

BCE304	Concrete Technology	3L:1T:0P	4 credits
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Pre-requisite: Building Material

Course Objectives:

CO1	To understand in detail the characteristics of constituent of concrete.
CO2	To understand the different types of concrete and there uses.
CO3	To design the concrete of required compressive strength.
CO4	To understand the properties and test conducted on fresh concrete

Module1:

Introduction:- Definition of concrete. Brief introduction to properties of concrete. Advantages of concrete. Use of concrete. Cements & Admixtures: Portland cement – chemical composition, Hydration of cement Setting of cement; Different grades of cement;
Aggregates:- Classification of aggregates according to source, size and shape. Characteristics of aggregates particle size and shape, surface texture; specific gravity of aggregate; bulk density, water absorption surface moisture, bulking of sand and deleterious materials in the aggregate. Grading of Aggregate:- Coarse aggregate, fine aggregate.

Module2:

Water Cement Ratio:-, Effect of various W/C ratios on the physical structure of hydrated cement, water cement ratio law and conditions under which the law is valid; internal moisture, temperature, age, and size of specimen. Definition of cube strength of concrete. Relations between water cement ratio and strength of concrete.
Workability: Definition of workability Segregation, Harshness. Factors affecting workability; water content, shape,. Measurement of workability slump test, compaction factor test. Recommended slumps for placement in various conditions. Vee-Bee Consistometer.
Special Concretes: Light weight aggregate concrete; Cellular concrete; No-fines concrete; High density concrete; Fibre-reinforced concrete (F.R.C.); Different types of fibres; Factors affecting properties of F.R.C.; Applications of F.R.C.; Polymer concrete – Types, Properties and Applications; High performance concrete; Self consolidating concrete.

Module 3:

Concrete Operations:- (i) **Storing Cement:-** (a) Storing of cement in the warehouse., (b) Storing of cement at site, (c) Effect of storage on strength of cement.
Batching:- (a) Batching of cement., (b) Batching of aggregate: Batching by volume, using gauge box, selection of proper gauge box, Batching by weight-spring balances and by batching machines., (c) Measurement of water.
Mixing (a) Hand mixing (b) Machine mixing-types of mixer, capacities of mixers, choosing appropriate size of mixers, operation of mixers, mixing of water.
Compaction:
 (a) Hand compaction. (b) Machine compaction-types of vibrators (internal screed vibrators and form vibrators) immersion vibrations. Suitability of concrete mixes. Finishing concrete slabs- screeding, floating, and trowelling.
Curing:- Object of curing, Method of curing, shading concrete works, covering surfaces with hessian, gunny bags, sprinkling of water, ponding method and membrane curing, steam curing.

Recommended duration for Curing.

Module 4:

Proportioning for Ordinary Concrete: Object of mix design, Strength required for various grades as per IS456, Preliminary test, cube test, Proportioning for ordinary mix as prescribed by IS and its interpretation. Adjustment on site, Introduction of formwork

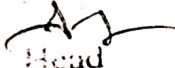
Quality Control at site:-Control tests on cement, aggregate water and concrete. Concept of quality control.

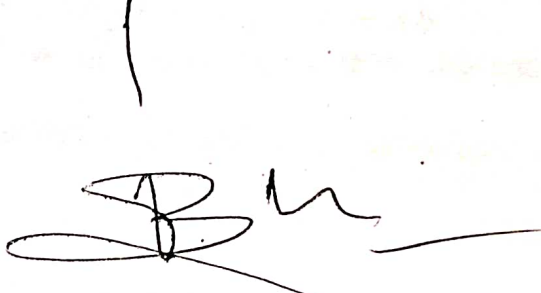
Course Outcomes: After the completion of this course the students will be able to:

CO1	Define the characteristics of ingredients of concrete and their role in preparing the concrete.
CO2	Decide the type of concrete to be used as per the prevailing exposure condition.
CO3	Design the ratio of constituents of concrete to get required compressive strength.
CO4	Perform the test on concrete at site for quality control.

Text Books:-

1. Neville A.M., *Concrete Technology*, Standard Publishers Distributors, Delhi.
2. Kulkarni P.D., *Textbook of Concrete Technology*, New Age International Publishers, Delhi.
3. Santha kumar A.R., *Concrete Technology*, Oxford University Press, Mumbai.


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