

Module Information

2022.01, Approved

Summary Information

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| Module Code | 7306CIV |
| Formal Module Title | Advanced Structural Design and Bridge Engineering |
| Owning School | Civil Engineering and Built Environment |
| Career | Postgraduate Taught |
| Credits | 20 |
| Academic level | FHEQ Level 7 |
| Grading Schema | 50 |

Teaching Responsibility

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| LJMU Schools involved in Delivery |
| Civil Engineering and Built Environment |

Learning Methods

| Learning Method Type | Hours |
|----------------------|-------|
| Lecture | 33 |
| Seminar | 11 |
| Tutorial | 22 |

Module Offering(s)

| Display Name | Location | Start Month | Duration Number Duration Unit |
|--------------|----------|-------------|-------------------------------|
| JAN-CTY | CTY | January | 12 Weeks |

Aims and Outcomes

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| Aims | Appreciate the underlying differences in the behaviour and analysis of bridges and large structures and develop critical understanding of the philosophies of current Codes of Practice and in using appropriate methods for the design of steel, composite, prestressed concrete, tensile cables and bridge elements/deck structures |
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After completing the module the student should be able to:

Learning Outcomes

| Code | Number | Description |
|------|--------|--|
| MLO1 | 1 | Critically evaluate the use of common structural materials in large structures. |
| MLO2 | 2 | Evaluate a range of structural theories and methods of analysis and their relevance to large structures according to current codes of practice. |
| MLO3 | 3 | Perform advanced structural analysis and design of steel, composite, prestressed concrete, tensile cables, bridge deck structures/elements, and apply knowledge to the design in varying environments. |

Module Content

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|------------------------|--|
| Outline Syllabus | Large span steel trusses & Lattice girder: design methods/principles, types, selection of elements; connections, analysis and design. Lightweight tension steel cable structures: analysis and design principles for cables and cable systems. Large span continuous composite steel beam: Plastic analysis of composite section. Foundations & holding-down systems: Plate and base plate steel strength; resistance in bearing; resistance in tension of an anchor bolt row; holding-down systems; grouting; bedding; examples-foundations and holding-down systems. Fire protection and fire engineering: prevention of steelwork from fire, fire engineering design codes, structural performance in fire, advanced fire engineering and worked examples. Bridge engineering: Types, uses, materials, foundations, analysis and design of; large span reinforced concrete slab deck, large span prestress beams supporting a bridge deck, composite steel deck. Worked examples. |
| Module Overview | |
| Additional Information | This module expands student knowledge from the design of relatively small structures to the design of Large structures such, large span roof trusses, cable bridge structures, composite, reinforced and prestressed concrete bridge decks. |

Assessments

| Assignment Category | Assessment Name | Weight | Exam/Test Length (hours) | Module Learning Outcome Mapping |
|---------------------|-----------------------------|--------|--------------------------|---------------------------------|
| Centralised Exam | Open Book Examination | 70 | 2 | MLO1, MLO2, MLO3 |
| Report | Real Practical Design Study | 30 | 0 | MLO1, MLO2, MLO3 |

Module Contacts

Module Leader

| Contact Name | Applies to all offerings | Offerings |
|------------------|--------------------------|-----------|
| Hassan Al Nageim | Yes | N/A |

Partner Module Team

| Contact Name | Applies to all offerings | Offerings |
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