INDUSTRIAL STRUCTURES

(Elective – I)

Course Code: 13CE 2104 **L P C**

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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, 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 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.

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

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

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

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

EXPERIMENTAL TECHNIQUES IN STRUCTURAL ENGINEERING LAB

Course Code: 13CE 2208

L	P	C
0	3	2

Course Outcomes:

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

CO1 : Draw stress-strain curve of concrete
CO2 : Determine elastic properties of steel
CO3 : Assess the flexural and shear capacity of R.C beams
CO4 : Measure the strength of concrete using Non-Destructive testing methods
CO5 : Estimate the double shear strength of steel specimen.

1. Elastic properties of concrete.
2. Elastic properties of steel.
3. Shear capacity of R.C. beams.
4. Flexural test on R.C. Beams.
5. Modulus of rupture of concrete
6. Flexural capacities of R.C. slabs.
7. Flexural capacity of corrugated metal decks.
8. Non-Destructive testing of Concrete.
9. Double shear test on steel rod specimen.
10. Pre-stressing of beam (pre-tensioning)
11. Pre-stressing of beam (post-tensioning)