Assessment Presentation + Viva	3
Total	60

TEACHING METHODOLOGY

Lecture and Discussion, Co-operative and Collaborative Method, Problem Based Learning (PBL)

TEACHING SCHEDULE

Weeks	Topic	Assessments
1	Visit of one industry	Presentation, Report, VIVA
2	Visit of another industry	
3	Preparing report based on their gather knowledge during industrial training Preparing presentation for shearing gathered knowledge Preparation for viva	

ASSESSMENT STRATEGY

Components	Grading	CO	Blooms Taxonomy
Continuous Assessment (Report)	50%	CO1	C2
		CO2	C3
		CO3	C3
		CO4	C2
Presentation & VIVA	50%	CO1	C2
		CO2	C3
		CO3	C3
		CO4	C2
Total Marks	100%		

REFERENCE BOOKS

N/A

REFERENCE SITE

N/A

COURSE INFORMATION	
Course Code: EWCE 311	Credit Hour: 4.0
Course Title: Structural Analysis and Design I	Contact Hour: 4.0

PRE-REQUISITE

EWCE 101 (Analytic Mechanics) , EWCE 211 (Mechanics of Solids)

CURRICULUM STRUCTURE

Outcome Based Education (OBE)

SYNOPSIS/ RATIONALE

In this course students will learn how to analysis various structural components subjected to both static and moving loads. Analysis technique learnt here will be useful in later courses where students will learn how to design different structural components. Knowledge gained from this course will be used in later semesters and also in professional life.

OBJECTIVE

1. To analyze the statically determinate linear structural systems such as simple beams, cantilever beams, three hinged arches or frames.
2. To analyze statically indeterminate structures such as frames, truss subjected to dead load, lateral load and vertical load.
3. To analyze structures for moving load.
4. To construct influence line diagram for beam, frame and truss.
5. To draw internal force diagrams and to calculate the displacements.

COURSE OUTCOMES & GENERIC SKILLS

No	Course Outcome	Corresponding POs	Bloom's Taxonomy*	CP	CA	KP	Assessment Methods
CO1	Ability to **analyze** statically determinate and indeterminate structures.	PO – 2	C4	1		5,6	CT,M, F
CO2	Ability to **determine** lateral load on structure at different area in Bangladesh.	PO – 2	C4, C5	1		5,6	Pr/M, F
CO3	Able to **develop** knowledge on various types of structures and their behavior.	PO –1, 2	C2, C5	1, 3		3	Asg/ CT, F
CO4	Ability to **determine** axial load on a column from different stories.	PO – 2	C4	1		4,5 ,6	Asg/ F
CO5	Able to **analyze** the effect of moving loads on statically determinate structures.	PO – 2	C4	1		2,3	CT/F

**Level of Bloom's Taxonomy:*

C1 - Remember C2 - Understand C3 - Apply C4 - Analyze C5 - Evaluate C6 - Create

(CP – Complex Problems, CA – Complex Activities, KP – Knowledge Profile, T – Test, PR – Project, Q – Quiz, M – Mid Term Exam, Asg – Assignment, Pr – Presentation, R – Report, F – Final Exam)

COURSE CONTENT

The concept of stability and determinacy of structures, Analysis of statically determinate frames, trusses and arches, Approximate analysis of statically indeterminate structures: Portal Frames. Bridge Portal, Mil bent, Braced trusses, Analysis of multi-storied building frames under gravity (vertical) load, Analysis of multi-storied building frames under lateral (wind and seismic) load: Portal method and Cantilever method, Deflection of beams, trusses and frames by energy method (strain energy, principles of virtual work, Castigliano's theorem), Influence lines, Moving loads on beams, Analysis of suspension bridge, Wind and earthquake loads.

SKILL MAPPING (CO – PO MAPPING)

No	Course Outcome	PROGRAM OUTCOMES (POs)											
		1	2	3	4	5	6	7	8	9	10	11	12
CO1	Be able to **analyze** statically determinate and indeterminate problems.		3										
CO2	Be able to **determine** lateral loads on structures.		3										
CO3	Be able to **develop** knowledge on various types of structures and their behavior	2	3										
CO4	Be able to determine axial load on column		3										
CO5	Be able to **analyze** the effect of moving loads on statically determinate structures.		3										

(Numerical method used for mapping which indicates 3 as high, 2 as medium and 1 as low level of matching)

JUSTIFICATION FOR CO – PO MAPPING

	Mapping	Corresponding Level of Matching	Justifications
	CO1 – PO2	3	Knowledge of approximate method and cantilever method will be applied to solve different indeterminate structures frame and truss. Knowledge of mechanics will be applied to solve determinate structures.
	CO2 – PO2	3	Using BNBC 1993 and 2014 code provision earthquake load and wind load will be calculated.
	CO3 – PO1	2	Students will be able to classify structures and find out behavior using mathematics, natural science and engineering fundamentals.
	CO3 – PO2	3	Ability to formulate engineering problems and to solve those complex engineering problems using structural knowledge.

	CO4 – PO2	3	Using approximate method or cantilever method students will be able to calculate axial force and moment in beam and column in different storey of structures.
	CO5 – PO2	3	Maximum moment, reaction, shear force will be calculated at a particular location of a beam and frame under moving concentric load and uniformly distributed load. Students will be able to calculate maximum bar force of a truss under moving load.

