

# SRM UNIVERSITY

## SCHOOL OF MECHANICAL ENGINEERING

MTech (CAD) - I Year / II (Even) Semester (JAN 2013-APR 2013)

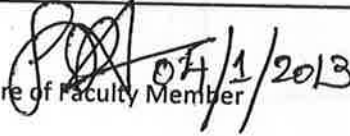
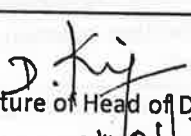
### LESSON PLAN (Theory) - ME 0504 - Mechanical Vibrations

Theory: Day Order 1 - 3rd & 4th hours; Day Order 3 - 1st hour;

Lab: Day order 5 - 5th, 6th, & 7th hours

Lecture - Room PG 301; Computational Lab - CAD Lab (Mechanical - 'B' Block)

S. No	# of hours	Topics	References (given below)
1	2	Intro - Vibration, course overview Oscillation of simple pendulum - Definition of position, concept of DOF Relation between SDOF & real-life problems Types of vibration - free, forced/undamped,damped/linear,non-linear/deterministic,probabilistic	T1 - Chapter 1
2	1	SDOF-Free, undamped vibration - equation of motion, energy method, Rayleigh's method, Newton's law; general procedure for determination of response;	T1 - Chapter 2
3	2	Solution of equ. of motion (analytical, numerical); initial conditions; forced undamped vibration - defn., relation to real-life problems	T1 - Chapter 2 T2 - Chapter 4 (4.5)(numerical method) T1 - Chapter 3
4	1	Forced response of SDOF-contd- response at resonance	T1 - Chapter 3
5	2	SDOF free, damped vibration - equ of motion, response	T1 - Ch 3(beats) T1 - Chapter 2
6	1	SDOF forced, damped vibration - response; mechanical impedance, vibration isolation, transmissibility; virtual work	T1 - Chapter 3
7	2	2-DOF free, undamped vibration; coordinate coupling; vibration modes; principal mode; response	T1 - Chapter 5
8	1	2-DOF forced vibration - response, applications (dynamic vibration absorber),	T1 - Chapter 5
9	2	Semi-definite systems - defn., examples, example problems (analytical & numerical soln); transient vibration - impulse, arbitrary excitations	T1 - Chapter 5
11	1	2DOF-contd., example problems	T1 - Chapter 5
12	2	Multi-DOF systems - Lagrange's equation in deriving system governing equations	T1 - Chapter 6

13	1	MDOF systems - derivation of equations	T1 - Chapter 6
14	2	MDOF - contd; Eigen values & vectors	T1 - Chapter 6
15	2	<b>Cycle Test 1 (Date to be confirmed later)</b>	
16	2	Influence coefficients; MDOF system equations	T1 - Chapter 6
17	1	Continuous systems - Intro	T1 - Chapter 8
18	2	Transverse vibration of strings	T1 - Chapter 8
19	1	Longitudinal vibration of rods	T1 - Chapter 8
20	2	Transverse vibration of beams	T1 - Chapter 8
21	1	Vibration of beams - contd., different support conditions	T1 - Chapter 8
23	2	Numerical methods for determination of natural frequencies - intro Matrix iteration method	T1 - Chapter 7
24	2	Determination of natural frequencies using matrix iteration and inverse matrix methods	T1 - Chapter 7
25	1	Holzer method for finding natural frequencies	T1 - Chapter 7
26	2	Stodola method; Vibration test/analysis	T1 - Chapter 7
27	1	Vibration measuring instruments, tests, analysis	T1 - Chapter 10
28	2	<b>Cycle Test 2 (Date to be confirmed later)</b>	
<b>T1. Singiresu S Rao - "Mechanical Vibrations" - 4th edition - 2004 - Pearson Education</b>			
<b>T2. William T Thomson - "Theory of Vibration with Applications" - 3rd edition - 1988- CBS Publishers</b>			
Signature of Faculty Member  04/01/2013		Signature of Head of Department  04/01/2013	
Name of Faculty: Dr S H Venkatasubramanian			