

Steel and Concrete Design

Module Code:	CSE5008-B
Academic Year:	2018-19
Credit Rating:	20
School:	Department of Civil and Structural Engineering
Subject Area:	Civil and Structural Engineering
FHEQ Level:	FHEQ Level 5
Module Leader:	Professor Ashraf Ashour

Additional Tutors:
Professor Dennis Lam

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	48
Tutorials	24
Directed Study	128

Availability Periods

Occurrence	Location/Period
BDA	University of Bradford / Academic Year (Sept - May)

Module Aims

Using first principles and structural Eurocodes to design structural steelwork and concrete elements.

Outline Syllabus

Philosophy of Limit State Design and partial safety factors as applied to reinforced concrete and steelwork design.
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.

Module Learning Outcomes

On successful completion of this module, students will be able to...

- 1 analyse and evaluate main reinforced concrete and steel structural elements according to limit state design method.
- 2 design different reinforced concrete and steel structural elements for serviceability and ultimate limit states.
- 3 present and interpret data; apply scientific method; develop systematic problem solving; and gain creative problem solving.

Learning, Teaching and Assessment Strategy

Variety of teaching and learning techniques are followed to encourage student learning and engagement (PPT, videos, tutorials, formal lectures). The students are provided with a well organised set of lecture notes and tutorial problems available via BB. Many solved/practical examples produced by Corus/Tata will be available on BB. Many interactive examples on steel and concrete design can be downloaded from the access-steel and concrete centre web sites. A set of "How to design various concrete elements according to Eurocodes" produced by the Concrete Centre available for download via BB. 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 members produced by ESDEP are uploaded on BB. There will be also a comprehensive reading list covering up-to-date books and articles.

2 class tests (one at the middle of each semester) and 2 exams (one at the end of each semester). The two class tests will cover design of typical structural elements made of reinforced concrete and steel. The purpose of the mid semester class test is to aid the students to assess their progress and provide them with constructive feedback on their learning before the end of semester exam. Each class test will be weighted 10%. The

examination part (1.5hr each) of the assessment will focus on the design of steel and reinforced concrete structural elements. Each exam will be weighted 40%. Past exam papers will be practiced in tutorial sessions.

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Examination - closed book	End of Semester one examination - closed book	1.5 hours	40%	No
Summative	Examination - closed book	End of Semester two examination - closed book	1.5 hours	40%	No
Referral	Examination - closed book	Supplementary examination - closed book	3 hours	100%	No
Summative	Classroom test	2 Class tests - open book 1 hour each	2 hours	20%	No

Legacy Code (if applicable)

ENG2301L

Reading List

To view Reading List, please go to [rebus:list](#).