SEMESTER – I

THEORY SUBJECTS

Sl. No.	Sub. Code	Theory	Contact Hours			Credit
			L	T	P/S	
1.	22AS113	Structural Mechanics	3	0	0	3

Course Objective

To introduce the concepts of behaviour of structural components and simple analytical techniques. The course aims at covering basic theorems of statics, the use and principles of composite sections, geometrical properties such as centroid, moment of inertia etc of sections for different shapes, analysis of perfect frames for vertical loads by analytical as well as graphical methods, concept of friction and its practical applications and also some elementary idea regarding special forces like wind and earthquake forces.

Anticipated Learning Outcomes:

Understanding of concepts taught in the semester through simple numerical calculations and models.

Module 1
Brief introduction of history of structural design

Trabeated construction, vaults, flying buttresses, tents, masted structures and bridges through ancient and medieval history, Post Industrial modular construction of large span and suspension structures in steel and concrete- examples of iconic projects.

Principle of statics, forces, resolution of forces, coplanar, non-coplanar, concurrent, non-concurrent, Equilibrium of concurrent forces in a plane, Triangle of forces, parallelogram of forces.

Module 2
Trusses & frames

Plane trusses. Method of joints, Equilibrium of Ideal system, stable and unstable equilibrium. Examples related to building and other structures.

Module 3
Friction & virtual work

Friction-definition, Types of friction, Laws of dry friction, Coefficients of friction, Angle of friction, Angle of repose, Friction in inclined plane, Numerical on dry friction, ladder and wedges.

Principle of Virtual work, Numerical on virtual work.

Module 4 Forces & geometrical properties of sections	Centre of gravity, Centre of parallel forces in a plane, Centre of gravity, Centroids of curves, Distribution of forces in a plane. Moment of inertia of plane figure with respect to an axis in its plane, with respect to perpendicular to the plane, parallel axis theorem, product of Inertia
Module 5	Introduction to special forces acting on structures, Wind force, Earthquake force, etc. Impact of these forces on structures.

Note: Most Architectural subjects do not have Textbooks. The Reference books mentioned below are for reference only and University question paper should be prepared from the Syllabus descriptions.

References

1. *Timoshenko, S., Young, D. H. and Rao, J. V., Engineering Mechanics. 4th Ed. New Delhi: Tata McGraw-Hill Education, 2007.*
2. *Khurmi R.S., A textbook of Engineering Mechanics, S. Chand and Co, New Delhi,1999.*
3. *Rajashekharan, S. and Sankara Subhramanian, G.,Fundamentals of Engineering Mechanics, 2nd Edition, Vikas Publishing House Pvt. Ltd.*
4. *Ferdinand, L. S., Engineering Mechanics: Statics and Dynamics. 3rd Ed. New York: Harper Collins Publishers, 1975.*
5. *Kumar, K. L., Engineering Mechanics. Delhi: Tata McGraw-Hill Education, 2003.*
6. *Ramamrutham, S., Engineering Mechanics: A Textbook of Applied Mechanics. New Delhi Dhanpat Rai Publishing Company, 2008.*