J. C. Bose University of Science and Technology, YMCA, Faridabad

Lecture Plan of Subject: Engineering Mechanics (EE IOT)

Subject Code: ESC01

Lecture No.	Topic to be covered
Unit 1	
1	Introduction to Engineering Mechanics, Force system, Basic concepts
2	Particle Equilibrium in 2D & 3D
3	Rigid Body Equilibrium, system of forces
4	Coplanar, Concurrent forces
5	Components in space-resultant moment of forces & its application
6	Couples and resultant force system, equilibrium of a system of forces,
7	Free body diagrams
8	Equations of equilibrium of coplanar systems and spatial systems,
9	Static indeterminacy
Unit 2	
10	Friction covering, types of friction, limiting friction, laws of friction,
11	Static and dynamic friction
12	motion of bodies, wedge friction
13	screw jack and differential jack
Unit 3	
14	Equilibrium in three dimensions,
15	Method of joints, How to determine if a member is in tension or compression
16	Method of sections,
17	Simple trusses, zero force members
18	Beams and types of beams
19	Frame and machines
Unit 4	
20	Centroid of simple figures from the first principle
21	Centroid of composite sections
22	Centre of gravity and its implications
23	Area moment of inertia, MOI of standard sections and composite sections
24	Mass moment of inertia of circular plate, cylinder
25	Mass moment of inertia of cone, circular hook
Unit 5	
26	Virtual displacements
27	Principle of virtual work for particle
24	Ideal system of rigid bodies
25	Degrees of freedom
26	Active force diagram

27	System with friction
28	Mechanical efficiency, conservative forces and potential energy
29	Energy equation for equilibrium,
30	Applications of the energy method of equilibrium, stability of equilibrium
Unit 6	
31	Rectilinear motion, plane curvilinear motion (rectangular path, polar coordinates)
32	3D curvilinear motion
33	Relative and constrained motion
34	Newton's second law (rectangular, polar, path coordinates)
35	Work-kinetic energy power, potential energy
36	Impulse momentum (linear, angular)
37	Impact (direct, oblique)
Unit 7	
38	General principles in dynamics, types of motion
39	Instantaneous centre of rotation in plane motion and simple problems
40	D' Alembert principle and its applications in plane motion and connected bodies
41	Work energy principle and its application in plane motion of connected bodies
42	Kinetics of rigid body motion
Unit 8	
43	Vibrations and their basic terminology, free and forced vibrations
44	Resonance and its effects, derivation of frequency and amplitude of free vibration without damping
45	Single DOF system, types of pendulum, use of simple, compound and torsion pendulums

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