

1.	Title of the course	Vibrations and Control
2.	Course number	ME307M
3.	Structure of credits	3-0-2-4
4.	Offered to	UG
5.	New course/modification to	Modification To ME3204/8
6.	To be offered by	Department of Mechanical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	<b>Course Objective(s):</b> The objective of this course is to enable students to build and solve mathematical models of discrete vibrating systems. The emphasis is on linear systems (Single and Multi degree-of-freedom) subject to initial conditions and excitations of sinusoidal and periodic nature. The course introduces the basics of control mechanisms used in vibrating systems	
10.	<b>Course Content:</b> Introduction to modelling of dynamical systems, assumptions, linearization, stability; Single Degree of Freedom Systems, free undamped vibration, viscous and Coulomb damping, response to initial conditions, response to harmonic and periodic excitations, superposition; Two degree of freedom system, free and forced vibrations, vibration absorber, mode shapes; Vibrations of Torsional systems; Multi degree-of-freedom systems; Introduction to controls, passive and active vibration controls, root locus method, stability, Routh-Hurwitz criterion, steady state errors and constants; Types of feedback control systems, proportional integral derivative feedback compensations, digital control. Laboratory: Free, forced, damped, undamped vibrations; active controls experiments	
11.	<b>Textbook(s):</b> 1. Nise N S, <i>Control Systems Engineering</i> , 6th Edition, Wiley (2010). 2. Rao S S, <i>Mechanical Vibrations</i> , 5th Edition, Pearson (2010).	
12.	<b>Reference(s):</b> 1. Ramamurti V, <i>Mechanical Vibrations Practice with Basic Theory</i> , 1st Edition, Narosa (2002).	