

## **Daffodil Polytechnic Institute, Institute Code: 50238**

- Subject Teacher : Shariful Islam Shishir
- Subject Name : Design of Structure-1
- Subject Code : 26464
- Technology : Civil Technology
- Semester : 6th

## **Reference Book** : **R C C Design (Abul Faraz Khan)**

Marks	Grad e Point	Letter Grad	Mark	Grad e Point	Letter Grade	Time Distribu	tion (90min)	Time	
	Folin	c	°	Folin			rurucului	THILE	
80>	4.00	A+	55-59	2.75	B-	Greeting with	students	5 Min	
75-79	3.75	Α	50-54	2.50	C+				
70.74	2.50	•	45.40	2.25	6	Previous class	s review	10 Min	
70-74	3.50	A-	45-49	2.25	Ľ	Present class	lecture	60 Min	
65-69	3.25	B+	40-44	2.00	D		lettere		
						Feedback		10 Min	
60-64	3.00	В	0-39	0.00	F	Attendance		5 Min	

Time Distribution			
Particular Time			
Greeting with students	5 Min		
Previous class review	10 Min		
Present class lecture	60 Min		
Feedback	10 Min		
Attendance	5 Min		

## THEORY LESSON PLAN

Chapt er	<b>Topics with contents</b>	Learning Outcome	Supporting Equipments
	<ul> <li>CEMENT CONCRETE AND STRUCTURAL SAFETY</li> <li>1.1 State plain concrete, reinforced concrete and pre-stressed concrete.</li> <li>1.2 Describe uses of the plain concrete, reinforced concrete and pre-stressed concrete.</li> <li>1.3 Calculate young modulus of elasticity of concrete.</li> <li>1.4 Describe test procedure of crushing Cubes and Cylinders for compression test.</li> <li>1.5 Define Earthquake, Richter scale, Tectonic plate and Epicenter.</li> <li>1.6 Illustrate the necessity of considering the seismic load and wind load</li> <li>in designing reinforced concrete work.</li> <li>1.7 List different types of thrust.</li> <li>1.8 Mention the significant of the thrust to be consider in designing</li> <li>reinforced concrete structure in coastal zone.</li> <li>1.9 Explain the need for structural safety and safety provision.</li> </ul>	<ol> <li>State plain concrete, reinforced concrete and pre-stressed concrete.</li> <li>Describe uses of the plain concrete, reinforced concrete and pre-stressed concrete.</li> <li>Calculate young modulus of elasticity of concrete.</li> </ol>	
	QUIZ TEST 1 (Date:30/07/2023)	Evaluation of Chapter-1	Questions & answers script

2	<ul> <li>REINFORCING STEEL IN RCC</li> <li>2.1.List the different types &amp; grades of steel used in RCC and Pre-stressed concrete.</li> <li>2.2.State the different types &amp; grades of steel used in RCC and Pre-stressed concrete.</li> <li>2.3.Mention the advantages of using mild steel in RCC.</li> <li>2.4.Describe the scope of using welded wire fabric in RCC.</li> <li>2.5.Illustrate the characteristics of Plain bar, Deformed bar, Twisted bar and Tendon.</li> <li>2.6.Mention the advantages of using Deformed and Twisted bar in RCC.</li> <li>2.7. State the minimum reinforcement used in RCC beam and slab.</li> </ul>	<ol> <li>List the different types &amp; grades of steel used in RCC and Pre-stressed concrete.</li> <li>State the different types &amp; grades of steel used in RCC and Pre-stressed concrete.</li> </ol>	
3	<ul> <li>TRANSFORMED SECTION OF BEAM</li> <li>3.1.Define Transformed section.</li> <li>3.2.Explain the theory of Transformed section with sketch.</li> <li>3.3.Derive the equation for investigating the stresses developed in Concrete and Steel by Transformed section method.</li> <li>3.4. State WSD and USD Method.</li> <li>3.5.Differentiate between WSD and USD method.</li> <li>3.6.Calculate the stresses developed in rectangular beam and T-beam in WSD method.</li> </ul>	<ol> <li>To Define Transformed section.</li> <li>To Explain the theory of Transformed section with sketch.</li> </ol>	

