SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Automobile Engineering	LP: AE22401 Rev. No: 00 Date: 29.01.2024
B.E/B.Tech/M.E/M.Tech : B.E Regulation: 2022 PG Specialisation : NA Sub. Code / Sub. Name : AE22401 / Applied Mechanics Unit : 1	

Unit Syllabus: Introduction & Statics of Particles

Fundamental Concepts and Principles, Systems of Units, forces in a plane - force on a particle. resultant of two forces, vectors, resultant of several concurrent forces, resolution of a force into components, rectangular components of a force -unit vectors, equilibrium of a particle, freebody diagrams, forces in space - rectangular components of a force in space.

Objective: To develop capability to predict the effect of force on statics of particles.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Overview of Engineering Mechanics	1, Ch.1, Pg. 3	PPT, BB
2	Systems of Units	1, Ch.1, Pg. 4	PPT, BB
3	Scalars and Vectors	1, Ch.1, Pg. 5-7	PPT, BB
4	Force on a Particle	1, Ch.2, Pg.9-11	PPT, BB
5	Resultant of Two Forces	1, Ch.2, Pg.9-15	PPT, BB
6	Vectors and Vector Operations	1, Ch.2, Pg. 9-21	PPT, BB
7	Resultant of Several Concurrent Forces	1, Ch.2, Pg. 9-21	PPT, BB
8	Resolution of a Force into Components	1, Ch.2, Pg. 9-21	PPT, BB
9	Equilibrium of a Particle	1, Ch.2, Pg. 27-30	PPT, BB
10	Free-Body Diagrams	1, Ch.1, Pg. 27-30	PPT, BB
11	Forces in Space	2, Ch.2, Pg. 13-27	PPT, BB
12	Rectangular Components of a Force in Space	2, Ch.2, Pg. 1-273	PPT, BB

Content beyond syllabus covered (if any):

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Sub. Code / Sub. Name: AE22401 / Applied Mechanics

Unit : II

Unit Syllabus : Equivalent Systems of Forces & Equilibrium of Rigid Bodies

External and Internal Forces, Principle of Transmissibility, Moment of a Force about a Point, Varignon's Theorem, Rectangular Components of the Moment of a Force, Moment of a Couple, Addition of Couples, Resolution of a Given Force into a Force and Couple. Free-Body Diagram, Equilibrium in Two Dimensions, Equilibrium in Three Dimensions.

Objective: To study the basic concepts of moment and its effects on the bodies at rest or in motion.

Session No *	Topics to be covered	Ref	Teaching Aids
13	Principle of Transmissibility	2, Ch.2, Pg. 23	PPT, BB
14	Moment of a Force about a Point	2 Ch 3 Pg 28-32	PPT, BB
15	Varignon's Theorem	2 Ch 3 Pg 30	PPT, BB
16	Rectangular Components of the Moment of a Force	2 Ch 3 Pg 30-35	PPT, BB
17	Moment of a Couple	2 Ch 4 Pg 49	PPT, BB
18	Addition of Couples	2 Ch 4 Pg 50	PPT, BB
19	Resolution of a Given Force into a Force and Couple	2 Ch 4 Pg 50 - 53	PPT, BB
20	Free-Body Diagram	2 Ch 5 Pg 56-57	PPT, BB
21	Equilibrium in Two Dimensions	2 Ch 5 Pg 56-70	PPT, BB
22	Equilibrium in Three Dimensions	2 Ch 5 Pg 56-70	PPT, BB
23	Equilibrium problems in Three Dimensions	2 Ch 5 Pg 56-70	PPT, BB
24	Equilibrium problems in Three Dimensions	2 Ch 5 Pg 56-70	PPT, BB

Content beyond syllabus covered (if any):

* Session duration: 50 mins

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Unit : III

Unit Syllabus : CENTROIDS AND CENTERS OF GRAVITY.

Centroids - Theorem of Pappus - Centroids of Composite figures - Centre of Gravity of a vehicle - Area moment of Inertia of vehicle frame: - polar Moment of Inertia - Transfer - Theorems - Moments of Inertia of Composite Figures - product of Inertia - Transfer Formula for product of Inertia. Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia - Mass moment of inertia of connecting rod and crankshaft.

