

Semester: III - Core Paper – VI
(for the candidates admitted from the academic year 2010-11 onwards)
Subject title: Statics **Credit hours: 3**

Subject Description:

This course contains the nature of forces acting on a surface, friction and center of gravity.

Goal:

To enable the students to realize the nature of forces and resultant forces when more than one force acting on a particle.

Objectives:

On successful completion of course the students should realize the concept about the forces, resultant force of more than one force acting on a surface, friction and center of gravity. Also he can differentiate static and dynamic forces.

UNIT-I

Forces acting at a point – Parallelogram law-triangle law –Converse of Triangle Law- Polygon Law of Forces- Lami's Theorem

UNIT- II

(λ, μ) theorem –Resolution of forces- Components of a force- Resultant of any number of Coplanar forces acting at a point- Conditions of equilibrium.

UNIT – III

Parallel Forces and Moments –Resultant of two parallel forces (Like and unlike)- Conditions of equilibrium of three coplanar forces- Moment of a force- Geometrical representation- Sign of the moment- Unit of moment – Varignon's Theorem on couples- Equilibrium of two couples-Equivalence of two couples.

UNIT – IV

Co-planar forces acting on a rigid body – Theorem on three co-planar forces in equilibrium – Reduction of a system of coplanar forces to a single force and a couple- Equation to the line of action of the resultant – Necessary and sufficient conditions of equilibrium only.

UNIT – V

Center of gravity (using integration only) – Equilibrium of strings and chains – Equation of the common catenary – Definitions – Tension at any point – Geometrical properties of the common catenary .

Treatment as in

M.K.Venkataraman, Statics, Agasthiar Publications, Trichy, 1999.

References

1. A.V.Dharmapadam, Statics , S.Viswanathan Printers and Publishing Pvt., Ltd, 1993.
2. P.Duraipandian and Laxmi Duraipandian, Mechanics , S.Chand and Company Ltd, Ram Nagar, New Delhi -55, 1985.
3. Dr.P.P.Gupta, Statics , Kedal Nath Ram Nath, Meerut, 1983-84.

SEMESTER IV - Core Paper – VII
(for the candidates admitted from the academic year 2010-11 onwards)

Subject title: Dynamics

Credit hours: 3

Subject Description: This course provides the knowledge about the field Kinematics, projectile, simple harmonic motion and impact of a particle on a surface.

Goal: To enable the students to apply Laws, Principles, Postulates governing the Dynamics in physical reality.

Objectives: End of this course, the student understands the reason for dynamic changes in the body.

UNIT – I

Projectiles: Path of a projectile-Greatest height-time of flight – Range -range on an inclined plane through the point of projection-Maximum range.

UNIT – II

Central Orbits: Radial and transverse components of velocity and acceleration – areal velocity of central orbits - Differential equation of central orbit in polar coordinates only.

UNIT – III

Simple Harmonic Motion: Amplitude, periodic time, phase-composition of two simple harmonic motions of the same period in a straight line and in two perpendicular lines.

UNIT – IV

Collision of elastic bodies : Impulsive force – Newton’s experimental law- Principle of conservation of momentum- Direct Impact on a smooth fixed plane -Direct impact of two smooth spheres- loss of kinetic energy during direct impact.

UNIT – V

Oblique impact of a smooth sphere on fixed smooth plane – oblique impact of two smooth spheres - Loss of Kinetic energy during oblique impact.

Treatment as in

M.K.Venkataraman, Dynamics, 11th Ed. Agasthiar Publications, Trichy, 1994.

References

1. A.V.Dharamapadam , Dynamics, S.Viswanathan Printers and Publishers Pvt., Ltd, Chennai, 1998.
2. K.Viswanatha Naik and M.S.Kasi, Dynamics, Emerald Publishers, 1992.
3. Naryanamurthi, Dynamics, National Publishers, New Delhi, 1991.