INSTITUTE	**DIPLOMA STUDIES**
PROGRAM	**DIPLOMA ENGINEERING (MECHANICAL ENGINEERING)**
SEMESTER	**5**
COURSE TITLE	**DYNAMICS OF MACHINE**
COURSE CODE	**09ME2502**
COURSE CREDITS	**4**

Objective:

1 This subject introduces in mechanical to understand the fundamental of the machine dynamics. In industries, the mechanical engineers/technicians have to perform balancing elements in motion to avoid excessive vibration. Such requirement needs knowledge of balancing and vibration. For mechanical engineer, knowledge of vibration isolation is necessary to overcome vibration due to certain reason and it is also required in foundation of various machines. This course also offers knowledge about flywheel and governor.

Course Outcomes: After completion of this course, student will be able to:

1 Analyze unbalance force in rotating mass and its effects

2 Analyze natural frequency of damped and undamped vibration

3 Design of flywheel for IC engine

4 Analyze performance of governor and distinguish function of flywheel and governor

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	**Balancing of rotating and reciprocating mass** Basic concept of balancing, static and dynamic balancing, effects produced due to unbalanced mass, analytical and graphical methods to resolve unbalance of revolving mass in single plan and multiple planes, concept of balancing of reciprocating mass	14
2	**Introduction to mechanical vibration** basic terminology of vibration, types of vibration, natural frequency, basic elements and lumping parameters, concept of degree of freedom, dampers and damping effect	5

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Contents : Unit	Topics	Contact Hours
3	**Flywheel** Concept of turning moment diagram, fluctuations of energy, co-efficient of fluctuations of speed and co-efficient of fluctuations of energy, methods to construct turning moment diagram and its example, moment of inertia and mass calculation of flywheel	11
4	**Governor** Types of governor and its function, difference between flywheel and governor, working of centrifugal governor, concept of control force, stability of governor, sensitivity of governor and hunting of governor	12
Total Hours		**42**

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	**Balancing of rotating mass by graphical method** Balancing of rotating mass by graphical method	6
2	**Balancing of rotating mass by analytical method** Balancing of rotating mass by analytical method	6
3	**Experimental analysis of free undamped longitudinal vibration of single degree of freedom system** Experimental analysis of free undamped longitudinal vibration of single degree of freedom system	4
4	**Experimental analysis of free undamped torsional vibration of single degree of freedom system** Experimental analysis of free undamped torsional vibration of single degree of freedom system	2
5	**Prepare turning moment diagram of flywheel** Prepare turning moment diagram of flywheel	6
6	**Demonstration of different types of governors** Demonstration of different types of governors	4
Total Hours		**28**

Textbook :

1 Theory of Machines, Prof. S. B. Soni, Atul Prakashan, 2020

References:

1 Theory of Machines, Theory of Machines, J.K. Gupta & R.S. Khurmi, S.Chand Publication, 2005

2 Mechanical Vibrations, Mechanical Vibrations, S.S.Rao, Pearson, 2017

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking**
26.00	37.00	37.00			

Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by blackboard, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
2. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room
3. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory
4. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

Supplementary Resources:

1. https://mv-iitg.vlabs.ac.in/
2. https://www.vlab.co.in/broad-area-mechanical-engineering

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