INDUSTRIAL STRUCTURES

(Elective – I)

Course Code: 15CE2104

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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 (10-Lectures)

PLANNINGANDFUNCTIONALREQUIREMENTS:

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 - 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 (10-Lectures)

LOADS ON INDUSTRIAL BUILDINGS, 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.

UNIT-III (10-Lectures)

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 (10-Lectures)

STEEL TRUSS: Transmission line and Communication towers. Analysis and design of bracing systems in industrial sheds.

UNIT- V (10-Lectures)

PREFABRICATION AND CONSTRUCTION TECHNIQUES: Pre-casting techniques - Planning, Analysis and design considerations suitability for Industrial structures. Handling techniques – Transportation, Storage and erection of structures. Tests on precast elements.

TEXTBOOKS

1. Duggal, S.K., Design of Steel Structures Tata McGraw-Hill Publications, 3rd Edition, 2006.
2. Krishna Raju N. "Advanced Reinforced Concrete Design", CBS Publishers, 2nd Edition, 2006.

REFERENCES

1. *"Teaching Resource for Structural Steel Design"*–INSDAG, Kolkatta, 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.
5. Subrahmanyam, N., *"Space Structures"*, Wheeler & Co., Allahabad, 1st Edition, 1999.