VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY BURLA

DEPARTMENT OF MECHANICAL ENGG.

LESSON PLAN FOR **Machine Dynamics**

SUBBJECT CODE: **BME- 317, 6th Semester Mechanical**

Lecture	**Topics to be covered**	**Remark**
Lecture 1	Toothed Gears: Introduction, classification of gears, gear terminology.	
Lecture 2	Gear terminology (contd.), law of gearing, velocity of sliding,	
Lecture 3	different forms of teeth, path of contact, arc of contact,	
Lecture 4	Number of pairs of teeth in contact, numerical problems.	
Lecture 5	Interference in involute gears, minimum number of teeth to avoid interference, interference between rack and pinion, numerical problems.	
Lecture 6	Numerical problems on interference, minimum number of teeth.	
Lecture 7	Undercutting, numerical problems.	
Lecture 8	Gyroscope: angular velocity, angular acceleration, gyroscopic couple, numerical problems.	
Lecture 9	Effect of gyroscopic couple on bearings, numerical problems.	
Lecture 10	Stability of 4-wheel automobile, numerical problems	
Lecture 11	Stability of two wheel vehicle, numerical problems	
Lecture 12	Effect of gyroscopic couple on naval ship, numerical problems.	
Lecture 13	Effect of gyroscopic couple on aeroplane.	
Lecture 14	Cams: Introduction, classification of cams, classification of followers, basic terminology used.	
Lecture 15	Motion of follower: Simple harmonics, numerical problems.	
Lecture 16	Constant velocity motion of follower, numerical problems.	
Lecture 17	Uniform acceleration retardation of follower, numerical problems.	
Lecture 18	Cams with specified contours	
Lecture 19	Numerical problems on Cams with specified contours	
Lecture 20	Governors: Introduction, types of governor, centrifugal governors, watt and porter governor, terminology used,	
Lecture 21	Numerical problems on centrifugal governors	
Lecture 22	Spring loaded governors: Hartnell governor, numerical problems.	
Lecture 23	sensitiveness ,stability isochronism, hunting, numerical problems	
Lecture 24	curves of controlling force , effect of friction	

Lecture 25	Numerical problems on governors.	
Lecture 26	Balancing: Balancing of single revolving mass in same plane, balancing of several revolving masses in same plane, several rotating masses in different plane.	
Lecture 27	Numerical problems on revolving masses.	
Lecture 28	Static and dynamic balancing, balancing of reciprocating mass, partial balancing of single cylinder engine, numerical examples.	
Lecture 29	Partial balancing of multi-cylinder engine, numerical problems.	
Lecture 30	Direct and reverse crank method of balancing, numerical problems.	
Lecture 31	Turning moment diagram of flywheel: fluctuation of energy, coefficient of fluctuation of energy, numerical examples.	
Lecture 32	Flywheel: energy stored in a flywheel, dimensions of the flywheel rim, flywheel and punching press. Numerical examples.	
Lecture 33	Numerical examples on flywheel.	
Lecture 34	Vibration: Introduction to vibration, causes of vibration, elimination of vibration, types of vibration – longitudinal, transverse , torsional ; definition of terminology like natural frequency, amplitude , time period	
Lecture 35	Calculation of natural frequency of undamped single degree of freedom system by Newton's 2^{nd} Law, D-Alembert's principle and energy method.	
Lecture 36	Numerical examples on calculation of natural frequency.	
Lecture 37	D-Alembert's principle and energy method, Equivalent spring constant for the system having different types of combination of springs and calculation of their natural frequencies ,	
Lecture 38	Numerical examples on D-Alembert's principle and energy method, and on calculation of natural frequency.	
Lecture 39	calculation of natural frequency of single degree of spring – mass system taking mass of spring into account	
Lecture 40	Numerical examples on calculation of natural frequency of single of spring mass-system.	

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