Semester	**: IV**		
Course No.	**: FS-242**	**Credit Hrs.**	**: 2(1+1)**
Course Title	**: Theory of Structures**		

SYLLABUS

Objectives : (i) To make the students acquainted with the principles of structural design,

(ii) To enable the students to design small and medium RCC and steel structures.

THEORY

Types of Load and use of BIS Codes.

Design of steel structures - specifications, use of IS code (IS 800-2007) and steel table, design of steel sections under tension, compression and bending, use of any one design software such as STAAD Pro, ETABS, etc. for design of roof truss.

Design of RCC Structures - specifications, use of IS code (IS 456-2000), analysis and design of singly and doubly reinforced sections, design of beams, design of one way and two-way slabs, columns and foundations, design considerations for retaining walls and silos, use of design software for simple RCC structures.

PRACTICAL

Design and drawing of steel roof truss including tension member, compression member and member under bending, use of design softwares. Design and drawing of RCC building including single reinforced beam, double reinforced beam, one-way slab, two-way slabs, columns and foundations, Use of design softwares for simple RCC structures.

TEACHING SCHEDULE

THEORY [FS-242]

Lecture No.	Topic	Sub-topics/ Key Points	Weightage (%)
1	**Types of Load and Use of BIS Codes**	Introduction, Characteristic strength and Characteristics load, Partial safety factors for load and material, Various loads acting on structures, BIS codes.	20
2	**Design of Steel Structures**	Specifications, Use of IS code (IS 800-2007) and Steel table	20
3 - 4		Design of steel sections under tension	
5 - 6		Design of steel sections under compression and bending	
7		Use of any one design software such as- STAAD Pro, ETABS, etc. for design of roof truss.	
8	**Design of RCC Structures**	Specifications, Use of IS code (IS 456-2000)	20
9 - 10		Analysis and design of singly reinforced sections	
11 - 12		Analysis and design of doubly reinforced sections	
13 - 14		Design of beams, Design of one-way slab, Design of two-way slab	20
15 - 16		Columns and foundations Types of footing/ foundations, Design of Isolated RCC footing, Design considerations for retaining walls and silos, Use of design software for simple RCC structures.	20
		Total =	**100**

TEACHING SCHEDULE

PRACTICAL [FS-242]

Exercise No.	Exercise Title
1	To study standard rolled steel sections and use of steel table to find their properties.
2	Design and drawing of steel roof truss including tension member.
3	Design and drawing of steel roof truss including compression member.
4	Design and drawing of steel roof truss including member under bending.
5	Use of design softwares for trusses (STAAD Pro, ETABS, etc).
6	Use of design softwares for simple steel structures.
7	Design of concrete using various grades of concrete mixes.
8	Design and drawing of RCC building including single reinforced beam.
9	Design and drawing of RCC building including double reinforced beam.
10	Design of one-way slab.
11	Design of two-way slab.
12	Design and drawing of columns.
13	Design and drawing of foundations.
14	Design and drawing of various retaining wall.
15	Design and drawing of silos.
16	Use of design softwares for simple RCC structures (STAAD Pro, ETABS, etc).

Suggested Readings [FS-242]:

1. Bhavikatti S.S. 2014. Design of Steel Structures: By Limit State Method as Per IS: 800-2007. I K International Publishing House Pvt. Ltd.
2. Duggal S.K. 2017. Limit State Design of Steel Structures. McGraw Hill Education.
3. Punmia B.C, Jain A.K. and Jain A.K. 2016. Limit State Design of Reinforced Concrete. Laxmi Publications.
4. Raju N.K. 2019. Design of Reinforced Concrete Structures: IS:456-2000. CBS Publishers & Distributors.
5. L.S. Negi 2012 Design of Steel Structures. Tata McGraw-Hill, New Delhi.
6. V.L. Shah and S.R. Karve 2008. Illustrated Reinforced Concrete Design. Structures publications, Pune.

7. T.P. Ojha and A.M. Michael. 2003. Principles of Agricultural Engineering, Volume-I. Jain Brothers, New Delhi.
8. V.L. Saha and S.R. Karve. 2012. Limit State Theory and Design of Reinforced Concrete Structures Publishers, Pune.
9. N. Krishan Raju and R.N. Pranesh. 2012. Reinforced Concrete Design (IS 456-2000), Principles and Practice. New Age International.
10. N.C. Sinha and S.K. Roy. Fundamentals of Reinforced Concrete. S. Chand and Company.
11. S.K. Duggal 2011. Design of Steel Structures. Tata McGraw- Hill, New Delhi.
12. M. Raghupati 2011. Design of Steel Structure. Tata McGraw- Hill, New Delhi.
13. Ramchandra 2010. Design of Steel Structures. Dhanpatrai and Sons Publication Company, New Delhi.
14. Sushilkumar 2000. RCC Design Standard Book House, New Delhi.
15. M.G. Shah and C.M. Kale 1984. RCC Theory and Design MacMillan, Delhi.