

Course Type	Course Code	Name of Course	L	T	P	Credit
DP	MEC 211	Machine Dynamics and Solid Modelling Lab	0	0	2	2
Course Objective						
The course aims to equip the students with basic understanding of dynamics of common moving parts of a machine and make 3D models using a CAD package						
Learning Outcomes						
<p>Upon successful completion of this course, students will be able to:</p> <ul style="list-style-type: none"> • Design machine parts considering the dynamical effects. • Analyze and modify the design of a part (CAM). • Solve rotor balancing problems • Make 3D models using a CAD package (AutoCAD) • Create drawings that are ready for manufacturing. 						

Unit No.	Topics to be Covered	Laboratory	Learning Outcome
1	Dynamics of motorized cam-follower system	1	Students will learn the effect of load inertia and how to find out the Jump speed for different weights.
2	Porter, Proell and Hartnell governors	1	Students will find out the characteristics curve of radius of rotation against the controlling force
3	Gyroscopic effect of rotating disc of a motorized Gyroscope	1	Students will understand the gyro dynamics and experimentally validate the theoretical formula.
4	Balancing of rotating parts of a 4-rotor system	1	Students will realize the effect of unbalanced couple and forces and how to balance those.
5.	Whirling speed of a rotating shaft	1	Students will find out the critical speeds experimentally and compare it with the theoretical values.
6.	Journal bearing	1	Students will study the pressure profile of lubricating oil at various conditions of load and speed in journal bearing.
7	Basics of 2D and 3D machine drawing in AUTOCAD	1	Students will understand the standard drafting principles in a CAD environment
8	Draw nut and bolt in 3D and derive front view, top view and side view	1	Students will learn to apply principles of technical drawings to create 3D models and computer generated 2D drawings
9	Draw 3D-isometric view of keys, cotters, and pins, and derive front view, top view and side view	1	Students will learn to apply principles of technical drawings to create 3D models and computer generated 2D drawings with more viewing features
10	Assembly drawing of bushed pin type flanged coupling	1	Students will be able to create family of parts and their assembly in multiple configurations and create their 2D drawings
11	Assembly drawing of plumber block	1	Students will be able to create family of parts and its assemblies in multiple configuration
12	Project	1	The students would learn to conceptualize a given problem, design and model the system in 3D environment for visualization and 2D drawings for manufacturing.
13	Evaluation	1	Evaluation of the understanding of the course by students

Reference books:

1. Kinematics and Dynamics of Machinery, C. L. Wilson, J. P. Sadler, Pearson, 3rd Ed. 2016
2. Kinematics, Dynamics and Design of Machinery, K. J. Waldron, G. L. Kinzel, Wiley 2nd Ed, 2007.
3. Theory of Machines, S. S. Rattan, McGraw Hill, 4th Ed. 2007
4. AutoCAD 2021 for Engineers and Designers, Basic and Intermediate, Sham Tickoo, BPB Publications, 2021.