OLLSCOIL TEICNEOLAÍOCHTA BHAILE ÁTHA CLIATH
TECHNOLOGICAL UNIVERSITY DUBLIN

School of Surveying and Construction Management

COURSEWORK COVER SHEET

GROUP NAME/ STUDENT NAME	
STUDENT ID	
PROGRAMME CODE & YEAR	**B.Sc. Construction Management DT117 – 3th Year**
MODULE CODE & NAME	**CONS3002 – Construction Technology 3B Building Structures**
PROJECT TITLE	**Assignment – Analysis and design of a beam in Steel and Reinforced Concrete**
MARK ALLOCATION	**40 marks out Module Total (100)**
DUE DATE	**20:00 - Wednesday 14th April 2021**
LECTURER	**Ronan Hogan**

FOR OFFICIAL USE

DATE DUE

DATE RECEIVED

LECTURER

GRADE AWARDED

Project Assessment

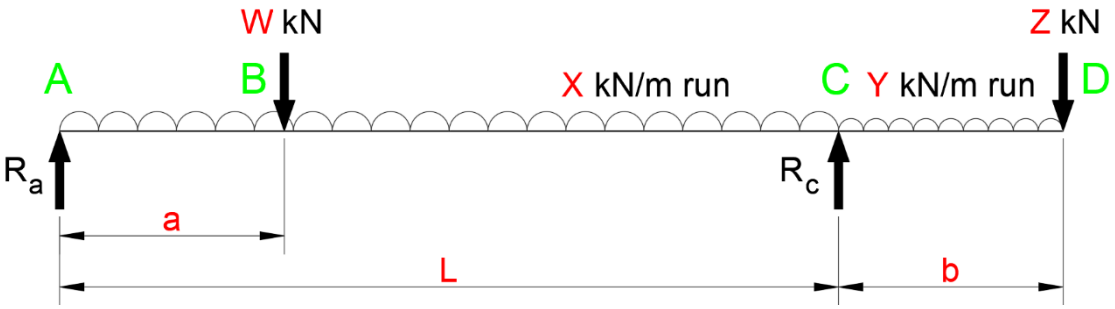
Element	Marks Available	Marks Awarded
Factoring loads & finding reactions	15	
Draw shear force diagram	5	
Draw bending moment diagram	10	
Identify points of contraflexure	5	
Select a suitable Steel beam against bending mt	10	
Check steel beam for shear capacity	10	
Design an RC beam against bending moments	20	
Select a suitable arrangement of shear links	15	
Prepare RC detail	10	
TOTAL	**100**	

Tasks

In this assignment you will carry out an analysis and design of a beam with the loads shown below. The results of the analysis will then be used to perform the design on the beam in both steel and reinforced concrete.

Part 1:

- Each person in the class will get their own factored load and span combination assigned to them, see below.
- Using the loads and the equations of statics, find the Reactions at A and C.
- Find the shear force and bending moment values at all the pertinent points: A, B, C, D & at the point of max bending moment.
- Find the point of contraflexure.



	L (m)	a (m)	b (m)	W kN	X kN/m run	Y kN/m run	Z kN
	9.1	2.3	2.8	13	30	16	35
	9.0	2.4	3.1	18	28	15	34
	8.8	1.9	3.5	20	22	20	18
	8.5	2.0	3.2	18	24	15	30
	10.0	2.5	2.0	30	25	23	28
	9.4	2.6	2.2	27	24	27	25
	8.7	2.4	2.4	26	20	28	30
	7.8	1.8	2.3	21	20	28	30
	9.2	2.4	2.8	15	21	15	30
	8.8	2.2	3.2	16	22	14	19
	8.5	1.9	2.7	12	20	12	16
	8.1	1.8	2.6	13	21	10	17
	9.6	2.3	3.0	17	22	14	18
	8.9	2.4	2.9	19	23	13	21
	8.6	2.3	2.5	25	21	11	25
	8.2	2.0	2.6	24	22	11	26
	9.7	1.9	2.9	21	24	20	28
	8.4	1.8	3.2	21	28	8	10
	9.3	1.5	2.7	30	26	12	12
	7.8	1.4	2.7	29	25	12	15
	8.3	1.9	3.1	26	20	13	12
	9.5	2.4	1.7	23	28	8	10
	8.2	3.2	1.6	18	26	14	12
	9.9	2.5	2.1	15	30	15	13
	8.8	1.7	2.2	21	27	17	20
	7.8	1.2	1.7	20	28	22	25
	10.2	3.0	1.8	25	26	24	28
	9.2	2.2	2.1	20	27	18	32
	8.6	2.3	1.7	13	23	13	15
	9.3	2.3	1.6	20	19	9	13
	8.7	2.4	1.8	20	20	13	15
	9.4	2.4	1.4	25	18	12	20

Part 2:

- Using the appropriate design codes select a steel beam which efficiently resists the maximum bending moment found in Part 1.
- Check the selected steal beam for shear to determine if the beam has sufficient capacity to resist the applied shear forces calculated in Part 1.

Part 3:

- Using the basic span / effective depth ratio tables select the appropriate effective depth and also width for the main span, use this value for the cantilever element also.
- Design the flexural steel at the point of maximum bending moment in the in the span A-C. Also find the arrangement of flexural steel at support C.
- Identify the maximum shear force in the spans and use this value to determine a suitable arrangement of shear links for the full length of the beam
- Prepare a drawing of the arrangement of the flexural reinforcement at both locations identified above and also show the shear link layout. This drawing should make reference to curtailment of tension and compression reinforcement.

Deliverables & Completion Date

Submission of the report will be in the form of a hand written document which will then be photographed and those photos in turn inserted into a Word document in the correct sequence which will then be submitted electronically.

The Final Submission must be submitted through Brightspace on Wednesday the 14th of April at 20:00. In the case of late submission, the school policy will apply.

An Interim Submission must also be made with the completed Part 1 on Thursday the 18th of March at 20:00. In the case of late submission, the school policy will apply.

The final submission will have **all** parts of the project included in that document.

This is an *individual* coursework assignment, projects should not be shared and copied work will be dealt with appropriately.

Marking

The assessment criteria applied to this assignment is as outlined above.