

# GOPALAN COLLEGE OF ENGINEERING AND MANAGEMENT

Department of Civil Engineering

Academic Year: **2016-17**

Semester: **EVEN**

## COURSE PLAN

Semester: **II**

Subject Code & Name: **15CIV23**

Name of Subject Teacher: **K PRABHAKAR**

Name of Subject Expert (Reviewer):

For the Period: From: 06-02-17 to 02-06-17

### Details of Book to be referred:

<b>Text Books</b>	<p>1. Elements of civil Engineering and engineering mechanics- S S Bhavikatti New age International publishers Fifth Edition 2016</p> <p>2. Elements of civil Engineering and engineering mechanics- H J Sawant and A P Nitsure., Technical publications , First Edition 2014</p> <p>3 Elements of civil Engineering and engineering mechanics- M N Sesha Prakash and Ganesh P Mogaveer, PHI Learning, Third edition 2016</p>
<b>Reference Books</b>	<p>1. Engineering mechanics- S Ramamrutham., Dhanpat Rai Publishing Company 10th Revised Edition 2012</p> <p>2. Engineering mechanics- Timoshenko , Sree Keshava &amp; Arun Kumar, “ Engineering Mechanics “, Enkay Publishing house , New Delhi.</p>

Lecture NO	Topic Planned	Practical Applications & Brief objectives	Book referred with Pg No.	Planned Date	Executed Date	Deviation Reasons thereof	How Made Good / Reciprocate arrangement	Remark by HOD
1.	Introduction to elements of civil engineering	To enrich the students with basic concepts of engineering mechanics .		6/2/17				
2.	Basic concepts of engineering mechanics			6/2/17				
3.	<b>MODULE-1</b> Scope of different fields of Civil	<b>Objectives:</b> 1. To understand the basic	T1-1 ,2,3 T3-2,3,4 R2-1,2	8/2/17				

	Engineering	concepts & scope of civil engineering.						
4.	Infrastructure –types and role of civil engineer in its development	2. knowledge about Roads, Bridges and Dams.	T1-4, T3-6,7 R2-3	9/2/17				
5.	Roads- Classification and comparison of different types of roads	3. Basic concepts of Engg Mechanics. wrt forces, moments and other loads acting on Rigid body.	T1-5,6,7,10 T3-8,9,10 R2-5,6	10/2/17				
6.	Bridges – types of bridges ,with sketches	4. To learn types, classification & characteristics of forces.	T1-12,13,14 T3-14,15, R2-10,11	13/2/17				
7.	Dams- types of dams with sketches.	5. solving problems on Couple, Moment of couple, & equivalent force couple system.	T1-16,17,18 T3-11,112, R2-14,15	13/2/17				
8.	Basic idealization -Forces , SI units		T1-21, T2- 2-2 R2-17,18	15/2/17				
9.	Force systems, Principles of force systems	<b>Application:</b> To analyse the forces acting in various members of structures like beams ,columns and further design of size of structural components.	T1-27, T3-24 R2-20,21	16/2/17				
10.	Moment of force- Geometrical interpretation		T1-30, T3-31 R1-9	17/2/17				
11.	Numerical problems on moment forces		T1-33 T2-3-12 R2-27,28	20/2/17				
12.	Numerical problems		T1-34 T2-3-26 R2-29,30	20/2/17				
13.	Couple system, characteristics of couple	<b>Outcome:</b> Students will be aware of various areas in civil engineering field so that they can choose the area to develop the career and the kind of work in each area to co-ordinate .	T1-32 T2-3-31 R1-10,11	21/2/17				
14.	Numerical problems		T2-3-30 R2-37,38	23/2/17				
15.	Numerical problems		T2-3-31 R2-44,45	27/2/17				
16.	Numerical problems			27/2/17				

