19BSM709					Statics and Dynamics					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs. / Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	0	4	4	25	50	25	--	--	100

COURSE OBJECTIVES

- To familiarize students with the importance of this subject in the field of science and engineering.
- To develop an understanding of the fundamental principles of statics and dynamics.
- To learn kinematics, kinetics of particle and rigid body, effect of friction on equilibrium.
- To analyze the statics of frames and machines, equation of static equilibrium & dynamic equilibrium of particles and rigid bodies.

UNIT 1 EQUILIBRIUM OF RIGID BODIES **10 Hrs.**

Equilibrium of particles in 2-D and 3-D, Equivalent systems of Forces, moments, couples, Equilibrium of rigid bodies in 2-D, Equilibrium of rigid bodies in 3-D.

UNIT 2 APPLICATIONS **8 Hrs.**

Centroids and center of gravity, Moments of inertia, Analysis of structures: Trusses, frames and machines, Forces in beams, Friction.

UNIT 3 KINEMATICS OF PARTICLES **11 Hrs.**

Kinematics of particles, Rectilinear motion, Curvilinear motion, Newton's second law of motion, Motion of particles under central force, Kinetics of particles: energy and momentum methods.

UNIT 4 MOTION OF RIGID BODIES WITH APPLICATIONS **11 Hrs.**

Systems of particles, Plane motion of rigid bodies: Kinematics, forces and accelerations, Plane motion of rigid bodies: Kinetics, Energy and momentum methods, Angular momentum of rigid bodies in 3-D motion.

40 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 – Demonstrate an understanding of the principles of kinematics and kinetics of particles and planar rigid bodies.
CO2 – Apply knowledge of mathematics to interpret problems involving frictional forces.
CO3 – Analyze different structural elements like trusses, frames and beams.
CO4 – Solve the problem related to bodies in dynamic Equilibrium and bodies undergoing forced and free vibration using the laws of kinetics.
CO5 – Evaluate problems in a systematic and logical manner including the ability to draw free-body diagrams.
CO6 – Formulate and solve the practical problems of statics and dynamics.

TEXT/REFERENCE BOOKS

1. I.H. Shames, Engineering Mechanics – Statics and Dynamics, 4th edition, Prentice–Hall of India Pvt. Ltd., 2003.
2. F.P. Beer and E.R. Johnston, Vector Mechanics for Engineers- Statics and Dynamics, 8th ed., McGraw Hill International Book Co., 2008.
3. R.C. Hibbeler, Engineering Mechanics, 12th edition, Pearson Education Pvt. Ltd., 2007.
4. J.L. Meriam, Dynamics, 5th edition, John Wiley & sons, 2003.
5. K. L. Kumar, Engineering Mechanics, 3rd edition, Tata McGraw Hill, 2003.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100 **Exam Duration: 3 Hrs.**

Part A: 6 questions of 4 marks each	24 Marks
Part B: 6 questions of 8 marks each	48 Marks
Part C: 2 questions of 14 marks each	28 Marks