

Module Information

2022.01, Approved

Summary Information

Module Code	7203CIV
Formal Module Title	Analysis and Design of Large Structures
Owning School	Civil Engineering and Built Environment
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 7
Grading Schema	50

Teaching Responsibility

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

Aims	This module aims to: <ul style="list-style-type: none"> • Appreciate the underlying differences in the behaviour and analysis of steel, prestressed concrete and tensile structures. • Develop understanding of the philosophies of current professional Codes of Practice, and to gain competence in using appropriate methods for the design of steel, prestressed concrete and tensile structures • Instil confidence in the proper design of large span elements in steel, pre-stress concrete and cable tensile structural elements and • Develop understanding of large span steel, pre-stress concrete and tensile 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 including: steel, prestressed concrete and tensile cables in large structures.
MLO2	2	Explain in detail a range of structural theories and methods of analysis, and comprehend their relevance to real structures fabricated in steel and/or prestressed concrete and the roles of current Euro code of practice.
MLO3	3	Demonstrate wide knowledge and comprehensive understanding of the analysis and design of large steel, prestressed concrete and tensile structures/elements and apply this knowledge to design in unfamiliar situations.

Module Content

Outline Syllabus	<p>STEEL & COMPOSITE STRUCTURES: Large span steel trusses & Lattice girder: design methods/principles, types, selection of elements; connections, analysis of trusses; design of large span roof truss, design of lattice girder. Single story, one-way-spanning steel structures: Type of structure; modelling; first-order and second-order analysis; analysis and design for the ultimate limit state; column stability; bracing & effect of wind on structural stability. Lightweight tension steel cable structures: the ways in which cables resist loads; analysis and design principles for cables and cable systems. Large span continuous composite steel beam: Plastic analysis of composite section. Space decks: Wide span roofs, two-way spanning, two-way grids, three-way grids, space deck analysis & design, computer analysis, member design. Foundations & holding-down systems: Design of foundations; design model; base 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, worked example- fire. PRESTRESS CONCRETE: methods of construction, prestress losses; design for serviceability limit state, design and analysis for ultimate limit state, total prestress losses, structural analysis and ultimate strength of large span prestress beam. COMPOSITE STEEL BRIDGE: large span prestress beams; bridge analysis and design with practical design example/s</p>
Module Overview	<p>This module expands your knowledge from the design of relatively small structures to the design of large structures such as bridges and tall buildings. This module aims to help you:</p> <ul style="list-style-type: none"> • Appreciate the underlying differences in the behaviour and analysis of steel, prestressed concrete, and tensile structures • Develop an understanding of the philosophies of current professional Codes of Practice, and to gain competence in using appropriate methods for the design of steel, prestressed concrete, and tensile structures • Feel confident in the proper design of large span elements in steel, pre-stress concrete and cable tensile structural element.
Additional Information	<p>This module expands student knowledge from the design of relatively small structures to the design of Large structures such as bridges and tall buildings.</p>

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	OPEN BOOK EXAMINATION	70	2	MLO1, MLO2, MLO3
Essay	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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