Objective: To predict the behavior of a moving body when acted on by gravity

	Topics to be covered	Ref	Teaching Aids
25	Theorem of Pappus	1 Ch 4 Pg 87-89	PPT, BB
26	Centroids of Composite Figures	1 Ch 4 Pg 89-117	PPT, BB
27	Center of Gravity of a Vehicle	1 Ch 4 Pg 89-117	PPT, BB
28	Area Moment of Inertia of Vehicle Frame	1 Ch 4 Pg 89-117	PPT, BB
29	Polar Moment of Inertia	4 Ch 10 Pg 530- 531	PPT, BB
30	Transfer Theorems	4 Ch 10 Pg 530-532	PPT, BB
31	Moments of Inertia of Composite Figures	1 Ch 5 Pg 124-144	PPT, BB
32	Product of Inertia	1 Ch 5 Pg 124-144	PPT, BB
33	Transfer Formula for Product of Inertia	1 Ch 5 Pg 124-144	PPT, BB
34	Moment of Inertia of Masses	1 Ch 5 Pg 124-144	PPT, BB
35	Transfer Formula for Mass Moments of Inertia	1 Ch 5 Pg 124-144	PPT, BB
36	Problems - Transfer Formula for Mass Moments of Inertia	1 Ch 5 Pg 124-144	PPT, BB

Content beyond syllabus covered (if any):

* Session duration: 50 mins

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Sub. Code / Sub. Name: AE22401 / Applied Mechanics

Unit : IV

Unit Syllabus : FRICTION & MOTION OF VEHICLES

The Laws of Dry Friction. Coefficients of Friction, Wedges, Wheel Friction. Rolling Resistance, Belt Drivers - Open, Crossed, compound belt and camshaft timing belt drives, Belt Friction, Types of Motions of Vehicles, Motion of a Vehicle Along a Level Track when the Tractive Force Passes Through its Centre of Gravity. Driving of a Vehicle, Motion of Vehicles on an Inclined Plane.

Objective: To determine the effects of friction on static and moving bodies and also to analysis the forces acting on the vehicle.

	Topics to be covered	Ref	Teaching Aids
37	Laws of Dry Friction	5 Ch 8 Pg 124-125	PPT, BB
38	Coefficients of Friction	5 Ch 8 Pg 124-125	PPT, BB
39	Wedges and Wheel Friction	5 Ch 8 Pg 157	PPT, BB
40	Rolling Resistance	5 Ch 8 Pg 157-158	PPT, BB
41	Problems on Laws of Dry Friction	5 Ch 8 Pg 157-169	PPT, BB
42	Problems on Wedges and Wheel Friction	5 Ch 8 Pg 157-169	PPT, BB
43	Belt Drives (Open, Crossed, Compound, Camshaft Timing)	5 Ch 8 Pg 670-672	PPT, BB
44	Problems on Belt Drives (Open, Crossed, Compound, Camshaft Timing)	5 Ch 8 Pg 670-680	PPT, BB
45	Types of Motions of Vehicles	5 Ch 32 Pg 651-669	PPT, BB
46	Motion of a Vehicle Along a Level Track	5 Ch 32 Pg 651-669	PPT, BB
47	Driving of a Vehicle	5 Ch 32 Pg 651-669	PPT, BB
48	Motion of Vehicles on an Inclined Plane	5 Ch 32 Pg 651-669	PPT, BB

Content beyond syllabus covered (if any):

* Session duration: 50 mins

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Sub. Code / Sub. Name: AE22401 / Applied Mechanics

Unit : V

Unit Syllabus : KINETICS OF PARTICLES

Kinetic Energy of a Particle. Principle of Work and Energy, Power and Efficiency, Principle of Impulse and Momentum, Plane Motion of a Rigid Body. D'Alembert's Principle, Newton's Laws of Motion of Rotation, Torque and Angular Acceleration, Relation Between Kinetics of Linear Motion and Kinetics of Motion of Rotation, Flywheel, Motion of Two Bodies Connected by a String and Passing Over a Pulley.

Objective: To study the relationship between energy, work, power which causes the motion of connected bodies.

Objective: To study	Topics to be covered	Ref	Teaching Aids
49	Kinetic Energy of a Particle	5 Ch 30 Pg 599-621	PPT, BB
50	Principle of Work and Energy	5 Ch 30 Pg 599-621	PPT, BB
51	Power and Efficiency	5 Ch 30 Pg 599-621	PPT, BB
52	Principle of Impulse and Momentum	1 Ch 8 Pg 215-244	PPT, BB
53	Plane Motion of a Rigid Body	1 Ch 8 Pg 215-244	PPT, BB
54	D'Alembert's Principle	1 Ch 8 Pg 215-244	PPT, BB
55	Newton's Laws of Motion of Rotation	1 Ch 8 Pg 215-244	PPT, BB
56	Torque and Angular Acceleration	1 Ch 8 Pg 215-244	PPT, BB
57	Relation Between Kinetics of Linear Motion and Kinetics of Motion of Rotation	5 Ch 31 Pg 625-650	PPT, BB
58	Flywheel	5 Ch 31 Pg 625-650	PPT, BB
59	Motion of Two Bodies Connected by a String Passing Over a Pulley	5 Ch 31 Pg 625-650	PPT, BB
60	Problems related to Motion of Two Bodies Connected by a String Passing Over a Pulley	5 Ch 31 Pg 625-650	PPT, BB
Content beyond syllabus covered (if any):			

* Session duration: 50 mins