

B.E Semester: 8 Automobile Engineering
Subject Name: Vibration Noise and Harshness Control (MA804-N-A)
[Dept. Elect.- 6]

A. Course Objective:

- To present a problem oriented in depth knowledge of vibration noise and harness control.
- To address the underlying concepts and methods behind vibration noise and harness control.

B. Teaching / Examination Scheme:

Teaching Scheme				Total Credit	Evaluation Scheme					
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract.	Total
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	Marks
3	0	0	3	3	3	70	30	20	0	120

C. Detailed Syllabus:

Unit No.	Details
1	<p>Basic principles of environmental noise Definition, basic attributes of sound (wavelength, period, frequency velocity, speed, pressure, power and sound intensity), units (decibel, dB (A) and SPL), Wave analysis of structures and spaces.</p> <p>Environmental noise propagation Sources, distance from source, atmospheric absorption, wind, temperature, wind and temperature gradient, obstacles such as barriers and buildings, ground absorption, reflections, humidity.</p>
2	<p>Perception and of effects of noise Human ear & hearing damage, measures of hearing, loudness, phones, noise descriptors. WHO guidelines for community noise: speech masking, activity interference, noise and sleep, noise annoyance, environmental impact assessment.</p>
3	<p>Noise measurements and instrumentation Noise measurement and control instrumentation, Leq and various noise metrics for road, railway, aircraft and industrial noises. Noise Level indicators, Noise severity criteria, Various types of acoustic testing chambers. Source identification, Sound Intensity Mapping</p>
4	<p>Measures and Standards for the Environmental and vehicular noise Current standards and regulations: ISO and other relevant standards, Calculation of Road Traffic Noise, Railway Noise, Aircraft noise prediction, Highways assessment - operation and construction.</p>
5	<p>Noise Control Importance of reverberations time. Design of absorption systems for required reverberation time. Noise isolation design. Noise absorber design. Acoustic Design of Buildings Common strategies for reducing environmental noise exposure. Case studies on Railway systems, automobiles, Traffic Noise, Aircraft Noise Introduction to active noise control.</p>
6	<p>Vibration Control Strategies Review of Vibration control measures, design of a Vibration Absorbers, unconstrained and</p>

constrained layer damping treatment, add on dampers, and stiffeners. Design of Isolators in machine foundations, Balancing, Role of materials damping. Introduction to Active Vibration Control.

Total hours (Theory):48

Total hours (Practical):00

Total hours:48

D. Lesson Planning:

Sr. No.	Date/Week	Unit	Weight age	Topic No
1	1 st ,2 nd ,3 rd	Unit 1	20%	1,2
2	4 th .5 th ,6 th	Unit 2	20%	3
3	7 th , 8 th ,9 th	Unit 3	20%	4
4	10 th .11 th . 12 th	Unit 4	20%	5
5	13 th , 14 th ,15 th ,16 th	Unit 5	20%	6

E. Instructional Method & Pedagogy

1	At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
2	Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal Weight age should be given to all topics while teaching and conduction of all examinations.
3	Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
4	One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
5	Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
6	Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.
7	The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.

F. Students Learning Outcomes:

1	The student can identify different areas of vibration noise and harshness control.
2	Can find the applications of all the areas in day to day life.

G. Text Books & Reference Books:

1	Baxa, Noise Control of Internal Combustion Engine, John Wiley, 1984.
2	Theory of Vibrations with Applications: W T Thomson CBS Publishers Delhi
3	Mechanical Vibrations: S S Rao Addison-Wesley Publishing Co.
4	Fundamentals of Vibration : Leonard Meirovitch , McGraw Hill International Edison.
5	Principles of Vibration Control : Asok Kumar Mallik, Affiliated East- West Press.
6	Mechanical Vibrations A H Church ,John Wiley & Sons Inc
7	Mechanical Vibrations J P Den Hartog, McGraw Hill.

8	Mechanical Vibration Analysis: Srinivasan, McGraw Hill.
9	Mechanical Vibrations: G K Groover.
10	Vibration and Noise for Engineers: Kewal Pujara , Dhanpat Rai And co.