DEPARTMENT OF CIVIL ENGINEERING

III B.Tech, I Semester,
Academic Year: 2024-25

Course Name : TRANSPORTATION ENGINEERING (CE3103PC)

L – T – P : 3 – 0 – 0
Course Instructor : P.SAI SRAVANI

SYLLABUS

Course Objectives:

Concrete is the basic construction material in the advancements present construction industry Lot of advances are taking place in the concrete technology on par with development taking place in the engineering. The present day industry needs the knowledge of concrete technology thoroughly. The subject is designed to give the basic knowledge as well as latest developments in concrete technology

Course Outcomes:

At the end of the course, the student will be able to:

Identify Quality Control tests on concrete making materials

Understand the behaviour of fresh and hardened concrete

Design concrete mixes as per IS and ACI codes

Understand the durability requirements of concrete

Understand the need for special concretes

UNIT - I

Cement: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement. Admixtures: Types of admixtures – mineral and chemical admixtures.

UNIT - II

Aggregates: Classification of aggregate – Particle shape & texture –, strength & other mechanical properties of aggregate – 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 aggregate – Maximum aggregate size.

UNIT - III

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 – Steps in manufacture of concrete – Quality of mixing water.

UNIT - IV

Hardened Concrete: Water / Cement ratio – Abram's Law – Gelspaoe ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compressive & tensile strength - Curing.

Testing Of Hardened Concrete: Compression tests – Tension tests– Flexure tests – Splitting tests – Pull-out test, Non-destructive testing methods – codal provisions for NDT. Elasticity, Creep & Shrinkage – Modulus of elasticity – Dynamic modulus of elasticity – 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 – Acceptance criteria – Proportioning of concrete mix, Nominal Mix Design of design mix as per IS -10262 Special Concretes: Introduction to light weight concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Polymer concrete &Geo Polymer concrete – High performance concrete – Self compacting concrete.

TEXT BOOKS:

1. Properties of Concrete by A. M. Neville Pearson 5th edition Education ltd 2016. 2. Concrete Technology by M. S. Shetty. – S. Chand & Co. 2004 3. Concrete Technology by Job Thomas -Cengage learning India Pvt Ltd 2015.

REFERENCES:

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi 2. Concrete: Micro structure, Properties and Materials – P. K. Mehta and J. M. Monteiro, McGraw Hill Publishers