

# GOPALAN COLLEGE OF ENGINEERING AND MANAGEMENT

Department of Civil Engineering

Academic Year: **2017-18**

Semester: **EVEN**

## COURSE PLAN

Semester: **II**

Subject Code& Name: **15CIV23& Elements of Civil Engg & Engg Mechanics**

Name of Subject Teacher: **ARCHANA GOUTHAMAN**

Name of Subject Expert (Reviewer): **KALYANI DONGARKAR**

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

### Details of Book to be referred:

<b>Text Books</b>	<p><b>T1.</b> SS Bhavikatti, “ Elements of civil engineering “, New Age international Publisher New Delhi 3 rd Edition 2009</p> <p><b>T2.</b> M N Shesha Prakash and Ganesh, B Mogaveer ,”Elements of civil engineering Mechanics”PHI Learning 3<sup>rd</sup> Revised Edition (2014)</p> <p><b>T3.</b> A Nelson,” Engineering mechanics –statics and Dynamics”, Tata McGraw Hill Education Private LTD., New Delhi 2009</p> <p><b>T4.</b> Engineering Mechanics by S. Timonshenko, D.H Young</p>
<b>Reference Books</b>	<p><b>R1.</b> : Timoshenko , D H Young and JV Rao, “ Engineering Mechanics “Tata McGraw Hill Book Company New Delhi.</p> <p><b>R2.</b> Shames IH “ Engineering Mechanics –Statics and Dynamics “, PHI-2009</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	Remarks by HOD
1.	<b>Module 1:</b> Introduction to Civil Engineering Scope of different fields of Civil	<b>Objectives</b>	T1-1 ,2,3 T3-2,3,4 R2-1,2	6/2/17				

	Engineering - Surveying, Building Materials, Construction Technology, Geotechnical Engineering, Structural Engineering, Hydraulics, Water Resources and Irrigation Engineering, Transportation Engineering, Environmental Engineering.	To get introduced to civil engineering branches and to know basic types and structures of roads, dams and bridges.  <b>Application:</b> Civil engineering is one of the oldest branches and is necessary for day to day life. This unit gives the basic information about civil engineering; all types of infrastructural developments like Roads, dams and bridges.						
2.	Infrastructure: Types of infrastructure, Role of Civil Engineer in the Infrastructural Development, Effect of the infrastructural facilities on socio-economic development of a country.		T1-4, T3-6,7 R2-3	6/2/17				
3.	Roads: Classification of Roads and their functions, Comparison of Flexible and Rigid Pavements (Advantages and Limitations)		T1-5,6,7,10 T3-8,9,10 R2-5,6	7/2/17				
4.	Bridges: Types of Bridges and Culverts, RCC, Steel and Composite Bridges		T1-12,13,14 T3-14,15, R2-10,11	8/2/17				
5.	Dams: Different types of Dams based on Material, Structural behavior and functionality with simple sketches.		T1-16,17,18 T3-11,112, R2-14,15	9/2/17				
6.	Introduction to Engineering Mechanics: Basic idealizations - Particle, Continuum and Rigid body; Newton's laws of Force and		T1-21, T2- 2-2 R2-17,18	10/2/17				

	its characteristics, types of forces-Gravity, Lateral and its distribution on surfaces,							
7.	Classification of force systems, Principle of physical independence, superposition, transmissibility of forces, ,		T1-27, T3-24 R2-20,21	13/2/17				
8.	Introduction to SI units. Couple, Moment of a couple, Characteristics of couple, Numerical problems on moment of forces and couples,		T1-30, T3-31 R1-9	13/2/17				
9.	Equivalent force - Couple system; Numerical problems on equivalent force - couple system.		T1-33 T2-3-12 R2-27,28	15/2/17				
10.	Numerical problems on moment of forces and couples, on equivalent force - couple system.		T1-34 T2-3-26 R2-29,30	16/2/17				
11.	Numerical problems on moment of forces and couples, on equivalent force - couple system.		T1-32 T2-3-31 R1-10,11	17/2/17				
12.	<b>Module-2</b> Analysis of Concurrent Force Systems Composition of forces - Definition of Resultant; Composition of coplanar - concurrent force system	<b>Objective:</b> To understand the concept of Resultants and Equilibrium Static Friction in rigid bodies in contact of Non-Concurrent Force Systems	T1-38 T2-4-2 R1-4,5	20/2/17				
13.	Parallelogram Law of forces,		T1-38 T2-4-9 R1-6	20/2/17				
14.	Principle of resolved parts		T1-44 T2-4-18 R1-16,17	21/2/17				
15.	Numerical problems on composition of coplanar		T1-45 T2-4-22	22/2/17				

