INDUSTRIAL STRUCTURES

Course Code: **13CE2104**

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Course Outcomes:

At the end of the course the student will be able to

CO1 : Discuss the planning and functional requirements of Industrial structures.

CO2 : Discover the need to learn about the design concepts, and constructional aspects of Industrial structures

CO3 : Analyse and evaluate the importance of various construction materials for Industrial constructions

CO4 : Design portal frames, tower cranes and bracing system in Industrial buildings.

CO5 : Analyse and design structural elements used in pre-cast construction including fabrication, erection and installation

UNIT –I

PLANNING AND FUNCTIONAL REQUIREMENTS: Classification of Industrial structures - Choice of site - General requirements of different types of industries for safety, space requirements, services and land planning for layout, requirements regarding lighting, ventilation and fire safety - Protection against noise and vibration - Guidelines from factories act - Codes of practice in the design and construction

MATERIALS: Properties of Concrete, Steel, R.C.C, Prestressed Concrete, Aluminum, PVC that affect the structural performance – relative merits and demerits – suitability as construction material in Industrial Structures.

UNIT- II

LOADS ON INDUSTRIAL BUILDINGS, AND VARIOUS CONFIGURATIONS - Loads on Industrial structures – Gravity load, Live load, wind load and Earthquake load - Configuration of various Industrial buildings, Need for large column free areas - Various types of floors, roofs and roof coverings.

UNIT-III

STEEL PORTAL FRAMES: Introduction to plastic analysis - Shape factor – Plastic moment carrying capacity of simple beams and portal frames – Design of steel portal frames with and without gantry girders.

UNIT–IV

STEEL TRUSS: Tower cranes and transmission line and communication towers - Analysis and design of bracing systems in industrial sheds.

UNIT-V

PREFABRICATION AND CONSTRUCTION TECHNIQUES: Pre-casting techniques - Planning, analysis and design considerations suitability for Industrial structures - Handling techniques – Transportation, storage and erection of structures -Test on precast elements - Quality control - Repairs and economical aspects on prefabrication.

TEXTBOOKS

1. Duggal, S.K., *"Design of Steel Structures"*, 3rd Edition, Tata McGraw-Hill Publications, 2006.

2. Krishna Raju N. *"Advanced Reinforced Concrete Design"*, 2nd Edition, CBS Publishers, 2006

REFERENCES

1. *"Teaching Resource for Structural Steel Design"* – INSDAG, Kolkata, 2008

2. IS: 456 – 2000, IS: 800 – 2007, IS: 875 – 1964, BIS, New Delhi

3. *"Large Panel Prefabricated Constructions"*, Proc. of Advance Course by SERC, Madras, 2004.

4. *"National Building Code"*, BIS, New Delhi, 2005.

4. Subrahmanyam, N., *"Space Structures"*, 1st Edition, Wheeler & Co., Allahabad, 1999.

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