

Module Details	
Module Title	Design Of Steel And Concrete Structures
Module Code	CSE5012-B
Academic Year	2024/5
Credits	20
School	School of Built Environment, Architecture & Creative Industries
FHEQ Level	FHEQ Level 5

Contact Hours	
Type	Hours
Lectures	40
Tutorials	20
Directed Study	140

Availability	
Occurrence	Location / Period
BDA	University of Bradford / Academic Year

Module Aims
<p>This module aims to introduce the students with the practical aspects of structural engineering design. The main aim is to equip the student with the tools and principle for the design of steel and concrete structural elements. Following the successful completion of this module, the students should be able to use the first principles and structural Eurocodes to design structural steelwork and concrete elements, showing essential skills required for employment as a structural engineer.</p>

## Outline Syllabus

Philosophy of Limit State Design and partial safety factors as applied to reinforced concrete and steelwork design (UNSDG-9&12&13).

Concept of load transfer in structures.

Load combinations for ultimate limit states.

Design bending moment and shear force envelopes.

Calculation of moment of resistance or area of steel of reinforced concrete sections from first principles. RC Beam design for ULS - flanged beams, shear, doubly reinforced.

Classifications of steel sections.

Design of restrained and unrestrained simply supported steel beams. RC Slab design - types of slabs, flexure, deflection, shear, durability.

RC and steel column design - short or slender columns, columns under axial loads and/or moment. Design and analysis of steel trusses.

Design of different steel connections.

Design of RC and steel structural elements for serviceability limit states.

Throughout the module topics, the principle of structural design for sustainability and net zero: build nothing, build less, build clever, build efficiently (UNSDG-11 &12&13).

## Learning Outcomes

Outcome Number	Description
01	Analyse, evaluate and design main reinforced concrete structural elements according to ultimate and serviceability limit states;
02	Analyse, evaluate and design main steel structural elements according to ultimate and serviceability limit states;
03	Present and interpret data; apply scientific method; develop systematic problem solving; and demonstrate creative problem solving skills.

## Learning, Teaching and Assessment Strategy

**Learning & Teaching Strategy:** Variety of teaching and learning techniques are followed to encourage student learning and engagement (PPT, videos, online tutorials, laboratory, online lectures). The students are provided with a well organised set of lecture notes and tutorial problems available via VLE. The students will be given the opportunity to solve the tutorial problems and receive feedback to enhance their design skills. The students will be given opportunities to discuss their knowledge and understanding in a group or individually with the tutor. Many solved/practical examples produced by professional organisations will be available on VLE. Two computer aided learning design software are available to aid the student learning (CALcrete is a comprehensive suite of 16 computer aided e-learning modules on concrete materials, design and construction, containing essential material and information for all construction professionals - from architects to site engineers and SteelCAL). A set of videos and documentations to help student visualize and understand the behaviour of steel and concrete members are uploaded on VLE. There will be also a comprehensive reading list covering up-to- date books and articles.

**Assessment Strategy:** 2 exams (one at the end of each semester). The assessments will focus on the design of steel and reinforced concrete structural elements. Each exam will be weighted 50%. Past exam papers will be practiced in tutorial sessions.

Mode of Assessment			
Type	Method	Description	Weighting
Summative	Examination - Closed Book	Examination Closed Book (Sem 1) (1.5 Hrs)	50%
Summative	Examination - Closed Book	Examination Closed Book (Sem 2) (1.5 Hrs)	50%

Reading List
To access the reading list for this module, please visit <a href="https://bradford.rl.talis.com/index.html">https://bradford.rl.talis.com/index.html</a>

*Please note:*

*This module descriptor has been published in advance of the academic year to which it applies. Every effort has been made to ensure that the information is accurate at the time of publication, but minor changes may occur given the interval between publishing and commencement of teaching. Upon commencement of the module, students will receive a handbook with further detail about the module and any changes will be discussed and/or communicated at this point.*

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