

Bangladesh Polytechnic Institute

Technology: **CIVIL**

Semester: 6th

Sub. Name: DESIGN OF STRUCTURE - 1 (6463)

T P C: 3 3 4

Course Outline

Teacher Name: Nowrose afreen

Mob.No: 01740 91 87 22

Class No.	Discussion and Explanation of Topics/ Titles	Remarks
Class-1	<ul style="list-style-type: none"> ❖ Understand the different type of cement concrete works. ➤ Describe the plain concrete, reinforced concrete and prestressed concrete. ➤ Describe the different uses of the plain concrete, reinforced concrete and prestressed concrete ➤ Mention the advantages, disadvantages & limitations of the reinforced concrete. ➤ Mention the advantages, disadvantages & limitations of the prestressed concrete. 	
Class-2	<ul style="list-style-type: none"> ❖ Understand the structural safety, design code and safety provision. ➤ Explain the need for structural safety. ➤ Solve simple problems using the design codes ➤ Explain the necessity for safety provision. 	
Class-3	<ul style="list-style-type: none"> ❖ Understand about the loads in designing reinforced concrete works. ➤ Define the meaning of load. ➤ Classify different kinds of loads. ➤ Define Richter scale, tectonic plate and epicenter 	
Class-4	<ul style="list-style-type: none"> ❖ Understand about the loads in designing reinforced concrete works. ➤ Explain the necessity of considering the seismic load and wind load in designing reinforced concrete works. ➤ Mention the significant of the thrust (like tidal, cyclones etc.) to be consider in designing reinforced concrete structure in coastal zone. 	
Class-5	 Feedback	
Class-6	 Feedback	
Class-7	<ul style="list-style-type: none"> ❖ Understand stress, strain and elasticity of concrete. ➤ State the meaning of stress, strain, ultimate stress and allowable stress of concrete. ➤ Define young modulus of elasticity of concrete. ➤ Calculate young modulus of elasticity of concrete. ➤ Interpret stress-strain curve of steel and concrete. ➤ Mention the purpose of compression test of concrete. 	
Class-8	<ul style="list-style-type: none"> ❖ Understand stress, strain and elasticity of concrete. ➤ State the different size & shape of moulds for compression test. ➤ Describe test procedure of crushing cubes and cylinders for compression test. ➤ Determine ultimate stress of concrete (f_c) and allowable stress of concrete (f_c). ➤ Determine the allowable shear stress of concrete using ultimate stress of concrete. 	
Class-9	<ul style="list-style-type: none"> ❖ Understand the properties & behavior of reinforcing steel used in RCC. ➤ List the different types & grades of steel used in RCC and prestressed concrete. ➤ Mention the advantages of uses of mild steel in RCC. ➤ Describe the scope of using welded wire fabric in RCC. 	
Class-10	<ul style="list-style-type: none"> ❖ Understand the properties & behavior of reinforcing steel used in RCC. ➤ Mention the characteristics of plain bar, deformed bar and twisted bar and tendon. ➤ Mention the advantages of uses of deformed and twisted bar in 	

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	<p>RCC.</p> <ul style="list-style-type: none"> ➤ State the minimum reinforcement used in RCC beam and slab. 	
Class-11	<ul style="list-style-type: none"> ❖ Understand the flexure formula of homogeneous beam. ➤ Define resisting moment. ➤ Explain the stress diagram of a loaded beam. ➤ Identify compression and tension zones of a homogenous beam. ➤ Express the derivation of the flexure formula for homogeneous beam. ➤ Solve the problems on homogeneous rectangular beam. 	
Class-12	 Feedback	
Class-13	 Class test-1	
Class-14	<ul style="list-style-type: none"> ❖ Understand the concept of transformed section of beam. ➤ Define transformed section. ➤ Explain the theory of transformed section with sketches. ➤ Express the derivation of the equation for investigating the stresses developed in concrete and steel by transformed section method 	
Class-15	<ul style="list-style-type: none"> ❖ Understand the concept of transformed section of beam. ➤ Calculate the stresses developed in rectangular beam and T-beam in WSD method. ➤ Explain balanced reinforced beam, under reinforced beam and over reinforced beam. ➤ Mention the effect of under reinforcement and over reinforcement in RCC beams. 	
Class-16	<ul style="list-style-type: none"> ❖ Understand the flexure formula for RCC beam in working stress design (WSD) method. ➤ State the assumptions used in developing the flexure formula. ➤ Explain the stress diagram of a loaded RCC beam. ➤ Mention the notations used in flexure formula in WSD method. 	
Class-17	<ul style="list-style-type: none"> ❖ Understand the flexure formula for RCC beam in working stress design (WSD) method. ➤ Express the derivation of the flexure formula for RCC beam in WSD method. ➤ Solve problems of flexure formula based on WSD method. 	
Class-18	<ul style="list-style-type: none"> ❖ Understand the shear stress developed in RCC beams. ➤ Explain the effects of shear force and stress in RCC beams. ➤ State the meaning of diagonal tension. ➤ Explain the causes of creating diagonal tension in RCC beams. ➤ Express the derivation of the formula to determine shear stress developed in RCC beams. ➤ Solve the problems on shear stress developed in WSD method. ➤ Solve the problems on shear stress developed in USD method. ➤ Mention the allowable shear stress for RCC beam (v) and shear stress for concrete (v_c). 	
Class-19	 Feedback	
Class-20	 Class test-2	
	Model Test	
Class-21	<ul style="list-style-type: none"> ❖ Understand the functions of web reinforcement in RCC beams. ➤ Define web reinforcement. ➤ Classify web reinforcement with sketches. ➤ Mention the functions of web reinforcement in RCC beams. 	
Class-22	<ul style="list-style-type: none"> ❖ Understand the functions of web reinforcement in RCC beams. 	

