

SHIV NADAR UNIVERSITY

UNDERGRADUATE COURSE PROPOSAL

I. COURSE TITLE: Concrete Technology

II. COURSE CODE: CED 205

III. COURSE CREDITS (L:T:P): 3:0:1

IV. TOTAL CONTACT HOURS/ BATCH/WEEK (L:T:P): (3L+0T+4(P) =7)

V. NO. OF BATCHES:

VI. COURSE TYPE (MAJOR/UWE/CCC/REAL/VELS/IC), PLEASE MENTION ALL

THAT APPLIES: Major + UWE + Minor

VII. PREREQUISITE/S (IF ANY): Basic knowledge of building materials

VIII. COURSE COORDINATOR/INSTRUCTOR(S): Dr. Sumedha Moharana

IX. SCHOOL/ DEPARTMENT: Department of Civil Engineering

X. DISCIPLINES TO WHICH THE COURSE MAY BE OF INTEREST:

1. Civil Engineering
2. Mechanical Engineering

XI. Course objective

To impart knowledge to the students on the properties of materials for concrete by suitable tests, mix design for concrete and special concretes. This course explores the materials science of concrete, and attempts to bring about the understanding of concrete behavior from a fundamental perspective. It will cover many aspects of concrete i.e. physical and chemical characterization of concrete aggregate, mixture proportioning, high performance concrete, fresh and hardened concrete behavior and durability of concrete

XII. Learning outcome

Upon successful completion of the course, students will be able to:

- Gain knowledge about the properties of cement, concrete and special concretes.
- Perform the process of selecting suitable ingredients of concrete and determining their relative amounts with the objective of producing a concrete of the required, strength, durability, and workability as economically as possible
- Identify properties of concrete in the fresh and hardened states and the effects of mineral and chemical admixtures in concrete
- Identify the chemical or physical process of concrete structures durability concerns, and design their service life.

XIII. COURSE CONTENT:

1. Module-1 Concrete Materials

*Types of material, **Cement** : cement production, composition, and properties; cement chemistry; Types of cements; special cements. **Aggregates**: mineralogy; properties, types of aggregates tests and standards. Brief idea about laboratory tests meant for cement and aggregate.*

2. Module-2 Chemical and mineral admixtures:

***Admixtures** - structure properties, and effects on concrete properties. Introduction to supplementary cementing materials and pozzolans. Fly ash, blast furnace slag, silica fume, and metakaolin - their production, properties and effects on concrete properties. Other mineral additives - reactive and inert, water reducers, air entrainers, set controllers*

3. Module-3 Concrete Mix Design

Mix Design - factors influencing mix proportion - Mix design by ACI method and I.S. code method - Design of high strength concrete.

4. Module-4 Properties of fresh and hardened concrete

Workability, Factors affecting workability, type of tests. Water cement ratio, gain of strength with age, effect of maximum size of aggregate, relationship between compressive and tensile, strength, high strength concrete, high performance concrete. Elasticity, shrinkage and creep of concrete.

5. Module-5 Durability of concrete

Introduction to durability; relation between durability and permeability. Chemical attack of concrete; corrosion of steel rebars; other durability issues.

6. Module-6 Special concrete

Lightweight concrete. high density concrete, hot weather and cold weather concreting, polymer concrete.

XII. RECOMMENDED BOOK(S):

Text Books

1. Concrete Technology: M. L. Gambhir
2. Properties of concrete: A.M. Neville

Reference Books:

1. Concrete Technology: M. S. Shetty

XIII. ASSESSMENT SCHEME:

Minor-15%

Quizes-15%

Project -15%

Lab-20%

Major-35%