



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad – 500043

Aeronautical Engineering

List of Laboratory Experiments

AEROSPACE STRUCTURAL DYNAMICS LABORATORY								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AAEC45	Core	L	T	P	C	CIA	SEE	Total
		0	0	3	1.5	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 36			Total Classes: 36			
Branch: AE	Semester: VII	Academic Year: 2021-22			Regulation: UG20			
<p>Course overview: This course focuses on mechanical devices that are designed to have mobility to perform certain functions. In this process they are subjected to some forces. This course will provide the knowledge on how to analyse the motions of mechanisms and design mechanisms to give required strength. This includes relative static and dynamic force analysis and consideration of gyroscopic effects on aero planes, ships, automobiles like two wheelers and four wheelers. Balancing of rotating and reciprocating masses, friction effect in brakes clutches and dynamometers are also studied. Mechanical vibrations give an insight into the various disturbances while designing vibratory systems.</p>								
<p>Course objectives:</p> <p>The students will try to learn:</p> <ol style="list-style-type: none"> I. The basic principles of kinematics and their related terminology of machines. II. The Discriminate mobility; enumerate links and joints in the mechanisms. III. The concept of analysis and formulation of different mechanisms. 								
<p>Course outcomes:</p> <p>After successful completion of the course, students will be able to:</p> <p>CO 1 Identify the effects gyroscopic couple in aeroplane, automobile and naval ship for stability at different speeds and manoeuvre.</p> <p>CO 2 Examine ball bearing using static and dynamic force balance for estimating the service life under different loads and speeds in industrial application</p> <p>CO 3 Select the appropriate journal bearing for balancing of machine components based on power transmission and rotational speed.</p> <p>CO 4 Build the inversion mechanism of 4-bar mechanism for analysing speed and motion machines components in fabrication.</p> <p>CO 5 Design a shaft and suitable gear box for determining the critical speed of shafts.</p> <p>CO 6 Analyze the vibrational response of cantilever structure under free and forced vibrations for improving service life.</p>								
WEEK NO	EXPERIMENT NAME							Course Outcomes
WEEK – I	GOVERNORS							CO1
	To study the function of a Governor.							
WEEK – II	GYROSCOPE							CO1
	To determine the Gyroscope couple.							
WEEK – III	STATIC FORCE ANALYSIS							CO2
	To draw free body diagram and determine forces under static condition.							
WEEK – IV	DYNAMIC FORCE ANALYSIS							CO2
	To draw free body diagram and determine forces under dynamic condition.							
WEEK – V	BALANCING							CO3
	To determine balancing forces and reciprocating masses.							
WEEK – VI	BEARINGS							CO3
	To determine the bearing life.							
WEEK – VII	SIMPLE MECHANISMS							CO4
	To design various mechanism and their inversions.							

WEEK –VIII	LONGITUDINAL AND LATERAL VIBRATIONS	CO5
	To determine the longitudinal and transfer vibration.	
WEEK - IX	VIBRATION ANALYSIS OF SHAFT	CO5
	To determine critical speed of a shaft.	
WEEK - X	DIFFERENTIAL GEAR BOX	CO5
	To study automobile differential gear box.	
WEEK - XI	FREE VIBRATION OF CANTILEVER BEAM	CO6
	To study Vibrations in beam Structures	
WEEK - XII	FORCED VIBRATION OF CANTILEVER BEAM	CO6
	To study Vibrations in beam Structures	