

<b>Course Number and Name</b>	
BME003 - MECHANICAL VIBRATIONS	
<b>Credits and Contact Hours</b>	
3 & 45	
<b>Course Coordinator's Name</b>	
Mr.S.Nakkeeran	
<b>Text Books and References</b>	
<b>TEXTBOOKS</b>	
1. G.K.Grover – Mechanical Vibrations – Namchand & Bros. 2001.	
2. V.P.Singh - Mechanical Vibrations –Dhanpat Rai & Co, 2005.	
<b>REFERENCES:</b>	
1.W.T.Thomson – Theory of vibrations,Uniwin Hyman Ltd/CBS Publishers,1998.	
2.Francis S.Tse, Iran E. Morse, Rolland T. Hinkle- Mechanical vibrations - CBS Publishers, 1983.	
3. S.P.Timoshenko – Vibration Problems in Engineering – CBS Publishers, 1985.	
4. <a href="http://booksformech.blogspot.com/.../mechanical-vibrations-by-vpsingh-pdf.ht..">booksformech.blogspot.com/.../mechanical-vibrations-by-vpsingh-pdf.ht..</a>	
<b>Course Description</b>	
The student will be able to understand the sources of vibration and noise in automobiles and make design modifications to reduce the vibration and noise and improve the life of the components	
<b>Prerequisites</b>	<b>Co-requisites</b>
KINEMATICS OF MACHINES ,DYNAMICS OF MACHINES	
required, elective, or selected elective (as per Table 5-1)	
Core elective	
<b>Course Outcomes (COs)</b>	
CO1	Understand in detail about principles of vibration
CO2	Will able to understand undamped free vibration
CO3	Will understand in detail about transient vibration
CO4	Will update the knowledge in multi degrees of freedom
CO5	Understand the different vibration absorber
CO6	Study about vibrometers

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	H							M			L	
CO2	H		H				M	H	H		L	L
CO3	H		H	H	M		M			L	L	
CO4	H				M		M		M		L	L
CO5	H				M							L
CO6	H					M	H	M				L

List of Topics Covered

**UNIT I PRINCIPLES OF VIBRATION**

**9**

Vibration principle- Equilibrium & Energy methods- Free vibrations-Viscous & coulomb damping- Forced vibration EXCITATION- Transmissibility –Resonance -Characteristics.

**UNIT II TWO DEGREES OF FREEDOM**

**9**

Two degrees of freedom –Matrix form – Undamped free vibration – Principal modes – Co-ordinate coupling – Principal co-ordinates – Torsional vibrations – Holzer method – Work &Energy approach.

**UNIT III TRANSIENT VIBRATION**

**9**

Transient vibration – Time dependency – Laplace transforms – Step inputs – Pulse inputs – Duhamel’s integral – Phase plane method – Shock spectrum

**UNIT IV MULTI DEGREES OF FREEDOM**

**9**

Multi degrees of freedom – Equations of motion – Solution –Orthogonality of normal modes – Continuous system – Free & forced vibrations – Vibration analysis by FEM.

**UNIT V VIBRATION INSTRUMENTS**

**9**

Vibration instruments – Vibration absorber –Elastically supported dampers – Seismic instruments – Vibrometers – Pickups – Accelerometers – Mounting instruments – Amplitude & phase distortions.