	concurrent force systems.	<p><b>Application:</b> To find out resultants and to resolve the forces for structural analysis.</p> <p><b>OUTCOME:</b> The physical forces and force systems acting on a body , Different types of loads and supports acting on beam and its analysis.</p>	R2-74,75						
16.	Composition of coplanar - non-concurrent force system		T1-50 T2-4-45 R1-11	23/2/2017					
17.	Varignon's principle of moments			27/2/2017					
18.	Numerical problems on composition of coplanar non-concurrent Force system.		T1-57 T2-4-62,63 R2-200,201	27/2/2017					
19.	Numerical problems on composition of coplanar non- concurrent Force system, composition of coplanar non- concurrent Force system.		T1-58 T2-4-64,65 R2-205	28/2/2017					
20.	Unit Test - 1			1/3/2017					
21.	Discussion on UT results			2/3/2017					
22.	Discussion on UT results			3/3/2017					
23.	IA -1 readiness – VTU QP		VTU Question papers	4/3/2017					
24.	Equilibrium of forces - Definition of Equilibrant; Conditions of static equilibrium for different force systems		T3-54,55 R2-206	6/3/2017					
25.	Lami's theorem, Numerical problems on equilibrium of coplanar – concurrent and non-concurrent force systems.	T1-68 T2-5-16 R1-12	6/3/2017						
26.	Types of friction, Laws of static friction, Limiting friction, Angle of friction, angle of repose, Impending motion on horizontal and inclined planes	T1- T2-72 R1-29,30	7/3/2017						

27.	Types of friction, Laws of static friction, Limiting friction, Angle of friction, angle of repose, Impending motion on horizontal and inclined planes		T1-74 T2-5-20 R1-40	8/3/2017				
28.	Impending motion on horizontal and inclined planes		T1-146,147 T3-171,172 R2-137,138	13/3/2017				
29.	Numerical Problems on single and two blocks on inclined planes		T1 -99,100,102, T2-6-2,4,5 R2-218,219	14/3/2017				
30.	<b>Module - 3 Application-Support Reaction in beams</b> Types of Loads and Supports, statically determinate beams	<b>Objective:</b> To understand the hardened concrete properties by factors influencing strength, durability of concrete.  <b>Application:</b> Preparing the concrete mix taking care of the durability and factors affecting the same.  <b>Outcome:</b> Application of Newton's laws of motions.	T1-104 T2-6-10,11 R2-219,220	15/3/2017				
31.	Numerical problems on support reactions for statically determinate beams with Point load (Normal and Inclined)		T1-105 T2-6-18,19 R2-221,222	16/3/2017				
32.	Numerical problems on support reactions for statically determinate beams with udl			17/3/2017				
33.	Numerical problems on support reactions for statically determinate beams with uvl		T1-106 T3-113 T2-223,224	20/3/2017				
34.	Numerical problems on support reactions for statically determinate beams with moments			20/3/2017				
35.	Unit Test - 2			21/3/2017				

