DESIGN OF CONCRETE STRUCTURE

Paper Code: ETCE-212   **L   T/P   C**
Paper: Design of Concrete Structure   **3   1   4**

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks: 75**
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To provide basic understanding of concrete making materials and their properties, mix design concepts and to make them understood various properties of the hardened concrete. The course also aims at designing of basic elements of structures such as beam, column, slab and foundation.

UNIT – I
Concrete making materials – Cement, mineral additives, aggregates, water, admixtures. Types of structural steel and their properties. Batching plant and equipment, types of mixers, transportation, pumping and placing of concrete, nominal mixes and design mixes, Design codes and handbooks.
Properties of hardened concrete: Effects of water cement ratio, compaction, age, curing on strength of concrete. Compressive strength, grades of concrete, bond strength, shrinkage and creep, durability, chemical attack, sulphate attack, resistance to abrasion, resistance to fire, marine atmosphere.
Structural Masonry: Behavior of Load bearing Masonry Wall, Introduction of Reinforced Masonry and analysis of lintel beams.
                                                                [T1,T2][No. of Hours: 12]

UNIT – II
Reinforced concrete design philosophies, Working stress design, Concept of limit states. Limit states design, partial safety factors. Codal recommendations. Characteristic and design values, Factored loads, design stress strain curves.
Limit state of Collapse: Flexure, Shear, bond and torsion, Compression, Limit state of Serviceability.
                                                                [T1,T2][No. of Hours: 11]

UNIT – III
Analysis and design of singly and doubly reinforced simply supported cantilever and continuous beams and flanged beam section, lintels, Design principles of retaining walls.
Design of simply supported, cantilever slabs, one way and two way slabs.
                                                                [T1,T2][No. of Hours: 11]

UNIT – IV
Design of short and slender columns under axial load, under uniaxial and biaxial bending and shear force.
Design of isolated footing for vertical load and Moment, Design of combined footings.
                                                                [T1,T2][No. of Hours: 11]

Text Books:
[T1]   Sinha S.N., " Handbook of Reinforced Concrete Design", McGraw Hill Publishing Company., New Delhi.
[T2]   Gambhir M.L., "Fundamentals of Reinforced Concrete Design"., PHI Learning (P) Ltd., New Delhi.

Reference Books:
[R1]   Jain A.K., "Limit State Design of Reninforced Concrete Structures"., Nem Chand Publishers, Roorkee.
[R2]   Shetty M.S., "Concrete Technology, Theory and Practice", S.Chand and Co., New Delhi.
[R3]   Raju K., "Reinforced Concrete", New Age International (P) Ltd., New Delhi.
[R4]   Varghese P.C., "Limit State Design of Reinforced Concrete", PHI (P) Ltd., New Delhi
[R5]   SanthaKumar A.R., "Concrete Technology", Oxford Publications., New Delhi
[R6]   UnikrishnaPillai S., "Reinforced Concrete Design".,Tata McGraw Hill Publishing Company Ltd., New Delhi.