

Subject Title : Concrete Technology (Elective)- 5th Semester

Subject Code : 5008

Periods per week : 4

Periods per semester: 72

CREDIT : 4

Module	Topics	Periods
I	Constituent materials – Cement – Aggregates – Water – Admixtures	18
II 18	Properties of fresh and hardened concrete	18
III 14	Concrete mix design	18
IV	Special Concrete, Concreting Methods, Defects in concrete	18
	Total	72
64		

Rationale:

Upon completion of the course the student should acquire required knowledge in constituents of concrete, its preparation, properties and applications in field.

Objectives:

Module – I

Student should be able to understand the following

- 1.1 Cement- chemical composition – Types
- 1.2 Hydration of cement
- 1.3 Testing of cement
- 1.4 Properties of cement
- 1.5 Aggregates – Properties and test procedures as per IS code
- 1.6 Water- Quality of water

- 1.7 Additive and admixtures – their properties and effect

Module –II

- 2.1 Properties of fresh concrete
- 2.2 Workability of concrete – factors affecting workability
- 2.3 consistency – Segregation - bleeding – mixing –transporting – placing and compacting
- 2.4 Curing of concrete and finishing
- 2.5 Properties in the hardened state – Compressive Strength – Flexural strength – tensile strength – factors influencing the strength of concrete
- 2.6 Stress strain characteristics of concrete
- 2.7 Elasticity – poisson’s ratio
- 2.8 Shrinkage - factors
- 2.9 Creep & -Durability
- 2.10 Testing of Hardened Concrete.

Module – III

- 3.1 Principles of Mix proportioning
- 3.2 Factors influencing the choice of mix proportions
- 3.3 Variables in proportioning
- 3.4 Methods of mix design and design procedure

Module – IV

- 4.1 Special Concrete
 - 4.1.1 Types, methods and application
- 4.2 Concreting under special condition
- 4.3 Defects in concrete, its causes, problems and remedial measures and repairs

Contents

Module – I

Constituent materials of concrete

Cement, chemical composition, Types, Storage, Chemistry of Hydration and testing of cement – field test-fineness tests-consistency-Setting time- Strength test-Soundness test-Heat of hydration

Aggregates –Classification- Size-shape-Texture-Strength-Impact-abrasion-flakiness index-Elongation index - Gradation- fineness modulus -Unit weight-Specific gravity-Bulking- Moisture content-alkali-aggregate reaction

Water- Quality of water – water cement ratio – Effect of w.c ratio

Additive and admixtures – Chemical and mineral admixtures- accelerators-retarders-plasticizers-supper plasticizers- Water proofers their properties and effect

Module-II

Properties of Fresh and hardened concrete

Properties of fresh concrete - Workability of concrete – Factors affecting workability – Measurement of workability – Slump test- Compaction factor test- Vee Bee test consistency – Segregation - bleeding –batching - methods of mixing , transporting, placing and compacting.

Curing of concrete-Need and effect of curing- different methods of curing and finishing

Properties in the hardened state – Strength – Factors affecting strength of concrete – Compressive strength – Stiffness –Poisson's ratio – Ductility – Fatigue – Impact - Elasticity – Creep & Shrinkage –Bond strength-Durability

Testing of Hardened Concrete – Compression test – Comparison between cube and cylinder strength–Flextural strength - Split tensile strength – Modulus of Elasticity – Poisson's ratio

Module – III

Principles of Mix proportioning - Variables in proportioning – List the Methods of proportioning - Definition of terminology- Mean strength, variance, standard deviation, co-efficient of variation – relationship between target strength and mean strength

Methods of mix design and design procedure based on IS 10262 – 1982

Module –IV

Special Concrete – classification – Light weight – High Strength- High performance- Polymer-Steel fiber reinforced and sulphur concrete. Methods of preparation and applications in specific areas.

Concreting under special condition - Underground & Under water concreting–
Concreting in cold and hot weather – Mass concreting – Self compacting concrete –
Concreting in marine environment

Defects in concrete- Permeability in concrete - Freezing and Thawing – Sulphate attack
– Carbonation – Creep & Shrinkage – Corrosion of reinforcement -its causes, problems,
remedial measures and repairs

References:

- 1) Concrete Technology by M.S.Shetty –
- 2) Concrete Technology by A.R. Santhakumar – Oxford University press
- 3) Concrete Technology by A.M.Neville & J.J.Brooks – Pearson
- 4) Concrete Technology by Krishnaswamy -