

ST5016 DESIGN OF SHELL AND SPATIAL STRUCTURES

DETAILED SYLLABUS

OBJECTIVE

Study the behaviour and design of shells, folded plates, space frames and application of FORMIAN software.

UNIT I CLASSIFICATION OF SHELLS

Classification of shells, types of shells, structural action, - Design of circular domes, conical roofs, circular cylindrical shells by ASCE Manual No.31. application to design of shell roofs of water tanks (membrane analyses)

UNIT II FOLDED PLATES

Folded Plate structures, structural behaviour, types, design by ACI - ASCE Task Committee method – pyramidal roof.

UNIT III INTRODUCTION TO SPACE FRAME

Space frames - configuration - types of nodes - Design Philosophy - Behaviour.

UNIT IV ANALYSIS AND DESIGN

Analysis of space frames – Design of Nodes – Pipes - Space frames – Introduction to Computer Aided Design.

UNIT V SPECIAL METHODS

Application of Formex Algebra, FORMIAN for generation of configuration.

REFERENCES

1. ASCE Manual No.31, Design of Cylindrical Shells.
2. Billington.D.P, "Thin Shell Concrete Structures", McGraw Hill Book Co., New York, 1982.
3. Ramasamy, G.S., "Design and Construction of Concrete Shells Roofs", CBS Publishers, 1986.
4. Subramanian.N ,"Principles of Space Structures", Wheeler Publishing Co. 1999.
5. Varghese.P.C., Design of Reinforced Concrete Shells and Folded Plates, PHI Learning Pvt. Ltd., 2010.