TEACHING AND LEARNING STRATEGY		
	Teaching and Learning Activities	Engagement (Hours)
	Face-to-face Learning • Lecture • Practical/ Tutorial/ Studio • Student – Centered Learning	 56 -- --
	Self- Directed Learning • Non-face-to-face learning • Revision of the previous lecture at home • Preparation for final examination	 12 24 63
	Formal Assessment • Continuous Assessment • Final Examination	 2 3
	Total	160

TEACHING METHODOLOGY
Lecture and Discussion, Problem Based Method

COURSE SCHEDULE			
		Intended Topics to be Covered	Assessment
Week 1			
	Class 1	Stability and determinacy of structure	
	Class 2	Stability and determinacy of structure	
	Class 3	Earthquake load calculation as per BNBC-1993	
	Class 4	Earthquake load calculation as per BNBC-1993	
Week 2			
	Class 5	Analysis of statically determinant truss	
	Class 6	Analysis of statically determinant truss	
	Class 7	Earthquake load calculation as per BNBC-2014	
	Class 8	Earthquake load calculation as per BNBC-2014	

Week 3			
	Class 9	Analysis of statically determinant arches	
	Class 10	Analysis of statically determinant arches	
	Class 11	Wind load calculation as per BNBC-1993	
	Class 12	Wind load calculation as per BNBC-1993	
Week 4			
	Class 13	Analysis of statically determinant arches	CT-1
	Class 14	Analysis of statically determinant arches	
	Class 15	Wind load calculation as per BNBC-2014	
	Class 16	Wind load calculation as per BNBC-2014	
Week 5			
	Class 17	Influence line of beams	
	Class 18	Influence line of beams	
	Class 19	Approximate analysis of statically indeterminate truss	
	Class 20	Approximate analysis of statically indeterminate truss	
Week 6			
	Class 21	Influence line of beams	
	Class 22	Influence line of beams	
	Class 23	Approximate analysis of statically indeterminate portal frame subjected to vertical load.	
	Class 24	Approximate analysis of statically indeterminate portal frame subjected to vertical load.	Mid Term Exam
Week 7			
	Class 25	Influence line of truss	
	Class 26	Influence line of truss	
	Class 27	Approximate analysis of statically indeterminate portal frame subjected to lateral load using portal method	
	Class 28	Approximate analysis of statically indeterminate portal frame subjected to lateral load using portal method	
Week 8			
	Class 29	Influence line of truss	
	Class 30	Influence line of truss	
	Class 31	Approximate analysis of statically indeterminate portal frame using cantilever method	CT 2

	Class 32	Approximate analysis of statically indeterminate portal frame using cantilever method	
Week 9			
	Class 33	Moving load on beams	
	Class 34	Moving load on beams	
	Class 35	Approximate analysis of tower truss	
	Class 36	Approximate analysis of tower truss	
Week 10			
	Class 37	Moving load on beams	CT 3
	Class 38	Moving load on beams	
	Class 39	Approximate analysis of tower truss	
	Class 40	Approximate analysis of tower truss	
Week 11			
	Class 41	Moving load on frame	
	Class 42	Moving load on frame	
	Class 43	Principle of work and energy. Principle of virtual work	
	Class 44	Analysis and deflection calculation of truss using method of virtual work	
Week 12			
	Class 45	Moving load on frame	CT 4
	Class 46	Moving load on frame	
	Class 47	Introduction to Castigliano's theorem	
	Class 48	Analysis and deflection calculation of truss using Castigliano's theorem	
Week 13			
	Class 49	Analysis of suspension bridge	
	Class 50	Analysis of suspension bridge	
	Class 51	Analysis and deflection calculation of beam using method of virtual work	
	Class 52	Analysis and deflection calculation of frame using method of virtual work	
Week 14			
	Class 53	Analysis of suspension bridge	
	Class 54	Analysis of suspension bridge	
	Class 55	Analysis and deflection calculation of beam using Castigliano's theorem	
	Class 56	Analysis and deflection calculation of frame using Castigliano's theorem	
	ASSESSMENT STRATEGY		

Components		Grading	CO	Bloom's Taxonomy
Continuous Assessment	Class Test/ Assignment/Presentati	20%	CO1, CO2	

(40%)	on (1-4)			
	Class Participation	5%	CO1 , CO3	
	Mid Term	15%	CO1 ,CO2	
Final Exam		60%	CO1	C4
			CO2	C4
			CO3	C2, C5
			CO4	C4
			CO5	C4
Total Marks		100%		

(CO = Course Outcome, C = Cognitive Domain, P = Psychomotor Domain, A = Affective Domain)

REFERENCES BOOKS

1. Structural Analysis, R C. Hibbeler, Prentice Hall, 8th Edition.
2. Elementary Structural analysis – C.H.Norris, J.B.Wilbur, I, utku
3. Theory of simple structures- TC Shedd and J. Vawter
4. Structural Analysis – Aslam Kassimali
5. Bangladesh National Building Code (BNBC,1993/2017)

REFERENCE SITE

http://classroom.google.com/...../.....

COURSE INFORMATION	
Course Code: EWCE 331	Credit Hour: 3.0
Course Title: Water Supply Engineering	Contact Hour: 3.0

PRE-REQUISITE

EWCE-261 (Fluid Mechanics)

CURRICULUM STRUCTURE

Outcome Based Education (OBE)

SYNOPSIS/ RATIONALE

In this course students will be presented with basic knowledge on water supply system, surface water collection, treatment and distribution, and water quality requirement. Knowledge gained from this course will be used in later semesters and also in professional life.

OBJECTIVE

1. To gain knowledge on the basics of water supply technology.
2. To become skilled at the design and construction of surface water treatment plant, ground water well and water distribution networks.
3. To get acquainted with low cost water supply options for rural communities and draught vulnerable areas
4. To devise the theories for well hydraulics.

COURSE OUTCOMES & GENERIC SKILLS

No	Course Outcome	Corresponding POs	Bloom's Taxonomy*	CP	CA	KP	Assessment Methods