17.	Numerical problems			28/2/17				
18.	Revision and Unit test			1/3/17				
19.	<b>MODULE -2</b> Resultant and composition of coplanar concurrent force systems	<p><b>Objectives:</b></p> <p>1. To ensure students understand the concepts of forces and their effects on bodies they act in nature.</p> <p>2. Comprehend the action of forces, Moments and other loads on systems of rigid bodies.</p> <p>3. To know the composition of Concurrent &amp; Non-concurrent Force Systems.</p> <p><b>Application:</b></p> <p>The parallelogram law of forces can be <b>applied</b> to any situation where multiple forces are acting on an object. The launching of a stunt person from a cannon in a circus is a prime example.</p> <p><b>Outcome:</b></p> <p>Multiple forces on a structure can be analysed to maintain equilibrium like beams columns etc.,</p>	T1-38 T2-4-2 R1-4,5	2/3/17				
20.	Parallelogram law of forces		T1-38 T2-4-9 R1-6	3/3/17				
21.	Numerical problems		T1-44 T2-4-18 R1-16,17	4/3/17				
22.	Numerical problems		T1-45 T2-4-22 R2-74,75	6/3/17				
23.	Equilibrium of forces – Equilibrant		T1-66 T2-5-6 R2-88,89	6/3/17				
24.	Lamis’ theorem		T1-68 T2-5-16 R1-12	7/3/17				
25.	Numerical problems on equilibrium bodies		T1- T2-72 R1-29,30	8/3/17				
26.	Numerical problems on strings		T1-73 T2-5-18 R1-28,39	13/3/17				
27.	Numerical problems- application		T1-74 T2-5-20 R1-40	13/3/17				
28.	Friction- types and law of friction		T1-146,147 T3-171,172 R2-137,138	14/3/17				
29.	Numerical problems		T1-150 T3-174,175 R2-143	15/3/17				
30.	Numerical problems	T2-7-7 T3-175,176 R2-144	16/3/17					
31.	Numerical problems	T2-7-8 T3-178,179 R2-145	17/3/17					

32.	Revision and Unit test			20/3/17				
33.	<b>MODULE -3</b> Varignons' theorem of moments	<p><b>Objectives;</b> To determine the resultant of any system of forces in non –concurrent foerce system. To apply varignons principle of moments and sove the force problems. To understand the different types of loads on beams . To analyse the supports and calculate the reactions.</p> <p><b>Application:</b> The varignons theorem can be applied in analyzing the moments and hence calculate the resultant force so that the reaction can be used to design the size of structural members.</p> <p><b>Outcome:</b> Students will be able to judge the loads and its effect on beams .</p>	T1-50 T2-4-45 R1-11	20/3/17				
34.	Numerical problems		T1-56, T2-4-56,57, R2-191,192	21/3/17				
35.	Numerical problems		T1-57 T2-4-62,63 R2-200,201	22/3/17				
36.	Numerical problems		T1-58 T2-4-64,65 R2-205	23/3/17				
37.	Numerical problems		T3-54,55 R2-206	24/3/17				
38.	Types of loads and supports in beams		T1 -99,100,102, T2-6-2,4,5 R2-218,219	27/3/17				
39.	Numerical problem		T1-104 T2-6-10,11 R2-219,220	27/3/17				
40.	Numerical problems		T1-105 T2-6-18,19 R2-221,222	28/3/17				
41.	Numerical problems		T1-106 T3-113 T2-223,224	30/3/17				
42.	Numerical problems		T3-114 R2-225	31/3/17				
43.	Numerical problems		T2-7-8 T3-178,179 R2-145	1/4/17				
44.	Revision-Numerical problems			3/4/17				
45.	Rebvision Numerical problems			3/4/17				
46.	Unit test			4/4/17				
47.	<b>MODULE -4</b> Centroid- Definition , centre f gravity. Derivation of centroid of rectangular lamina from first principles.	<p><b>Objectives:</b> 1. To understand the concepts of cente of gracity and centroid of body .</p>	T1-169,170 T2-8-2 R1-136	5/4/17				

