

Th 4(a). CONCRETE TECHNOLOGY (ELECTIVE)

Name of the Course: Diploma in Civil Engineering			
Course code:		Semester	6th
Total Period:	60	Examination	3 hrs
Theory periods:	4P/week	Class Test:	20
Maximum marks:	100	End Semester Examination:	80

A. RATIONALE

Concrete is said to be the second most consumed material and in construction plays a vital role. The knowledge in constituents, strength development process and deterioration mechanism helps the learner in designing and producing good quality concrete.

B. COURSE OBJECTIVES

On completion of the course, the students will be able to

1. Describe functions and characteristics of the concrete constituents
2. Prescribe test requirements and methods for fresh and hardened concrete
3. Design concrete mix
4. Comprehend concrete production and inspection techniques
5. Acquaint themselves with special concrete preparation and application
6. Know the concrete deteriorating agencies and methods towards durability improvement and repair

C. TOPIC WISE DISTRIBUTION

Chapter	Name of topics	Hours
1	Concrete as a construction material	02
2	Cement	04
3	Aggregate, Water and Admixtures:	06
4	Properties of fresh concrete	06
5	Properties of hardened concrete	07
6	Concrete mix Design	05
7	Production of concrete	06
10	Inspection and Quality Control of Concrete	06
11	Special Concrete	06
12	Deterioration of concrete and its prevention:	06
13	Repair technology for concrete structures:	06

D. COURSE CONTENTS:

1 Concrete as a construction material:

- 1.1 Grades of concrete.
- 1.2 Advantages and disadvantages of concrete.

2 Cement:

- 2.1 Composition, hydration of cement, water cement ratio and compressive strength, fineness of cement, setting time, soundness, types of cement.

3 Aggregate, Water and Admixtures:

- 3.1 Classification and characteristics of aggregate, fineness modulus, grading of aggregate, I.S.383
- 3.2 Quality of water for mixing and curing.
- 3.3 Important functions, classification of admixtures, I.S 9103, accelerating admixtures, retarding admixtures, water reducing admixtures, air containing admixtures

4 Properties of fresh concrete:

4.1 Concept of fresh concrete, workability, slump test, compacting factor test, V-bee consistency test and flow test, requirement of workability, I.S. 1199.

5 Properties of hardened concrete:

5.1 Cube and cylinder compressive strengths, flexural strength of concrete, stress-strain and elasticity, phenomena of creep and shrinkage, permeability, durability of concrete, sulphate, chloride and acid attack on concrete, efflorescence.

6 Concrete mix Design

6.1 a) Introduction

b) Data or input required for mix design.

6.2 Nominal mix concrete & design mix concrete.

6.3 Basic consideration for concrete mix design, Methods of proportioning concrete mix – I.S Code method of mix design (I.S. 10262)

7 Production of concrete:

7.1 Batching of materials, mixing of concrete materials, transportation, placing of concrete, compaction of concrete (vibrators), Curing of concrete, Formwork-requirements and types, stripping of forms. (Concepts only)

10 Inspection and Quality Control of Concrete

10.1 Quality control of Concrete as per I.S.456, Factors causing the variations in the quality of concrete

10.2 Mixing, Transporting, Placing & curing requirements of Concrete as per I.S.456.

10.3 Inspection and Testing as per Clause 17 of IS:456.

10.4 Durability requirements of Concrete as per I.S:456.

11 Special Concrete

11.1 Introduction to ready mix concrete, high performance concrete, silica fume concrete, shot-crete concrete or gunniting (Concepts only).

12 Deterioration of concrete and its prevention:

12.1 Types of deterioration, prevention of concrete deterioration, corrosion of reinforcement, effects and prevention

13 Repair technology for concrete structures:

13.1 Symptom, cause and prevention and remedy of defects during construction, cracking of concrete due to different reasons. Repair of cracks for different purposes, selection of techniques, polymer based repairs, common types of repairs.

E. COURSE COVERAGE UPTO INTERNAL ASSESSMENT

Chapters 1,2,3,4,5,6

F. RECOMMENDED BOOKS

Sl. No	Name of Authors	Titles of Book	Name of Publisher
1	M.S Shetty & A.K.Jain	Concrete technology	S.Chand
2	M.L.Gambhir	Concrete technology	Tata McGraw Hill.
3	A R Santhakumar.	Concrete technology	Oxford Publication
CODE			
4	BIS Codes:- I.S 383,10262,9103		