighting (%) | Exam Duration |
|----------|-------------------|----------------|---------------|---------------|
| Exam | AS1 | Open Book Exam | 70 | 3 |
| Report | AS2 | Report | 30 | |

Aims

To develop and consolidate the structural application, design, evaluation and analysis introduced at 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 emphasize sustainability, health and safety in design of reinforced concrete and

steel structures.

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 and critically review safe and economical design in accordance with the EC codes of practice.
- 3 Design more advanced structural elements in reinforced and prestressed concrete, masonry, steel structures and pavement engineering for roads and highways.
- 4 Produce and critically review safe and economical designs of structures in accordance with the current codes of practice.

Learning Outcomes of Assessments

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

| | | | |
|----------------|---|---|---|
| OPEN BOOK EXAM | 1 | 2 | 3 |
| REPORT | 4 | | |

Outline Syllabus

Reinforced concrete work to EC2: Frame analysis- design and detailing, Design of: ribbed floor slabs, waffle slabs and slender columns. Prestressed concrete; Pre-tensioned and Post-tensioned flexural members, losses of pre-stress force.

Steelwork to EU 3: laterally unrestrained beams, plate girders, cased columns and steel bracing.

Loading conditions (to EC1)

Load bearing masonry: Solid and cavity walls, design of masonry columns and lateral strength.

Design and analyses of roads and highways pavements: including destructive and non destructive testing.

Learning Activities

Combination of lectures, Laboratory testing including destructive and non destructive testing, tutorials and project works supported by video and slides. The module contains practical problems solving that should develop a competence in understanding structure design and behaviors under different loading environments. Supportive materials in the form of British Standards, European codes of practices

and case studies from practical consultancy work are provided to conduct and evaluate design proposals and for the student to work as a team member and demonstrate team working and presentation skills.

Notes

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