



Kadi Sarva Vishwavidyalaya's
LDRP Institute of Technology & Research
Gandhinagar-382 015



B.E. Semester: III

Department of Civil Engineering

Subject Name: Concrete Technology (CV304-N)

A. Learning objectives:

The objective of this course is

- To define and understand concepts related Concrete technology which involves types and property of concrete and different adhesive materials and its vital use for safe, economic development for the buildings.
- To present the foundations of many basic Engineering tools and concepts related to Concrete technology and Civil Engineering.
- To give an experience in the implementation of engineering concepts which are applied in field of Civil Engineering

B. Teaching Scheme (Credits and Hours)

Teaching scheme				Total Credit	Evaluation Scheme					Total Marks
L	T	P	Total		Theory		Mid Sem Exam	CIA	Pract/ Tut.	
Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
03+1*	00	02	06	04	03	70	30	20	30	150

C. Detailed Syllabus

1 Introduction:

Historical background, composition of concrete, general note on strength mechanism, recent practice and future trends.



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2 Ingredient of Concrete:

1. Cement - Chemical composition, hydration, heat of hydration, hydrated structure, various types of cement, testing of cement as per Indian standard.

2. Aggregates - Utility in concrete, classification, effect of geometry & texture, strength, mechanical properties, moisture content, water absorption, bulking of sand, deleterious substances, sieve analysis, various grading and grading requirements, sampling & testing as per Indian Standards.

3. Water - General Requirements & limiting values of impurities.

4. Admixtures - Additives and admixtures, types, necessity and benefit Mineral admixture - Fly ash, silica fume, blast furnace slag, and other pozzolanic materials. Chemical admixtures - Accelerator, retarder, water reducing elements, plasticizer and super-plasticizer, their functions and dosage.

3 Fresh concrete:

Methods of mixing, transporting and placing of concrete. Workability – Definition and requirement, factors affecting workability, various tests as per IS and ASTM. Segregation and bleeding, stiffening, re-tempering. Curing: necessity and various methods, micro-cracking.

4 Hardened concrete:

Compressive and tensile strength and their relationship, various tests as per IS and ASTM. Factors affecting strength – water cement ratio, gel space ratio, aggregate cement ratio, properties of ingredients, effect of age, maturity, aggregate cement-paste inter-face, various finishes of concrete. Introduction to aspects of elasticity, shrinkage and creep. Tests for strength of concrete: Destructive, semi destructive and non- destructive tests with their limitations, test methods as per IS and ASTM.

5 Special Concrete:

Review of behavior and characteristics of high strength concrete, high performance concrete, fiber reinforced concrete, mass concrete, light weight and heavy weight concrete, Precast concrete.

6 Special concreting techniques:

Pumped concrete, concrete, underwater concrete, pre-placed concrete,



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vacuum de- watered concrete, hot and cold weather concreting, ready mixed concrete.

7 Concrete mix design:

Principles of mix proportioning, probabilistic parameters, factors governing selection of mix. Road note - 4, DOE, ACI and IS method of concrete mix design, Variability of test results, acceptance criteria, various IS code provisions.

D. Lesson Planning:

Unit No.	Course Content	Hours	Weightage (%)
1	Introduction	3	7
2	Ingredient of Concrete	8	18
3	Fresh concrete	6	13
4	Hardened concrete	8	18
5	Special Concrete	6	13
6	Special concreting techniques	6	13
7	Concrete mix design	8	18

E. List of Experiments:

Test of Aggregates	
1	Introduction to Concrete Lab
2	Sieve Analysis
3	Flakiness Index
4	Elongation Index
5	Aggregate Impact Test
6	Specific Gravity, Water Absorption & Natural Moisture Content of Fine and Course Aggregate.



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7	Course And Compacted Bulk Density And Voids of Fine & Course Aggregate.
Test of Cement	
1	Consistency of Standard Cement Paste.
2	Initial & Final Setting Time of Ordinary Portland Cement.
3	Soundness Test
Test on Design Concrete- Fresh Concrete	
1	Slump Test
2	Compaction factor test
Test on Designed Concrete – Hardened Concrete	
1	Compressive Strength Of Concrete
2	Rebound Hammer Test

Field Visit: Visit of any construction Site or RMC or Cement manufacturing Plant.

F. Instructional Method and Pedagogy (Continuous Internal Assessment (CIA) Scheme)

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures and practical which carries marks.
- At regular intervals assignments will be given. Students should submit all assignments during given period.
- Classroom participation and involvement in solving the problems in Tutorial rooms Carries Marks.
- Internal exam of 30 marks will be conducted as a part of Mid-semester evaluation.
- Experiments shall be performed in the field related to course contents.
- The course includes a practical, where students have an opportunity to build an



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appreciation for the concept being taught in lectures.

G. Students Learning Outcomes:

At the end of the course

- The students will be able to think logically for development Concrete technology application in field of Civil Engineering.
- The students will gain an experience in the implementation of Concrete Materials on engineering concepts which are applied in field Construction Fields.

H. Recommended Study Material:

(A) Reference Books:

1. M S Shetty; Concrete Technology , S. Chand Publication New Delhi
2. P Kumar Mehta, Monteiro; Concrete Technology, Indian Concrete Institute
3. A R Santhakumar; Concrete Technology , Oxford University Press
4. A. M. Neville ; Properties of Concrete , Pearson Education
5. M L Gambhir; Concrete Technology , Tata McGraw Hill
6. IS 456-2000
7. IS 269-1989
8. IS 516-1959
9. IS 1786-1985
10. IS 1893-2002
11. IS 12269-1987
12. IS 9103-1999
13. IS 8112-1989
14. IS 10262-1982 and IS 10262-2009

(B) Web Materials:

<http://www.nptel.iitm.ac.in>