**Liverpool** John Moores University

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| Title: | STRUCTURAL ANALYSIS AND DESIGN |
| Status: | Definitive |
| Code: | **5205CIV** (122931) |
| 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 |
| Clare Harris | |

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| **Academic Level:** | FHEQ5 | **Credit Value:** | 20 | **Total Delivered Hours:** | 85 |
| **Total Learning Hours:** | 200 | **Private Study:** | 115 | | |

**Delivery Options**
Course typically offered: Semester 1

| Component | Contact Hours |
|---|---|
| Lecture | 44 |
| Practical | 12 |
| Tutorial | 22 |
| Workshop | 5 |

**Grading Basis:** 40 %

**Assessment Details**

| Category | Short Description | Description | Weighting (%) | Exam Duration |
|---|---|---|---|---|
| Exam | AS1 | EXAMINATION | 70 | 2 |
| Report | AS2 | REPORT ON ANALYSIS AND DESIGN, INCLUDING LAB RESULTS (<2000 WORDS) | 30 | |

**Aims**

*To introduce the analysis of statically indeterminate structures and the analysis of the plastic behaviour of steel structures.*

*To design and detail structural elements in reinforced concrete and structural steelwork using Eurocode 2 and 3.*

*Introduce students to the use of software for the analysis and design of structures.*

## Learning Outcomes

After completing the module the student should be able to:

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|---|---|
| 1 | Analyse indeterminate beams, rectangular portal frames and columns |
| 2 | Evaluate deflection in beams and frames. |
| 3 | Design and detail flexural and compression elements in reinforced concrete and structural steel. |
| 4 | Design and detail continuous flanged beams in reinforced concrete. |
| 5 | Design connections between steel elements. |
| 6 | Collect, process and report on data from laboratory experiments |

## Learning Outcomes of Assessments

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

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|---|---|---|---|---|---|
| EXAMINATION | 1 | 2 | 3 | 4 | 5 |
| ANALYSIS & DESIGN REPORT | 1 | 2 | 3 | 4 | 6 |

## Outline Syllabus

*Analysis of beams.*
*Statically indeterminate beams, deflection, composite (flitch) beams.*
*Analysis of Frames, including sway*
*Moment distribution, plastic analysis, virtual work, slope deflection*
*Analysis of columns.*
*Reinforced concrete design and detailing to EC2 of rectangular and flanged beams, slabs, pad foundations and stocky columns.*
*Structural steelwork design and detailing to EC3 of laterally restrained and unrestrained beams, columns and connections.*

## Learning Activities

Lectures, tutorials, problem-solving sessions, laboratory practical work, use of specialist computer software.

## Notes

The analysis and design of structures. Students will develop their analytical skills to include the analysis of redundant structures, and will learn to apply the Eurocodes in the design of simple concrete and steel structures. They will also be introduced to

industry standard analysis and design software.