	<ul><li>3.7.Illustrate balanced reinforced beam, under reinforced beam and over reinforced beam.</li><li>3.8.Mention the effect of under reinforced and over reinforced in RCC</li></ul>		
	CLASS TEST 1 (Date: 20/08/23)	Evaluation of Chapter-2 & 3	Questions & answers script
4	<ul> <li>SHEAR STRESS DEVELOPED IN RCC BEAM</li> <li>4.1.Define Shear Stress.</li> <li>4.2. Explain the effect of shear force and stress in RCC beam.</li> <li>4.3.State the meaning of diagonal tension.</li> <li>4.4.Illustrate the causes of diagonal tension in RCC beam.</li> <li>4.5.Derive the formula to determine shear stress developed in RCC beam.</li> <li>4.6.Solve the problems on shear stress developed in WSD method.</li> <li>4.7.Solve the problems on shear stress developed in USD method.</li> <li>4.8.Mention the allowable shear stress for RCC beam (v) and shear stress for concrete (vc ).</li> </ul>	<ol> <li>To Define Shear Stress.</li> <li>To Explain the effect of shear force and stress in RCC beam.</li> </ol>	
5	<ul><li>WEB REINFORCEMENT IN RCC BEAM</li><li>5.1. Define web reinforcement.</li><li>5.2.Classify web reinforcement with sketch.</li></ul>	<ol> <li>To Define web reinforcement.</li> <li>To Classify web</li> </ol>	

	<ul> <li>5.3.Mention the functions of web reinforcement in RCC beam.</li> <li>5.4.Determine the spacing of vertical web reinforcement in WSD method.</li> <li>5.5.Determine the spacing of web reinforcement in USD method.</li> <li>5.6.Calculate the portion of the RCC beam requiring web reinforcement.</li> </ul>	reinforcement with sketch.	
	QUIZ TEST 2 (Date: )	Evaluation of Chapter-4 & 5	Questions & answers script
6	<ul> <li>BOND STRESS DEVELOPED IN RCC BEAM</li> <li>6.1. State the meaning of bond stress.</li> <li>6.2.Derive the formula to determine bond stress developed in RCC beam.</li> <li>6.3.Illustrate the allowable bond stress for plain bar and deformed bar in WSD and USD method.</li> <li>6.4.Determine the anchorage length of reinforcement in RCC beam.</li> <li>6.5.Explain the necessity of standard hooks of reinforcement in RCC beam.</li> </ul>	<ol> <li>To State the meaning of bond stress.</li> <li>To Derive the formula to determine bond stress developed in RCC beam.</li> </ol>	
7	<ul><li>FLEXURE FORMULA AND DESIGN OF RCC RECTANGULAR BEAM IN WSD METHOD</li><li>7.1. State the assumptions used in developing the flexure formula.</li><li>7.2.Explain the stress diagram of a loaded RCC beam.</li></ul>	<ol> <li>To State the assumptions used in developing the flexure formula.</li> <li>To Explain the stress diagram of</li> </ol>	

