

MODULE DESCRIPTION FORM

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

CL114: Civil Engineering Design Projects

Module Registrar: Mr. Neil Cochrane	Taught To (Course): BEng Hons / MEng Civil Engineering BEng Hons / MEng Civil & Environmental Engineering		
Other Lecturers Involved: Mr. David Alcaraz-Garcia	Credit Weighting: 20	Semester: 1 and 2	
Assumed Prerequisites: N/A	Compulsory class	Academic Level: 1	Suitable for Exchange: N

Module Format and Delivery (HOURS i.e. 1 credit = 10hrs of study):

Lecture	Tutorial	Laboratory	Groupwork	External	Online	Project	Assignments	Private Study	Total
16	10	10	50	0	16	50	24	24	200

Educational Aim

This class introduces the design process for civil and structural engineering projects. It includes an introduction to engineering drawing and AutoCAD in the first semester. In the second semester, students apply the skills and knowledge learned in this class, plus CL132 and CL134 to design, construct and test a model of a bridge.

Learning Outcomes

On completion of the course the student is expected to be able to

- LO1 Carry out a precedent study of an existing structure
- LO2 Prepare simple 2D engineering drawings using AutoCAD
- LO3 Carry out an analysis of a design brief
- LO4 Prepare conceptual designs and a detailed design for a simple structure

Syllabus

Semester 1

- Introduction to the design process, design constraints and how structures stand up
- Case studies of existing buildings and bridges
- 2D engineering drawings and an introduction to AutoCad

Semester 2

- Analyse and develop a project brief
- Carry out precedent studies of existing structures
- Conceptual structural design
- Hand analysis for statically determinate structures
- Outline technical design of structural elements
- Prepare a detailed structural design for a bridge model including making and testing of components, joints and prototypes, analysis and design calculations, plus technical drawings from which the bridge can be constructed.
- Construct and test a model of the bridge
- Learning from failure – analysis of the failure mode of the model

Assessment of Learning Outcomes

For each of the Course Learning Outcomes the following criteria will be used to make judgements on student learning:

LO1 Carry out a precedent study of an existing structure

- C1 Appreciation of the loadings on a structure
- C2 Understanding of loadpaths in statically determinate structures
- C3 Understanding of different types of forces in structural elements and associated types of elements

LO2 Prepare simple 2D drawings using AutoCad

- C1 Knowledge of standard rules and conventions used to prepare civil and structural engineering drawings
- C2 Ability at using CAD software

LO3 Carry out an analysis of a design brief

- C1 Able to identify design constraints applicable to a project
- C2 Able to identify options for design constraints
- C3 Able to identify interactions and priorities between design constraints

LO4 Prepare conceptual designs and a detailed design for a simple structure

- C1 Develop the brief
- C2 Hand analysis to assess the forces and stresses in individual elements
- C3 Structural optimisation
- C4 Develop an understanding of structural behaviour
- C5 Detailed analysis of elements in a simple structure
- C6 Detailed technical design of elements in a simple structure

The standards set for each criterion per Module Learning Outcome to achieve a pass grade are indicated on the assessment sheet for all assessment.

Principles of Assessment and Feedback

(within Assessment and Feedback Policy at: <https://www.strath.ac.uk/staff/policies/academic/>)

This module aims to promote effective learning by assessing students through increasingly complex tasks which are evaluated in line with current academic policies. Timely, actionable feedback will be provided to students within 15 working days of the submission deadline. Where possible, work will be assessed anonymously. Students will have the opportunity to get interim feedback or feedforward guidance in advance of submission.

Assessment Method(s) Including Percentage Breakdown and Duration of Exams

Examinations				Coursework		Projects	
Number	Month(s)	Duration	Weighting	Number	Weighting	Number	Weighting
0	-	-	-	-	-	DP13	25%
				DP11	5%	-	-
				DP12	20%	-	-
				-	-	DP14	20%
				-	-	DP15	15%
				-	-	DP16	10%
-	-	-	-	DP17	5%	-	-
L/Outcomes				LO2		LO1, LO3, LO4	

Indicate which learning outcomes (L01, L02 etc) are to be assessed by exam/coursework/project as required.

Coursework / Submissions deadlines (<i>academic weeks</i>):			
PLEASE CHECK MYPLACE FOR ANY CHANGES TO THESE DEADLINES			
	Semester 1		Semester 2
DP11: AutoCAD Assignment 1	8	DP14: Bridge Project – design report	7
DP12: AutoCAD Assignment 1	11*	DP15: Bridge Project – model building	TBC
DP13: Case study group presentation	11*	DP16: Bridge Project – testing report	10
		DP17: Bridge Project – group presentation	10

Resit Assessment Procedures:
Submission of coursework(s) prior to commencement of the August exam diet.

PLEASE NOTE:

Students must gain a summative mark of 40% to pass the module. Students who fail the module at the first attempt will be re-examined during the August diet. This re-examination will consist entirely of coursework. No marks from any previous attempts will be transferred to a new resit attempt.

Recommended Reading

***Purchase recommended	**Highly recommended reading	*For reference
** Narayanan, R. S. (2017)	<i>Introduction to design for civil engineers</i>	978-0429217234
*** Cobb, F. (2009)	<i>Structural engineer's pocket book</i>	978-0080942933
** Slade, R. (2016)	<i>Sketching for engineers and architects</i>	978-1315683775
** Millais, M. (2005)	<i>Building structures: from concepts to design</i>	978-0415336239
** Millais, M. (2017)	<i>Building structures: understanding the basics</i>	978-1317312161
* Hunt, T. (2003)	<i>Tony's Hunt's structures notebook</i>	978-0080519302
* Gordon, J.E. (2003)	<i>Structures: or why things don't fall down</i>	0306812835
* Calder, B. (2021)	<i>Architecture from prehistory to climate emergency</i>	978-0141978215
* Arup, O.N. (2012)	<i>Ove Arup: philosophy of design – essays</i>	978-3791347318
* Paxton, R. (2007)	<i>Scotland: Lowlands and Borders</i>	978-0727734877
* Parke, G.A.R.; Hewson, N.R.; Ryall, M.J.; (2008)	<i>ICE manual of bridge engineering</i>	978-0727738028

Please consult the reading list on MyPlace for additional texts.

Additional Student Feedback

(Please specify details of when additional feedback will be provided)

Date	Time	Room No
Weeks 6 & 11	N/A	N/A - online

Session: AY 2022-23

Approved:

Course Director Signature:

Date of Last Modifications: 22-August-2022

MODULE TIMETABLE

Module Code:

CL114

Module Title:

Civil Engineering Design Projects

Brief Description of Assessment:

This module is assessed through a mix of group presentations and reports (DP13, DP14, DP15, DP17), practical construction activities (DP15), and individually assessed technical drawings (DP11, DP12).

Assessment Timing:-

Semester One	W&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
		Project Set DP13					Interim Review DP13	Course work Set DP11		Course work Submit DP11	Course work Set DP12		Group Presentation DP13

Semester Two	C&D Wk	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8	WK9	WK10	WK11	Exam Period
		Project Set DP14- DP17							Project Submission DP14	Lab Bridge Building Times TBC DP15		Project Submission DP16	Group Presentation DP17

Please note: Timings can and will change, this should only be used as a guide.