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	<ul style="list-style-type: none"> ➤ Determine the spacing of web reinforcement (vertical & inclined) in WSD method. ➤ Determine the spacing of web reinforcement in USD method. ➤ Determine the portion of the RCC beam requiring web reinforcement. 	
Class-23	<ul style="list-style-type: none"> ❖ Understand the bond stress developed in RCC beams. ➤ State the meaning of bond stress. Express the derivation of the formula to determine bond stress developed in RCC beams. ➤ State the allowable bond stress for plain bar and deformed bar in WSD and USD methods. ➤ Determine the anchorage length of reinforcement in RCC. ➤ Explain the necessity of standard hooks of reinforcement in RCC. 	
Class-24	<ul style="list-style-type: none"> ❖ Understand the design of RCC rectangular beam in WSD method. ➤ Outline the design steps of RCC rectangular beam in WSD method. ➤ State the minimum spacing of reinforcing bars in RCC beam. 	
Class-25	<ul style="list-style-type: none"> ❖ Understand the design of RCC rectangular beam in WSD method. ➤ Design a simply supported RCC rectangular beam in WSD method. ➤ Design a semi-continuous RCC rectangular beam in WSD method. 	
Class-26	<ul style="list-style-type: none"> ❖ Understand the design of RCC rectangular beam in WSD method. ➤ Design a continuous RCC rectangular beam in WSD method. 	
Class-27	 Feedback	
Class-28	 Class test-2	
Class-29	<ul style="list-style-type: none"> ❖ Understand flexure formula in ultimate strength design (USD) method. ➤ Differentiate WSD and USD method. ➤ Explain the stress diagram of loaded beam with showing the actual & equivalent rectangular stress distribution of ultimate load. ➤ State the load and load factors used in USD method. 	
Class-30	<ul style="list-style-type: none"> ❖ Understand flexure formula in ultimate strength design (USD) method. ➤ Mention the notations used in flexure formula in USD method. ➤ Express the derivation of the flexure formula in USD method. ➤ Solve problems of flexure formula based on USD method. 	
Class-31	<ul style="list-style-type: none"> ❖ Understand the design of RCC rectangular beam in USD method. ➤ Outline the design steps of RCC rectangular beam in USD method. ➤ Design a simply supported RCC rectangular beam in USD method. 	
Class-32	<ul style="list-style-type: none"> ❖ Understand the design of RCC rectangular beam in USD method. ➤ Design a semi-continuous RCC rectangular beam in USD method. ➤ Design a continuous RCC rectangular beam in USD method. 	
Class-33	<ul style="list-style-type: none"> ❖ Understand the design of RCC cantilever & overhanging rectangular beams in WSD method. 	

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	<ul style="list-style-type: none"> ➤ Determine the design load, shear force and bending moment of RCC cantilever & overhanging beams. ➤ Design a cantilever RCC rectangular beam. 	
Class-34	<ul style="list-style-type: none"> ❖ Understand the design of RCC cantilever & overhanging rectangular beams in WSD method. ➤ Design an overhanging RCC rectangular beam. ➤ Describe the technique of curtailment of reinforcement in cantilever RCC beams. 	
Class-35	<ul style="list-style-type: none"> ❖ Understand the T-beam and its uses. ➤ Define T-beam. Identify the different parts of a typical T-beam. ➤ Determine the width of flange of T-beam considering span length and slab thickness. ➤ State the ratio of width of web to the depth of web for T-beams. Distinguish between RCC rectangular beam and T-beam. 	
Class-36	<ul style="list-style-type: none"> ❖ Understand the design of RCC T-beams. ➤ Determine the depth and width of a simply supported T-beam in respect to shear force. ➤ Outline the design steps of RCC T-beam in WSD method. ➤ Design a simply supported RCC T-beam in WSD method 	
Class-37	<ul style="list-style-type: none"> ❖ Understand the design of RCC T-beams. ➤ Design a semi-continuous RCC T-beam in WSD method. ➤ Design a continuous RCC T-beam in WSD method. 	
Class-38	<ul style="list-style-type: none"> ❖ Understand the design of RCC beam with compression reinforcement. ➤ State the meaning of double reinforced beam. ➤ Differentiate between RCC single and double reinforced beam. ➤ Outline the design steps of double reinforced beam. 	
Class-39	<ul style="list-style-type: none"> ❖ Understand the design of RCC beam with compression reinforcement . ➤ Design a simply supported double reinforced beam. ➤ Design a semi-continuous double reinforced beam. ➤ Design a continuous double reinforced beam. 	
Class-40	<ul style="list-style-type: none"> ❖ Understand the design of RCC lintel over doors & windows. ➤ Determine the area of the wall to be considered in determining the design load for RCC lintels. ➤ Outline the design steps of RCC lintel. Design a RCC lintel over doors and windows. 	
Class-41	 <u>Feedback</u>	
Class-42	 <u>Feedback</u>	

Reference Book:-

1. Modern Refrigeration and Airconditioning
Althouse/Turnquist/ Bracciano.
2. Basic Refrigeration and Airconditioning
– Hazrh & Chakravarty.
3. Automobile Mechanics
– Crouse – Anglin.