	7.3.Mention the notations used in flexure formula in WSD method.	a loaded RCC beam.	
	7.4.Derive the flexure formula for RCC beam in WSD method.		
	7.5.Outline the design steps of RCC rectangular beam in WSD method.		
	7.6.Determine the minimum spacing of reinforcing bars in RCC beam.		
	7.7.Design a simply supported RCC rectangular beam in WSD method.		
	7.8.Design a semi-continuous RCC rectangular beam in WSD method.		
	7.9.Design a continuous RCC rectangular beam in WSD method.		
	CLASS TEST 2 (Date: )	Evaluation of Chapter-6 & 7	Questions & answers script
8	CLASS TEST 2 (Date: ) DESIGN OF RCC RECTANGULAR BEAM IN USD METHOD	<b>Evaluation of</b> <b>Chapter-6 &amp; 7</b> 1) To Explain the stress diagram of	Questions & answers script
8	CLASS TEST 2 (Date: )         DESIGN OF RCC RECTANGULAR BEAM IN USD METHOD         8.1.Explain the stress diagram of loaded beam with showing the actual & equivalent rectangular stress distribution of ultimate load.	Evaluation of Chapter-6 & 7	Questions & answers script
8	CLASS TEST 2 (Date: )DESIGN OF RCC RECTANGULAR BEAM IN USD METHOD8.1.Explain the stress diagram of loaded beam with showing the actual & equivalent rectangular stress distribution of ultimate load.8.2.State load and load factors used in USD method.	Evaluation of Chapter-6 & 7	Questions & answers script
8	CLASS TEST 2 (Date: )DESIGN OF RCC RECTANGULAR BEAM IN USD METHOD8.1.Explain the stress diagram of loaded beam with showing the actual & equivalent rectangular stress distribution of ultimate load.8.2.State load and load factors used in USD method.8.3.Mention the notations used in flexure formula in USD method.	Evaluation of Chapter-6 & 7	Questions & answers script
8	CLASS TEST 2 (Date: )DESIGN OF RCC RECTANGULAR BEAM IN USD METHOD8.1.Explain the stress diagram of loaded beam with showing the actual & equivalent rectangular stress distribution of ultimate load.8.2.State load and load factors used in USD method.8.3.Mention the notations used in flexure formula in USD method.8.4.Express the derivation of the flexure formula in USD method.	Evaluation of Chapter-6 & 7	Questions & answers script

10	T-BEAM AND DESIGN OF RCC T-BEAMS 10.1 Define T-beam and rectangular beam. 10.2 List the different parts of a typical T-beam.	1) To Define T-beam and rectangular beam.	Text book, Marker & Link:
	QUIZ TEST - 3 (Date: )	Evaluation of Chapter- 9	Questions & answers script
9	<ul> <li>DESIGN OF RCC CANTILEVER &amp; OVERHANGING RECTANGULAR BEAMS IN WSD METHOD</li> <li>9.1.Determine the design load, shear force and bending moment of RCC cantilever &amp; overhanging beam.</li> <li>9.2.Design a cantilever RCC rectangular beam.</li> <li>9.3.Design an overhanging RCC rectangular beam.</li> <li>9.4. Describe curtailment technique of reinforcement in cantilever RCC beam.</li> </ul>	<ol> <li>To Determine the design load, shear force and bending moment of RCC cantilever &amp; overhanging beam.</li> <li>To Design a cantilever RCC rectangular beam.</li> </ol>	
MID T	ERM EXAM-(Exam starts from September 07)	Syllabus: Chapter 01-08	Questions & answers script
	<ul><li>8.6.Design a simply supported RCC rectangular beam in USD method.</li><li>8.7.Design a semi-continuous RCC rectangular beam in USD method.</li><li>8.8.Design a continuous RCC rectangular beam in USD method.</li></ul>		

	<ul> <li>10.3 Determine the width of flange of T-beam considering span length and slab thickness.</li> <li>10.4 State the ratio of width of web to the depth of web for T-beams.</li> <li>10.5 Distinguish between RCC rectangular beam and T-beam.</li> <li>10.6 Determine the depth and width of a simply supported T-beam in respect to shear force.</li> <li>10.7 Outline the design steps of RCC T-beam in WSD method.</li> <li>10.8 Design a simply supported RCC T-beam in WSD method.</li> <li>10.9 Design a semi-continuous RCC T-beam in WSD method.</li> <li>10.10 Design a continuous RCC T-beam in WSD method.</li> </ul>	2) To List the different parts of a typical T-beam.	
11	method. DESIGN OF RCC BEAM WITH COMPRESSION REINFORCEMENT AND RCC LINTEL OVER DOORS & WINDOWS. 11.1. State the meaning of double reinforced beam. 11.2. Differentiate between RCC single and double reinforced beam. 11.3. Outline the design steps of double reinforced beam.	<ol> <li>To State the meaning of double reinforced beam.</li> <li>To Differentiate between RCC single and double reinforced beam.</li> </ol>	Marker, Text Book & Link:

11.4. Design a simply supported double reinforced beam.		
11.5. Design a semi-continuous double reinforced beam.		
11.6. Design a continuous double reinforced beam.		
11.7. Determine the area of wall to be considered the design load for		
RCC lintels.		
11.8. Outline the design steps of RCC lintel.		
11.9. Design a RCC lintel over doors and windows.		
CLASS TEST 4 (Date: )	Evaluation of Chapter- 14 & 15	Questions & answers script
Total Class/ Quiz Test: 4	Total C	Class: 40

