

# Plain & Reinforced Concrete-I

<b>Course Code</b> <b>CE-308</b>	<b>Credit Hours</b> <b>3-1</b>
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## Course Description

This course provides the knowledge and understanding of concrete as a structural material. The course introduces students with the properties of constituent materials of concrete as well as fresh and hardened properties and characteristics of concrete. The course also covers the concrete making practices and testing of hardened concrete through destructive and non-destructive testing. As an initial course on reinforced concrete design, students are introduced with mechanics and concepts of reinforced concrete design and interaction of two materials. The course also covers design and analysis of reinforced concrete axially loaded short columns.

## Text Book:

1. Properties of Concrete, 4th ed. ELBS, by A.M. Neville.
2. Concrete by Sidney Mindess [2nd Edition]
3. Design of Concrete Structures (14th Edition), by Arthur H. Nilson, David Darwin, and Charles W. Dolan, McGraw-Hill, New York, NY 10020.
4. ACI Building Code Requirement for reinforce concrete structures 318-11.

## Reference Book:

1. Properties of Concrete, by P.K. Mehta
2. Advanced Concrete Technology by John Newman
3. Reinforced Concrete - Mechanics and Design (5th edn) by James K. Wright and James G. MacGregor, Pearson-Prentice Hall, Upper Saddle River New Jersey NJ 07458.

## Prerequisites :

Nil.

## ASSESSMENT SYSTEM FOR THEORY

	<b>Without Project (%)</b>	<b>With Project/Complex Engineering Problems (%)</b>
Quizzes	15	10-15
Assignments	10	5-10
Mid Terms	25	25

Project	-	5-10
End Semester Exam	50	45-50

### ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assesment/ Viva	20%

### Teaching Plan

Week No	Topics/Learning Outcomes
1 – 2	Types of cements, phases of cements, dormant period of cement, open time, Calorimetry
3	Properties of Aggregates, Introduction to Micro & Macro Level Material Characterization
4 – 5	Admixtures-chemical and mineral admixtures, incompatibility issues
6	Mixing, Transporting, Placing & Compaction of Concrete
7	Curing and volume stability of concrete
8	Fresh properties of concrete, CEP
9	<b>Mid Semester Exam</b>
10	Factors affecting strength of concrete, OEL
11	Creep and shrinkage of concrete
12	Mix Design - basic considerations, approximate mix design, mix design as per ACI 211
13	Predictive Modeling and Design of Specialized Concrete using Machine Learning- An Introduction
14	Durability of concrete
15	Types of concrete and non-destructive testing
16	Reinforced concrete – General concept
17-18	<b>End Semester Exam</b>

### Practical

Experiment No	Description
1	Determination of the standard consistency of cement paste
2	Determination of soundness of cement
3	Determination of Initial and Final setting times of cement
4	To carry out sieve analysis of Fine Aggregate Sample and Determination of Fineness Modulus
5	To carry out the sieve analysis of Coarse Aggregate Sample
6	To determine the compressive strength of cement using mortar cubes

7	Determination of crushing value of coarse aggregate
8	Determination of specific gravity and absorption of coarse aggregate
9	Determination of specific gravity and absorption of fine aggregate
10	To perform the workability test on fresh concrete
11	Determination of Split tensile strength of concrete
12	Determination of the effect of aging on strength of concrete
13	Non-Destructive testing of concrete
14	Open – Ended Lab Project