ANALYSIS AND DESIGN OF CONCRETE SHELLS AND FOLDED PLATES

Course Code: 15CE2213

Course Outcomes: At the end of the course, the student will be able to:

CO1: Classify the shells and know the shell action.
CO2: Understand the bending theory of cylindrical shells.
CO3: Design and detail cylindrical shells.
CO4: Analyse and detail folded plates.
CO5: Analyse and design doubly curved shells.

UNIT – I (10-Lectures)
Shell classification and shell action:

UNIT – II (10-Lectures)
Bending Theory of Cylindrical Shells:

UNIT – III (10-Lectures)
Simplified design and detailing of Cylindrical Shells:
Simplified beam theory of simply supported long cylindrical shells with and without edge beams – design of end diaphragms – detailing of reinforcement in shells, edge beams and end diaphragms.

UNIT – IV (10-Lectures)
Folded Plates:
Structural behaviour of trough type folded plate roofs – slab-beam
analysis of folded plates – correction analysis for edge shears – stress
distribution – correction analysis for deflection and rotation –
reinforcement in folded plates.

UNIT – V

Doubly Curved Shells:
Membrane theory for doubly curved shells of revolution – stress-
resultants in a spherical dome – membrane theory of doubly curved
shells other than shells of revolution – approximation for shallow
shells – stress-resultants in an umbrella type HP shell roof – example
of design of a HP shell roof.

TEXT BOOKS
1. Design and Construction of Concrete Shell Roofs by G.S. Rama
   Swamy – CBS Publishers & Distributors, 485, Jain Bhawan
   BholaNath Nagar, shahotra, Delhi.
2. ASCE Manual of Engineering practice No. 31, Design of
cylindrical concrete shell roofs ASC, New York.
3. Design of Reinforced Concrete Shells and Folded plates by P.C.

REFERENCES
1. Theory and Design of Concrete Shells by B.K. Chatterjee,
2. Analysis of Thin Concrete Shells by K. Chandrasekhara, Oxford
   and IBH, Kolkata, 1971.
3. Thin Shell Structures by Bandopadhyay J.N. New Age International