Branch Name:	Automobile Engineering
Program Code:	ET402
Course Name:	Engineering Mechanics
Course Code:	2ET4000108
Pre-requisite Course:	--

COURSE OBJECTIVE:

1. Apply basic principles of physics in solving engineering problems
2. Apply the concepts of energy & calculate work done, power required & efficiency for various simple machines

TEACHING AND EVALUATION SCHEME:

Teaching Scheme (Hours per week)				**Evaluation Scheme (Marks)**				Total (Marks) (T+P)
Lecture	Tutorial	Practical	Credit	Theory		Practical		
				University Assessment	Continuous Assessment	University Assessment	Continuous assessment	
3	-	2	4	60	40	20	30	150

DETAILS OF COURSE CONTENTS:

S. NO.	**TOPIC**	**Total Hrs.**	**WEIGHTAGE**
1	**Introduction** 1.1 Scope of Engineering Mechanics 1.2 Static & Dynamic – Kinetics & Kinematics 1.3 Scalar & Vector Quantities like force, pressure, velocity, acceleration etc. 1.4 MKS, CGS & SI units. 1.5 Conversion Of Units	02	05
2	**Coplanar Concurrent Forces** 2.1 Force – units, elements 2.2 Laws/Principles of forces such as Principle of Superposition, Principle of transmissibility 2.3 Composition & Resolution of Forces 2.4 Resultant &Equilibrium forces 2.5 Conditions of equilibrium 2.6 Analytical & graphical method for Law of	10	20

	Parallelogram, Law of Triangle, Law of Polygon. 2.7 Lami's Theorems		
3	**Coplanar Non-Concurrent Forces** 3.1 Moment, Couple, conditions of equilibrium 3.2 Types of beam and supports end conditions – Hinge , free end , roller ,fix 3.3 Types of loads like point load , U.D.L , U.V.L 3.4 Analytical method to Evaluate reactions in statically determinate beam subjected to point load and/ or U.D.L by analytical method of solving statically determinate beams.	10	20
4	**Centroid And Centre Of Gravity** 4.1 First moment of area to find Centroid –standard shapes of I, L, Channel & T sections 4.2 Axis of symmetry 4.3 First moment of mass to find C.G of standard solids sections	04	15
5	**Friction** 5.1 Friction, Laws of Friction, Angle of Friction, Angle of Repose, types of friction 5.2 Examples on friction for a block resting on horizontal plane & on inclined plane.	06	15
6	**Simple Machines** 6.1 Principles of machines to evaluate Mechanical Advantage, Velocity Ratio and efficiency of simple machines 6.2 Reversible & non reversible machines 6.3 Law of Machines 6.4 Velocity Ratio of different simple machine and its problem.	06	15
7	**Work, Power And Energy** 7.1 Work – work done 7.2 Force displacement diagram 7.3 Torque, work done by torque 7.4 Power – I.H.P and B.H.P of engine 7.5 Equation of H.P in terms of Torque and R.P.M 7.6 Energy –Kinetic & Potential energy and Engineering problems 7.7 Law of conservation of energy.	04	10

COURSE OUTCOME:

On the completion of the course student will be able to:

1. Demonstrate an understanding of load actions acting on bodies in equilibrium.
2. Demonstrate proficiency in calculating reaction in beam.
3. Determine properties of area including centroids and first moment of area.
4. Analyses problem involving frictional forces and importance of it.
5. Advantages of using machines and effect of forces for different phenomenon.
6. Understanding relation between Work, Power and Energy.
7. Demonstrate proficiency in calculating reaction in beam.
8. Determine properties of area including centroids and first moment of area.
9. Analyses problem involving frictional forces and importance of it.
10. Advantages of using machines and effect of forces for different phenomenon.
11. Understanding relation between Work, Power and Energy.

LIST OF PRACTICAL:

SR. No.	Experiment
1	Verify and calculate resultant force through Law of Parallelogram.
2	Verify Law of Triangle of forces. (Lami's Theorem)
3	Verify and calculate resultant force through Polygon Law of Forces.
4	Calculate Co efficient of Sliding Friction for different surfaces – Wood and Glass.
5	Determine Angle of Repose between different surfaces.
6	Work-out M.A & Efficiency of simple wheel and axle, simple wheel and differential axle, single and double purchase crab.
7	Verify reactions in beam through Graphical & analytical method

LIST OF REFERENCES:

1. Engineering Mechanics by R S Khurmi- S. Chand, New Delhi

2. Engineering Mechanics by D S Kumar- S. K. Kataria& Sons,

3. Applied Mechanics by H J Shah & Junarkar - Charotar Publication.

4. Engineering Mechanics by R S Khurmi- S. Chand, New Delhi

5. Engineering Mechanics by D S Kumar- S. K. Kataria& Sons,

6. Applied Mechanics by H J Shah & Junarkar - Charotar Publication

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Demonstrate an understanding of load actions acting on bodies in equilibrium.	3 Applying, 2 Understanding
CLO2	Determine centroid and moment of inertia of a different geometrical shape and its use in engineering problem.	5 Evaluating 4 Analyzing
CLO3	Demonstrate proficiency in calculating reaction in beam	3 Applying 2 Understanding,
CLO4	Analyses problem involving frictional forces and importance of it	4 Analyzing 3 Applying 2 Understanding
CLO5	Apply the basics of simple machines and their working mechanism	3 Applying 2 Understanding
CLO6	Understanding relation between Work, Power and Energy	2 Understanding

Course Learning Outcomes	Program Outcomes(Pos)											
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CLO1	L	H	M									
CLO2		L	M	H								
CLO3	H	M		L								
CLO4	L	M	H									
CLO5	H			L		M						
CLO6		M	L	H								

H: High, M: Medium, L: Low