

GUJARAT TECHNOLOGICAL UNIVERSITY

CIVIL ENGINEERING

B. E. SEMESTER: VII

Subject Name: **Structural Design - I**

Subject Code: **170603**

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	University Exam (E)		Mid Sem Exam (Theory) (M)	Practical (Internal)
				Theory	Practical		
4	4	0	8	70	30	30	20

Sr. No	Course Content
1.	<p>Design: strength, stiffness, stability, serviceability</p> <p>Design process: Analysis, design and detailing</p> <p>Design philosophy: working stress method, Limit state method, plastic method</p>
2.	<p>Limit state design of RC elements:</p> <p>Flexural design: Analysis, design and detailing of rectangular & flanged beams, one-way & two way simply supported & continuous slabs.</p> <p>Flexural and shear design: Design and detailing of rectangular & flanged beams</p> <p>Axial load design: Design and detailing of axially loaded Short columns Combined axial, shear and flexural design: Design and detailing of uniaxial & biaxial - Short & long columns.</p> <p>Torsion design: Design of rectangular beam section for torsion.</p> <p>Combined shear and torsion: Design of rectangular beam section</p> <p>Shear, flexural, punching, torsion: Design of isolated footing and combined footing.</p> <p>Bond and development length: Checking bond & development length for bars under tension, compression.</p> <p>Combined axial, shear, flexure: Design and detailing of uniaxial & biaxial – Short & long columns. Design of flat slabs.</p>
3.	<p>Limit State design of Steel elements:</p> <p>Axial force design: tension member, compression member</p> <p>Flexural design for beams: Restrained, unrestrained</p>

	<p>Combined axial and flexural design: Columns</p> <p>Footing : slab based, gusseted base foundation</p> <p>Torsion design: Beams, columns Combined axial, flexural and torsion: columns</p> <p>Connections: Bolted – bearing type, Hsfg for seismic purpose, Welded: types of electrodes. Connection design for tension, compression, flexural, flexural + shear..</p> <p>Plastic Design: Design of continuous beams and portal frame using plastic design approach.</p>
--	---

Weightage: Topic-I (10 %), Topic-II and III (45 % each)

Term Work shall consist of the following

1. Test on simple R.C.C. and steel members.
2. 20 problems based on above topics.

Practical shall consist of oral and sketching based on the topics given under Term- work.

IS Codes :

1. Code of practice for General Construction in steel - IS : 800-2007
2. Code of practice for plain and reinforced concrete IS : 456 (III revision) (with amendment I)
3. Code of practice for structural safety of Buildings IS : 875 Part I to V
Loading standards.(revised)(with Amendment 1)

Text Books:

1. S.N.Sinha ; Reinforced Concrete Design, Tata McGrawhill
2. N.Subramanian; Steel Structures, Oxford Publication

Reference Books:

1. Shah and Karve; Limit State theory & Design of Reinforced Concrete
2. A.K.Jain; Design of Concrete Structures, Nemchand Publication
3. K. S. Sai Ram; Design of Steel Structures, Pearson
4. Arya & Ajmani; Design of Steel Structures
5. Dayaratnam ; Design of Steel Structures
6. B.C.Punamia; Steel Structures, Laxmi Publication