

22BEAS302 DESIGN OF STRUCTURES

Hours Per Week :

L	T	P	C
1	0	2	2

PREREQUISITE KNOWLEDGE:

COURSE DESCRIPTION AND OBJECTIVES:

The objective of the course is to learn the basic concepts of design, and perform analysis, and design of structural steel members and their connections. To understand the concepts of the working stress method and be able to Analyze and design reinforced concrete structural elements.

MODULE-1

UNIT-1

3L+0T+0P=3 Hours

DESIGN PHILOSOPHIES FOR STEEL STRUCTURES:

Structural steel types: Mechanical properties of structural steel, Types of loads, Combinations of loads and use of BIS Codes.

UNIT-2

5L+0T+16P=21 Hours

ANALYSIS AND DESIGN OF TENSION AND COMPRESSION MEMBERS:

Design of connections. Design of structural steel members in tension, compression and bending.

PRACTICES:

- Design and detailing of steel roof truss.
- To measure workability of cement by slump test.
- To measure workability of cement by compaction factor test.
- To determine the compression of concrete.
- To determine the tensile strain test of concrete.

MODULE-2

UNIT - 1

3L+0T+0P=3 Hours

DESIGN PHILOSOPHIES FOR CONCRETE STRUCTURES:

Objective of structural design: steps in RCC structural design process. Code of practices and specifications, Concept of Limit State design methods.

UNIT - 2

5L+0T+16P=21 Hours

ANALYSIS AND DESIGN OF STAIRCASE, COLUMNS AND FOOTINGS:

Analysis and design of singly and doubly reinforced sections, Shear, Bond and Torsion. Design of Flanged Beams, Slabs, Columns, and Foundations.

PRACTICES:

- Design and detailing of Singly reinforced beam, Doubly reinforced beam.
- Design and detailing of One-way slabs, Two-way slabs.
- Design and detailing of shear reinforcements.
- Design and detailing of Column.
- Design and detailing of footings square or rectangular.

Source : https://i.guim.co.uk/img/media/0e7ca6481d30130c8311e6c5a5673f521c7fd4cc/0_151_3869_2176/3869.jpg?width=1280&quality=85&auto=format&fit=max&s=87bb9939917b8ec60394852f31276ce9

SKILLS:

- ✓ Identify tension members in trusses.
- ✓ Select the suitable configuration for the compression member.
- ✓ Calculate the cross-section area required for plate girders.
- ✓ Decide the connection methods (Bolting / Welding).
- ✓ Design beams for limit state of collapse.
- ✓ Study about bond and anchorage, design and analysis of substructure.

COURSE OUTCOMES:

Upon successful completion of this course, students will have the ability to:

CO No.	Course Outcomes	Blooms Level	Module No.	Mapping with POs
1	Apply the various design methodologies for the design of steel and RC elements.	Apply	1,2	1, 3
2	Analyze common bolted connections for steel structures,	Analyze	1	2, 5, 6
3	Analyze ability to design and proportion structural concrete members including slabs, beams and columns for strength, serviceability, and economy.	Analyze	1	1, 2, 3
4	Evaluate columns for axial, uniaxial and biaxial eccentricity loadings,	Evaluate	2	2, 3
5	Creative design of footing by limit state method of footing by limit state method,	Create	2	2, 3, 6, 9

TEXT BOOKS:

1. Bhavikatti, S.S. "Design of Steel Structures" By Limit State Method, Fifth Edition, 2017.
2. Varghese, P.C. Limit State "Design of Reinforced Concrete" 2nd Edition, PHI, 2009.
3. Unnikrishna Pillai, S., Devdas Menon "Reinforced Concrete Design" Tata McGraw Hill Education, 2003.
4. Punmia, B.C. Limit State "Design of Reinforced Concrete" Laxmi Publications, 2016.

REFERENCE BOOKS:

1. Subramanian, N. Design of Steel Structures, Oxford University Press, New Delhi, 2018.
2. Subramanian, N. Design of Reinforced Concrete Structures, Oxford University Press, New Delhi, 2014.
3. Krishnaraju, N. Design of Reinforced Concrete Structures, Fourth Edition, CBS Publishers & Distributors Pvt. Ltd., New Delhi. 2019.
4. Ramachandra, Limit state Design of Concrete Structures, Standard Book House, New Delhi. 2014.