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Kurigram Polytechnics Institute, Kurigram

Semester plan

Course name : Theory of structure (6454)

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No. of week	No. of Class	• General Objective	• Specific Object	Remarks
1	1 2	**Understand shear force and bending moment of beams**	1.1 State different type of loads on beam. 1.2 Mention different types of support condition. 1.3 Define point of contraflexure or inflection point. 1.4 Define dangerous section 1.5 Explain the relations between shear force and bending moment. 1.6 Characteristics of SF and BM diagrams. 1.7 Solve problems on SF and BM of cantilever beam with concentrated load, distributed load, inclined load, couples, pure moment and combined loads	
2	1 2	**Understand shear force and bending moment of beams**	1.8 Solve problems on SF and BM of simply supported beam with concentrated load, distributed load, inclined load, couples, pure moment and combined loads. 1.9 Solve problems on SF and BM of overhanging beam with concentrated load, distributed load, inclined load, couples, pure moment and combined loads. 1.10 Solve problems on SF and BM diagram to loading diagram of cantilever, simply supported and overhanging beams	
3	1 2	**Understand the bending (flexural) stresses in beams**	2.1 State the meaning of bending stresses in beam. 2.2 List the assumptions of bending stresses in beam. 2.3 Differentiate between bending moment and bending stress. 2.4 Express and derivation of the formula for bending stress. 2.5 State the meaning of elastic section modulus. 2.6 Solve problems on bending stresses of circular, rectangular, I, T, L and hollow sections of beams. 2.7 Solve problems on section modulus of circular, rectangular, I, T, L and hollow sections of beams.	

4	1 2	**Understand the shearing stresses in beams**	3.1 State the meaning of shearing stresses in beam 3.2 Differentiate between maximum and average shear stress. 3.3 Relate maximum shear stress and average shear stress for rectangular, circular and triangular section. 3.4 Express the derivation of the formula for shearing stress. 3.5 Solve problems on shearing stresses of circular, rectangular, I , T, L and hollow sections of beams. 3.6 Determine the section of homogeneous beam with respect to shearing stress and bending stress.	
5	1 2	**Understand the deflection of beams**	4.1 Define the meaning of deflection of beam and elastic curve. 4.2 List the assumptions of deflection of beam. 4.3 State the maximum allowable deflection for beam, RCC slab and steel trusses. 4.4 Express the derivation of equation for elastic curve 4.5 State the 1st and 2nd area moment proposition. 4.6 Compute the slope of elastic curve for cantilever beam with concentrated and distributed load. 4.7 Compute the maximum deflection for cantilever beam with concentrated and distributed load. 4.8 Compute the slope of elastic curve for simply supported beam with symmetrically concentrated and distributed load. 4.9 Compute the maximum deflection for simply supported beam with symmetrically concentrated and distributed load. 4.10 Compute the maximum deflection for simply supported beam with unsymmetrical concentrated load.	
6	1 2 .	**Understand the importance of joints**	5.1 Define joint, pitch, back pitch and repeating section. 5.2 State the necessity of joints. 5.3 Mention the classification of joints. 5.4 State the meaning of efficiency of joints. 5.5 Explain the modes of failure and remedial measures of riveted joints. 5.6 Solve problems on simple lap joint subjected to axial load only. 5.7 Solve problems on butt joint subjected to axial load only.	
7	1 2	**Understand the significance of welded connections**	6.1 Define terms: Leg, Throat, Fillet, Reinforcement etc. 6.2 State the significance of welded connections. 6.3 Classify different types of welded connections. 6.4 Mention the merits of welded connections. 6.5 Mention the demerits of welded connections. 6.6 Distinguish between joints and connections. 6.7 Solve problems on butt weld connection subjected to axial load only. 6.8 Solve problems on fillet weld connection subjected to axial load only.	
	1	**Understand the action of forces in frames**	7.1 Define the terms: truss, tie, strut, perfect, imperfect, deficient, redundant, web and chord member. 7.2 Mention different types of roof trusses and bridge trusses.	

8	2		7.3 State the fundamental assumptions in trusses. 7.4 Describe the methods of computing forces in trusses. 7.5 Determine the forces on frames for warren truss, cantilever, jib crane and howe truss with dead load by Analytical (joint and moment method) and Graphical method.	
9 & 10			**Class test ,quize test and Mid semester Examination**	
11	1	**Understand the stability of masonry dam**	8.1 Define dam and mention the functions of a dam. 8.2 Mention the different types of dam. 8.3 Explain the stability of a masonry dam. 8.4 State the meaning of middle third law. 8.5 Express the derivation of the equation for minimum width of the base for just no tension. 8.6 Calculate the maximum and minimum pressure on the foundation bed for rectangular dam 8.7 Calculate the maximum and minimum pressure on the foundation bed for trapezoidal dam having water face vertical only. 8.8 Solve problems on stability and suitable section of the dam.	
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12	1	**Understand the elastic buckling of columns**	9.1 State the meaning of short and long column. 9.2 Mention the type of columns on the basis of end conditions. 9.3 Compare the equivalent length of different columns. 9.4 Express the derivation of the Euler's formula for flexural buckling of a pin ended strut/column. 9.5 Calculate the safe load on column using Euler's formula. 9.6 State the Rankine-Gordon formula. 9.7 Calculate the safe load on column using Rankine-Gordon formula.	
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13	1	**Understand the concept of moving loads and cylindrical shell.**	10.1 State the meaning of moving load. 10.2 Classify different types of moving loads. 10.3 State the meaning of influence line. 10.4 Draw influence line for single concentrated load and reaction of a beam. 11.1 Introduction. 11.2 Failure of a cylindrical shell due to an internal pressure. 11.3 Stresses in a thin cylindrical shell. 11.4 Circumferential stress. 11.5 Longitudinal stresses. 11.6 Design of thin cylindrical shells	
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14, 15, 16			**Class test ,Quize test, Extra class and Semester Final Examination.**	