INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

Course Title	**Vibration Control**	Course Code	**MEXXXX**			
Dept./ Specialization	Mechanical Engineering	Structure (LTPC)	3	1	0	4
To be offered for	UG/PG	Status	Core ☐		Elective ■	
Faculty Proposing the course	Dr. Siva Prasad AVS	Type	New ■		Modification ☐	
Recommendation from the DAC		Date of DAC	01-06-2021			
External Expert(s)	Prof. S Narayanan, IIITDM Kancheepuram					
Pre-requisite	Principle of Vibrations	Submitted for approval			46th Senate	
Learning Objectives	The main objective of course is to learn the active and passive techniques for vibration control. The design consideration of material selection, smart materials and vibration measurement techniques are also discussed.					
Learning Outcomes	• At the end of the course, students will be capable of designing mechanical systems for vibration control and energy harvesting.					
Contents of the course *(With approximate break-up of hours for L/T/P)*	**Basic Concepts:** Review of free and forced vibrations with and without damping; Free and forced vibration of single, two and multi-degree of freedom systems with and without viscous damping (L6+ T2) **Basic Vibration Control:** Reduction at source, Active feedback control, Vibration Isolation (L9 + T3) **Vibration generation mechanisms:** Source classification, self-excited vibration, flow induced vibration, field balancing of rigid rotors/flexible rotors and damping models and measures, Design consideration of material selection. (L10 + T3) **Passive Vibration Control:** Basics, design of absorber, absorber with ideal spring, shock absorber, isolators with stiffness and damping. (L6 + T2) **Active Vibration Control:** Basics, Piezoelectric materials, electro rheological fluids, magneto rheological fluids, Magneto- and Electrostrictive Materials in Vibration Control, shape memory alloys and electro-magnetic materials. (L8 + T3) **Vibration Measurement:** Basics, data acquisition, FFT analysis and filters (L3+T1)					
Text Book	2. S. S. Rao, Mechanical Vibrations, 6th edition, Pearson Education, 2017. 3. A. Preumont, Vibration Control of Active Structures-An Introduction, Springer, 3rd edition, 2011.					
Reference Books	1 A. K. Mallik and S. Chatterjee, Principles of Passive and Active Vibration Control, 1st edition, Affiliated East West Press, 2014 2 C. Sujatha, Vibration and Acoustics, 1st edition, Tata McGraw-Hill Education, 2010 3 Vibration and Control, D. J. Inman, John Willey & Sons Inc, 2002 4 Vibratory Condition Monitoring of Machines, J.S. Rao, CRC Press, 2000 5 D. J. Mead, Passive Vibration Control, 1st edition, John Wiley & Sons, 1998					