Course Number and Name
BGE001 - VIBRATION CONTROL AND MONITORING
Credits and Contact Hours
3&45
Course Coordinator's Name
Dr.Bachshumiyan
Text Books and References
TEXTBOOKS: 1. Singiresu S.Rao. "Mechanical Vibration". Addison- Wesley Publishing Co.2004 2. Rao J.S. "Vibratory Condition Monitoring of Machines" CRC Press. 2000. **REFERENCES:** 1.J.O. Den Hartog- "Mechanical Vibrations" McGraw Hill New York.1985. 2.Science Elsevier-"Hand book of Condition Monitoring" ELSEVIER SCIENCE,1996. 3.https://www.overdrive.com/media/118481/**vibration**-with-**control**
Course Description
To presents fundamentals to a modern treatment of vibrations, placing the emphasis on analytical developments and computational solutions. This course will provide the detail knowledge about nonlinear and random vibration with fault diagnosis of machinery using vibration signature analysis.

Prerequisites	Co-requisites
KOM, DOM	Nil

required, elective, or selected elective (as per Table 5-1)
Non Major elective

Course Outcomes (COs)	
CO1	Understand the principles of vibration
CO2	Learn the types of vibration
CO3	Gain knowledge in vibration control
CO4	Gain knowledge in vibration monitoring
CO5	Undergo derivations related to vibrations
CO6	Learn dynamic balancing and alignment of machinery

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											
CO2	H		H	M					H			H
CO3			H			M						H
CO4	H		H					M			L	L
CO5	H											L
CO6	H											

List of Topics Covered

UNIT I INTRODUCTION **9**

Review of fundamentals of single degree of freedom systems- Two degree of freedom systems- Multi degree freedom systems- Continuous system- Determination of Natural frequencies and mode shapes. Numerical methods in vibration analysis.

UNIT II VIBRATION CONTROL **9**

Introduction – Reduction of vibration at source- Control of vibration- By structural Design- Material selection- Located Additions- Artificial Damping- Resilient Isolation, Vibration Isolation- Vibration Absorbers.

UNIT III ACTIVE VIBRATION CONTROL **9**

Introduction - Concepts and Applications- Review of Smart Materials- Types and Characteristics Review of Smart Structures- Characteristic Active Vibration in Smart Structures.

UNIT IVCONDITION BASED MAINTANENCE PRINCIPLES AND APPLICATION **9**

Introduction- Condition Monitoring methods- The design of Information system, Selecting Methods of Monitoring, Machine Condition Monitoring and Diagnosis- Vibration Severity Criteria Machine Maintenance Techniques- Machine Condition Monitoring Techniques- Vibration Monitoring Techniques- Instrumentation Systems- Choice of Monitoring Parameter.

UNIT V DYNAMIC BALANCING AND ALIGNMENT OF MACHINERY **9**

Introduction, Dynamic Balancing of Robots, Field Balancing in one Plane, Two Planes and in Several Planes- Machinery Alignment, “Rough” Alignment methods- The face Periphery Dial Indicator Method- Reverse indicator method.