## PRACTICAL LESSON PLAN

Exp. No.	Experiment Names	Submission date
1	<ul> <li>PERFORM COMPRESSION TEST OF CONCRETE CYLINDER FOR</li> <li>PARTICULAR PROPORTION.</li> <li>1.1 Select tools and raw materials.</li> <li>1.2 Mix cement, sand and stone chips as per ratio with proper Water-cement ratio.</li> <li>1.3 Prepare the concrete cylinder with concrete according to standard procedure.</li> <li>1.4 Perform curing.</li> <li>1.5 Perform compression test using UTM / compression test Machine.</li> <li>1.6 Calculate compressive strength.</li> <li>1.7 Maintain the record of performed job.</li> </ul>	Within next 7 days

2	PERFORM COMPRESSION TEST OF CONCRETE CUBE FOR PARTICULAR PROPORTION 2.1.Select tools and raw materials.	Within next 7 days
	2.2.Mix cement, sand and stone chips as per ratio with proper water- cement ratio.	
	<ul> <li>2.3.Prepare the concrete cube with concrete according to standard procedure.</li> <li>2.4.Perform curing.</li> <li>2.5.Perform compression test using UTM / compression test machine.</li> <li>2.6.Calculate compressive strength.</li> <li>2.7.Maintain the record of performed job.</li> </ul>	
3	DETERMINE TENSILE STRENGTH OF MILD STEEL FOR PLAIN BAR IN DIFFERENT DIAMETERS 3.1 Select tools and raw materials. 3.2 Prepare mild steel for plain bar of different diameters according to standard procedure. 3.3 Perform tensile strength test according to standard Procedure using Universal Testing Machine (UTM). 3.4 Calculate tensile strength. 3.5 Maintain the record of performed job.	Within next 7 days
4	DETERMINE TENSILE STRENGTH OF MILD STEEL FOR DEFORMED BAR OF DIFFERENT DIAMETERS 4.1 Select tools and raw materials. 4.2 Prepare mild steel for deformed bar of different diameters according to standard procedure. 4.3 Perform tensile strength test according to standard procedure using Universal Testing Machine (UTM). 4.4 Calculate tensile strength. 4.5 Maintain the record of performed job.	Within next 7 days
5	PREPARE A MODEL OF SIMPLY SUPPORTED RCC RECTANGULAR BEAM AS PER DRAWING 5.1 Collect tools and raw materials. 5.2 Prepare a model of simply supported RCC rectangular beam as per	Within next 7 days

	drawing. 5.3 Check the accuracy of the work. 5.4 Maintain the model for demonstration.	
6	MAKE A MODEL OF SEMI-CONTINUOUS RCC RECTANGULAR BEAM AS PER DRAWING 6.1 Collect tools and raw materials. 6.2 Prepare a model of semi-continuous RCC rectangular beam as per drawing. 6.3 Check the accuracy of the work. 6.4 Maintain the model for demonstration.	Within next 7 days
7	PREPARE A MODEL OF CONTINUOUS RCC RECTANGULAR BEAM AS PER DRAWING 7.1 Collect tools and raw materials. 7.2 Prepare a model of continuous RCC rectangular beam as per drawing. 7.3 Check the accuracy of the work. 7.4 Maintain the model for demonstration.	Within next 7 days
8	CREATE A MODEL OF DOUBLE REINFORCED SIMPLY SUPPORTED RECTANGULAR BEAM AS PER DRAWING 8.1 Collect tools and raw materials. 8.2 Prepare a model of double reinforced simply supported rectangular beam as per drawing. 8.3 Check the accuracy of the work. 8.4 Maintain the model for demonstration.	Within next 7 days
9	PREPARE A MODEL OF RCC LINTEL WITH SUNSHADE AS PER DRAWING 9.1 Collect tools and raw materials. 9.2 Prepare a model of RCC lintel with sunshade as per drawing. 9.3 Check the accuracy of the work. 9.4 Maintain the model for demonstration.	Within next 7 days
Last submission date: 02/10/23		Total Classes: 10