

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 4

Environmental Science & Engineering

Subject Code 141301

Subject Name : DESIGN OF ENVIRONMENTAL STRUCTURES-I

Sr No	Course content
1.	Loads : Indian standard specifications for Dead, Live and Wind loads , Seismic forces, Hydrodynamic forces, Snow loads, Erection loads
2.	Reinforcement: Different types of reinforcement and their properties.
3.	Reinforced concrete structures : a) Various design philosophies: Advantages & limitations b) Limit state method: Design of reinforced rectangular beams for shear, flexure and bond, One way simply supported and continuous slabs, Two way slabs, Design of beams for shear & bond, Design of axially loaded columns and isolated footings. Check for serviceability, Shear failure, Bending failure & remedial measures c) Precast element – Introduction & handling systems, Prestressed concrete, Basics of Circular prestressing
4.	Steel structures : Bolted and Welded connections, Tension members, Angle and built-up sections, Choice of sections, , Axially loaded columns, Single and built-up sections, Lacing and Battening, Simple beams & connections, Shear & Moment connection, Stiffened and Unstiffened connections. Slab base & Gusseted foundation, Erection aspects.

Term Work

Term work shall consist of the following

- 1) Quiz based on the topics under 'Design of environmental structures - I'
- 2) 25 problems based on the topics under 'Design of environmental structures - I'. Practical / oral shall be based on above course.
- 3) Drawing of design elements to be done using AutoCAD

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

IS Codes :

1. Code of practice for plain and reinforced concrete (III revision) (with amendment I) - IS : 456
2. Code of practice for General Construction in steel - IS : 800-1984
3. Code of practice for structural safety of Buildings Loading standards.(revised) - IS : 875 (with Amendment 1)
4. Criteria for earthquake resistant design General provision & Building - IS: 1893 (Part I 2002)
5. Code of Practice for Ductile Detailing of RC Structures - IS: 13920 (1993).
6. Code of practice for concrete structure for storage of liquids – IS 3370

REFERENCE BOOKS:

1. Shah & Karve ; Reinforced Concrete
2. Arya & Ajmani ; Steel Structures
3. A.K. Jain ; Reinforced Concrete
4. Krishna Raju ; Prestressed Concrete