48.	Derivation of centroid of triangular lamina and sector from first principles.	<p>The different standard shapes and its centroidal formula</p> <p>The 2-D lamina and 3-D solid body, the forces and their effects on bodies they act in nature.</p> <p><b>Application:</b> Application of integration concept to derive the centroid helps in finding the distance of centroid and equilibrium.</p> <p>To find MOI and hence the section modulus so that the size of structural member.</p> <p><b>Outcome:</b> Students can identify and analyse the shape and size of structural member and hence find the strength.</p> <p>Design the shape to suit the loads and meet equilibrium condition.</p>	T1-176 T2-8-8 R1-137	6/4/17				
49.	Derivation of centroid of quarter circle and semi circle from first principles.		T1-179 T2-8-11 R1-139	7/4/17				
50.	Numerical problems		T1-18 T2-8-28,32 R1-142,	10/4/17				
51.	Numerical problems		T1-185 T2-8-40 R1-143	10/4/17				
52.	Numerical problems		T2-8-43 R1-144	11/4/17				
53.	Moment of inertia-Definition, parallel axes theorem and perpendicular axes theorem.		T1-A1,A2 T2-9-2,3,4 R1-145	12/4/17				
54.	Derivation of MOI of triangular lamina and rectangular from first principles.		T1-A5,A6 T2-9-7 R1-149	13/4/17				
55.	Derivation of MOI of quarter circle and semi circle from first principles.		T1-A9 T2-9-10 R1-148	20/4/17				
56.	MOI of Composite and tabulation Numerical problems		T1-A16,A17, T2-9-12 R1-153	21/4/17				
57.	Numerical problems		T1-A18 T2-9-14,15 R1-155	24/4/17				
58.	Revision -Numerical problems	T1-A24 T2-9-20,21 R2-254	24/4/17					
59.	Unit test		25/4/17					
60.	<b>MODULE -5</b> Introduction to kinematics Displacement, Average velocity, speed, acceleration .Newtons low of motion	<p><b>Objectives:</b> To understand the geometry of motion without reference to the forces causing the motion of the masses moved. To identify the types of</p>	T1-198,199, T3-275 R1-307	26/4/17				
61.	Rectilinear motion-Equations of motion -derivation		T1-203 T3-280 R1-308	27/4/17				

62.	Numerical problems-variable acceleration	<p>motion and hence solve the Problems of velocity, acceleration and speed. To understand the circular motion and its effect on the moving bodies.</p> <p><b>Application:</b> The movement of bodies can be traced wrt to projectile like rockets , take off of flying objects. To design the super elevation of roads in the curved section . To fix the maximum speed of vehicles on road or rail . Firing of bullets to reach the target .</p> <p><b>Outcome:</b> Students will be able to solve the problems on speed velocity and acceleration of moving bodies. The effect of force on the moving bodies so that they can design the roads wrt gradients and curvature.</p>	T1-218, T3-281 R1-309,310	28/4/17				
63.	Numerical problems – constant acceleration		T1-203 T3-283 R1-311,312	2/5/17				
64.	Numerical problems		T1-204 T-284 R1-313	3/5/17				
65.	Motion under gravity: concept and numerical problems		T3-290 R1-341,342	4/5/17				
66.	Numerical problems		T3-292 R1-343,344	5/5/17				
67.	Numerical problems		T1-A30 T3-293 R1-345,346	6/5/17				
68.	Curvilinear motion : concept and numerical problems		T1-A37,A38 T3-296 R1-441	8/5/17				
69.	Numerical problems		T3-302,304 R1-442,443	8/5/17				
70.	Super elevation: concept & Numerical problems		T1-A33 T3-316 R2-417	9/5/17				
71.	Numerical problems		T3-316 R2-418	10/5/17				
72.	Projectile motion- Concepts & numerical problems		T1-225 T3-316 R1-374,375	11/5/17				
73.	Numerical problems		T1-226 T3-325,326 R1-380,381	12/5/17				
74.	Relative motion : Concepts and Numerical problems		T1-249 T2-10-48 R2-411	15/5/17				
75.	Numerical problems		T1-250 T2-10-51 R2-414	15/5/17				
76.	Revision			16/5/17				
77.	Unit test			17/5/17				

Prepared By: \_\_\_\_\_

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Date & Sign \_\_\_\_\_

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