B. Tech. Civil Engineering				
Course code: Course Title	**Course Structure**			**Pre-Requisite**
CE203: Design of Structures - I	**L**	**T**	**P**	**CE104: Mechanics of Solids**
	3	**0**	**2**	

Course Objective: To familiarize the students with the basics of the Design of RCC Structures.

S. No	Course Outcomes (CO)
CO1	Provide a coherent development to the students for the courses in the sector of Reinforced Concrete Design
CO2	Develop the foundations of many basic engineering concepts related to the design of structures
CO3	Analyze and Design RC beams for Flexure, Shear, and Torsion
CO4	Analyze and design RC Short & Long columns for different axial loadings, Compute Bond, Anchorage, and Development Length for Columns and Beams
CO5	Design of Foundation and Slab, and also develop the Concept of Load Transfer Mechanism in Slab and Foundations

S. No	Contents	Contact Hours
UNIT 1	**Introduction to Designing Process and Design Materials**: Structural Layout-Analysis-Designing-Detailing, Stress-Strain curves for concrete and steel, Grade of Steel, Grade of Concrete, and Materials Properties, Design Process & Philosophies, Function of concrete and steel in RC Structures, Under Reinforced, Balanced, and Over-Reinforced Section.	8
UNIT 2	**Introduction to Different Methods**: Working Stress Method and Ultimate Strength Method: Introduction and assumptions, Limit State Method – Limit state of collapse and serviceability.	8
UNIT 3	**Design of beams**: Function of beams, Types of Beams (Singly Reinforced Beam, Doubly Reinforced Beam, Flanged Beam), Calculation of Moment Carrying Capacity of Beam Section, Design (Flexure, Shear & Torsion) of Rectangular and Flanged beam, Singly Reinforced Section and Doubly Reinforced Section (with appropriate checks).	8

UNIT 4	**Design of Columns**: Function of Column, Types of Columns (Short Column & Long Column), Design of Axially Loaded Short Column, Design (Flexure & Shear) of Axially Loaded Column, Uni-Axially Loaded Column, Bi-Axially Loaded Column. Bond, Anchorage and Development Length: Bond Strength and Development Length, Provision for Development Length in Tension, Anchorage by Hooks, Development Length in Compression, Bar Cutoff and Bend Points in Beams, Bar Splices with the help of an example.	8
UNIT 5	**Design of Slab and Foundations**: Functions of Foundation, Types of Foundation, Design (Flexure and Shear) of Isolated Column Footing & Combined Footing. Slab Behaviour and Design: Describe the load transfer mechanism in Slab, Design of One-way slab and Two-way Slab for Flexure, Shear, Temperature, and Shrinkage Requirements.	10
	Total	**42**

REFERENCES

S. No.	Name of Books/Authors/Publishers	Year of Publication / Reprint
1	A. K . Jain; Design of Concrete Structures, NemChand Publications.	2001
2	Dr. B.C. Punmia, A.K. Jain; RCC Designs; Laxmi Publication	2006
3	N. Krishna Raju, Advanced Reinforced Concrete Design, CBS Publishers.	2016
4	Varghese A. V., Advanced Reinforced Concrete, Varghese, Prentice Hall of India.	2011
5	Reinforced Concrete Design - S Unnikrishnan Pillai and Devdas Menon.	2007
6	IS Codes (latest) : IS:456, IS:875 (all parts), IS:1893(P-1,2), IS:4326, IS:13920, IS: 3370 (P-1 to 4), SP:16, SP:34.	