III Year-II Semester
(20CE6754) CONCRETE TECHNOLOGY

Int. Marks	Ext. Marks	Total Marks	L	T	P	C
30	70	100	3	-	-	3

Pre- Requisites: Fundamentals of Building Materials

Course Objectives:

- To learn the concepts of Concrete production and its behavior in various environments.
- To learn the test procedures for the determination of properties of concrete.
- To understand durability properties of concrete in various environments.

UNIT-I: Ingredients of Concrete Cements & Admixtures:
Portland cement – Chemical composition – Hydration, Setting of cement, Fineness of cement, Structure of hydrate cement – Test for physical properties – Different grades of cements – Admixtures – Mineral and Chemical Admixtures – Accelerators, Retarders, Air Entertainers, Plasticizers, Super Plasticizers, Fly Ash and Silica Fume.
Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand –Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded and well graded aggregate as per relevant IS code – Maximum aggregate size. Quality of mixing water.

UNIT-II: Fresh Concrete:
Steps in Manufacture of Concrete–proportion, mixing, placing, compaction, finishing, curing – including various types in each stage. Properties of fresh concrete-Workability – Factors affecting workability – Measurement of workability by different tests, Setting times of concrete, Effect of time and temperature on workability –Segregation & bleeding – Mixing and vibration of concrete, Ready mixed concrete, Shotcrete

UNIT-III: Hardened Concrete:
Water / Cement ratio – Abram's Law – Gel space ratio –Nature of strength of concrete –Maturity concept – Strength in tension & compression –Factors affecting strength – Relation between compression & tensile strength – Curing, Testing of Hardened Concrete: Compression tests – Tension tests – Factors affecting strength– Flexure tests –Splitting tests – Non-destructive testing methods – codal provisions for NDT.

UNIT-IV: Elasticity, Creep & Shrinkage:
Modulus of elasticity, Dynamic modulus ofelasticity, Poisson's ratio, Creep of concrete, Factors influencing creep, Relation between creep & time, Nature of creep, Effects of creep – Shrinkage –types of shrinkage.

UNIT –V: Mix Design:
Factors in the choice of mix proportions – Durability of concrete –Quality Control of concrete – Statistical methods – Acceptance criteria – ConceptsProportioning of concrete mixes by various methods – BIS method of mix design.

Course Outcomes:

S.No	Course Outcomes	BTL
1	Understand the basic concepts of concrete.	L2
2	Realize the importance of quality of concrete.	L2
3	Familiarize the basic ingredients of concrete and their role in the production of concrete and its behavior in the field.	L2
4	Test the fresh concrete properties and the hardened concrete properties and evaluate the ingredients of concrete through lab test results.	L4
5	Design the concrete mix by BIS method.	L4

Text Books:

1. Concrete Technology by M. S. Shetty. – S. Chand & Company
2. Concrete Technology by A. R. Santha Kumar, Oxford University Press, New Delhi

Reference Books:

1. Properties of Concrete by A. M. Neville – Pearson – 4th edition
2. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi