CORE PAPER –IX -STATICS

Semester	Subject Code	Category	Lecture		Theory		Practical	Credit
V		Core paper – IX	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			6	90	6	90		

COURSE OBJECTIVES:

The students will be able to

- Understand the basic concepts of forces, moments, couple and friction, laws of friction, catenary and centre of gravity.
- Focus on the development of skills in formation of suitable mathematical models and problems solving techniques.

COURSE OUTCOMES:

On the successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Obtain adequate information on forces and moments and generalize the concepts of moments	K2
CO2	Get a basic coverage of coplanar forces, equilibrium of a rigid body, develop the skills in solving many practical problems	K3
CO3	Understand the basic concepts of friction and its laws and to solve many simple problems	K2
CO4	Acquire knowledge on intrinsic equation and Cartesian equation on Catenary & its properties	K3
CO5	Get a wide knowledge about centre of gravity, find the mass centre of certain simple systems which can be found by using integration or without using integration	K4

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING OF COURSE OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	M	S	S
CO2	S	M	S	S	M	M
CO3	S	M	S	M	M	S
CO4	S	S	M	M	S	M
CO5	S	M	S	S	S	S

S- Strong M – Medium L – Low

UNIT – I: FORCES AND MOMENTS **18 Hours**

Parallelogram Law of forces – Triangle Law of forces and its converse – Polygon Law of forces – Lami's theorem and its converse – Parallel forces and moment – Varignon's theorem on moments – Generalized theorem on moments.

(Sections: 2.1 – 2.2, 3.1, 4.1 – 4.4)

UNIT – II: COUPLES **18 Hours**

Arm and Axis of couple – Moment of a couple – Equilibrium of two couples – Couples in parallel planes – coplanar forces – Equilibrium of a rigid body: Three forces acting on a rigid body – Conditions of Equilibrium – Problems.

(Section: 4.6 – 4.7)

UNIT – III: FRICTION **18 Hours**

Basic concepts – Laws of friction – Equilibrium of a particle on a rough inclined plane under any force – Simple Problems.

(Section: 5.2)

UNIT – IV: CATENARY **18 Hours**

Intrinsic equation and Cartesian equation of the common catenary – properties of catenary – Sag of telegraph wireless (tightly stretched wires) - Simple Problems.

(Section: 9.1)

UNIT – V: CENTRE OF GRAVITY (C.G) **18 Hours**

CG of particles lying in one plane – CG of plane area – CG of an arc – CG of solid of revolution – CG of surface of revolution – CG when density varies.

(Section: 6.1 – 6.2)

DISTRIBUTION OF MARKS: THEORY 40% AND PROBLEMS 60%

TEXT BOOK

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	P. Duraipandian, Laxmi Duraipandian and Muthamizh Jayapragasam	Mechanics	S. Chand & Co. New Delhi.	2006

REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	A.V. Dharmapadam	Mechanics	S. Viswanathan Printers & Publishers Chennai	1991
2	S.L. Loney	Elements of Statics	Macmillian India, Delhi	1982
3	M.K. Venkataraman	Statics	Agasthier Book Depot, Trichy	1990

WEB RESOURCES

1. https://web.itu.edu.tr/~ustunda1/course/restlectures.pdf
2. https://www.brown.edu/Departments/Engineering/Courses/En4/Notes/Forces.pdf
3. https://engineering.purdue.edu/~aprakas/CE297/CE297-Ch3.pdf
4. http://isdl.cau.ac.kr/education.data/statics/ch8.pdf

TEACHING METHODOLOGY

1. Class room teaching
2. Giving Assignments for all units
3. Discussions
4. Home test
5. PPT presentation