NIRMA UNIVERSITY

Institute of Technology

School of Engineering

Master of Technology - Civil Engineering

(Computer Aided Structural Analysis and Design)

Semester- I

L	T	P	C
3	0	2	4

Course Code	6CL103
Course Name	Design of Concrete Structures

Course Outcomes:

At the end of the course, students will be able to -

1. assess gravity and lateral loading on the structures and apply appropriate codal stipulations
2. analyze and design structural elements such as continuous beam, slender column, corbel, deep beam, grid floor and shear wall
3. analyze and design frame structure, slab bridge & water retaining structures and assess serviceability criteria.

Syllabus: **Teaching hours: 45**

Unit-1: Load Estimation and Combination **Hours: 08**

Estimation of dead load, live load, wind & earthquake loads on structures and its combinations.

Unit-2: Limit Analysis of Reinforced Concrete Structures **Hours: 04**

Moment - Rotation characteristic of Reinforced Concrete (RC) members, Redistribution of moments, Rotation of a plastic hinge, IS code provisions and applications for continuous beam.

Unit-3: Serviceability Criteria **Hours: 05**

Serviceability criteria for RC members: deflection - short term & long term, crack width and fire resistance.

Unit-4: Analysis and Design of Structural Elements **Hours: 12**

Analysis and design of RC structural elements like slender column, corbel, deep beam, grid floor and shear wall.

Unit-5: Analysis and Design of Structures **Hours: 16**

Analysis and design of RC structures like frame structure, slab bridge and water retaining structures, Form work design.

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Laboratory Work:

Laboratory work comprises of analyse and design of following:
1. Multi storeyed building
2. Water retaining structures

The design report shall contain details of planning, modelling, analysis, design, reference and all necessary drawing in the form of neat dimension sketches drawn to scale.

Suggested Readings:

1. Sinha, S.N. *Reinforced Concrete Design*, Tata McGraw Hill.
2. Pillai, S.U. & Menon, D. *Reinforced Concrete Design*, Tata McGraw Hill.
3. Shah, V.L. &Karve, S.R. *Illustrated Reinforced Concrete Design*, Structures Publications.
4. Shah, V.L. &Karve, S.R. *Illustrated Design of Reinforced Concrete G+3 Buildings*, Structures Publications.
5. Varghese, P.C. *Advanced Reinforced Concrete Design*, PHI Learning.
6. Codes: IS:456, IS:875, IS:1893, IS:13920, SP:16, SP:34, IS:3370, IRC:6, IRC:112.

L= Lecture, T= Tutorial, P= Practical, C= Credit