36.	<b>Module 4: Centroids and Moments of Inertia of Engineering Sections</b> Centroids Introduction to the concept, centroid of line and area, centroid of basic geometrical figures,	<b>Objective:</b>  To learn the methods of finding out centroid and the moment of Inertia of different shapes.  <b>Application:</b>  Centroid is a point where whole mass of the body can be assumed to be concentrated. The concept is applied in analysis of structures for stability  <b>Outcome:</b>  Concept of Centroid and Moment of inertia of a built up section	T1-169,170 T2-8-2 R1-136	22/3/2017				
37.	computing centroid for– T, L Numerical Problems		T1-176 T2-8-8 R1-137	23/4/2017				
38.	computing centroid for I, Z Numerical Problems		T1-179 T2-8-11 R1-139	24/3/2017				
39.	computing centroid for full & quadrant circular sections Numerical Problems		T1-18 T2-8-28,32 R1-142,	27/3/2017				
40.	computing centroid for built up sections Numerical Problems		T1-185 T2-8-40 R1-143	27/3/2017				
41.	Numericals - QP			28/3/2017				
42.	Numericals -QP			30/3/2017				
43.	Numericals-QP			31/3/2017				
44.	<b>Moment of Inertia</b> Introduction to the concept, Radius of gyration, Parallel axis theorem, Perpendicular axis theorem		T2-8-43 R1-144	01/4/2017				
45.	Moment of Inertia of basic planar figures, computing moment of Inertia for – T, L Numerical problems		T1-A1,A2 T2-9-2,3,4 R1-145	3/4/2017				
46.	computing moment of Inertia for I, Z Numerical problems Numerical problems	T1-A5,A6 T2-9-7 R1-149	3/4/2017					

47.	Revision for IA		T1-A9 T2-9-10 R1-148	4/4/2017				
48.	Computing moment of Inertia for full/quadrant circular sections Numerical problems		T1-A16,A17, T2-9-12 R1-153	5/4/2017				
49.	Computing moment of Inertia for built up sections. Numerical problems		T1-A18 T2-9-14,15 R1-155	6/4/2017				
50.	Unit Test - 3			7/4/2017				
51.	Discussion on UT results			10/4/2017				
52.	Discussion on UT results			10/4/2017				
53.	IA – 3 readiness – VTU QP			11/4/2017				
54.	IA – 3 readiness – VTU QP			12/4/2017				
55.	<b>Module 5: Kinematics</b> Definitions of Displacement, Average velocity, Instantaneous velocity, Speed , Acceleration and Average acceleration, Variable acceleration	<b>Objective:</b>  To learn the vector forces and their effect on stationery and moving bodies  <b>Application:</b>  This part of the unit gives the forces acting on an object moving in a circular or parabolic path And applied in the analysis of vehicles and spacecrafts.	T1-198,199, T3-275 R1-307	24/4/2017				
56.	Acceleration due to gravity, Newton’s Laws of Motion.		T1-203 T3-280 R1-308	24/4/2017				
57.	Rectilinear Motion– Numerical problems		T1-218, T3-281 R1-309,310	25/4/2017				
58.	Rectilinear Motion– Numerical problems		T1-203 T3-283 R1-311,312	26/4/2017				
59.	Curvilinear Motion- Super elevation Numerical problems		T1-204 T-284 R1-313	27/4/2017				
60.	Projectile Motion Numerical problems		T3-290 R1-341,342	28/4/2017				

61.	Relative motion Numerical problems	<b>OUTCOME:</b>  Application of Newton's laws of motions  Relationship between the motions of bodies.	T3-292 R1-343,344	2/5/2014				
62.	Motion under gravity – Numerical problems.		T1-A30 T3-293 R1-345,346	3/452014				
63.	Motion under gravity – Numerical problems.		T1-A37,A38 T3-296 R1-441	4/5/2017				
64.	Motion under gravity – Numerical problems.		T3-302,304 R1-442,443	5/5/2017				
65.	Relative motion Numerical problems		T1-A33 T3-316 R2-417	6/4/2017				
66.	Revision for IA3		T3-316 R2-418	8/5/2017				
67.	Relative motion Numerical problems		T1-225 T3-316 R1-374,375	9/5/2017				
68.	Relative motion Numerical problems		T1-226 T3-325,326 R1-380,381	10/5/2017				
69.	Relative motion Numerical problems		T1-227 T3-326,327 R1-381,382	11/5/2017				
70.	Unit Test - 3			12/5/2017				
71.	Discussion on UT results			15/5/2016				
72.	Discussion on UT results			16/5/2016				
73.	VTU readiness			17/5/2016				
74.	VTU readiness			18/5/2016				

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