AE6006 THEORY OF PLATES AND SHELLS

DETAILED SYLLABUS

OBJECTIVES

- To study the behaviour of the plates and shells with different geometry under various types of loads.

UNIT I CLASSICAL PLATE THEORY

Classical Plate Theory – Assumptions – Differential Equation – Boundary Conditions.

UNIT II PLATES OF VARIOUS SHADES

Navier's Method of Solution for Simply Supported Rectangular Plates – Leavy's Method of Solution for Rectangular Plates under Different Boundary Conditions. Governing Equation – Solution for Axi- symmetric loading – Annular Plates – Plates of other shapes.

UNIT III EIGEN VALUE ANALYSIS

Stability and free Vibration Analysis of Rectangular Plates.

UNIT IV APPROXIMATE METHODS

Rayleigh – Ritz, Galerkin Methods– Finite Difference Method – Application to Rectangular Plates for Static, Free Vibration and Stability Analysis.

UNIT V SHELLS

Basic Concepts of Shell Type of Structures – Membrane and Bending Theories for Circular Cylindrical Shells.

TEXT BOOKS

1. Timoshenko, S.P. Winowsky. S., and Kreger, "Theory of Plates and Shells", McGraw-Hill Book Co. 1990.

2. Varadan. T. K. and Bhaskar. K., "Theory of Plates and Shells", 1999, Narosa.

REFERENCES

1. Flugge, W. "Stresses in Shells", Springer – Verlag, 1985.

2. Timoshenko, S.P. and Gere, J.M., "Theory of Elastic Stability", McGraw-Hill Book Co. 1986