NIRMA UNIVERSITY

Institute of Architecture and Planning

Bachelor of Architecture

Semester-III

L	W	S	C
1	2	-	2

Course Code	**2AR365**
Course Title	**Structure III**

Course Learning Outcomes (CLO):
At the end of the course, students will be able to –

- Develop to gain understanding by using the abstract method of analysis of structures
- Evaluate basic requirement of stability and strength of materials.
- Evaluate structural elements and their importance in Structural System.

Syllabus: **15 weeks (3 hours/week)** **Total Teaching hours**: **45 Hr**

Unit No.	**Syllabus**: **Topic**	**Sub Topic**	**Teaching hours**:
1	Concept of Centre of gravity	• Determining the centroid of simple figures. • Moment of inertia, its application to sections subjected to bending, determining M.I. of simple and compound sections	9 hours
2	Resolution of forces	• Concept of triangulation and its application in pin jointed trusses • Assumption in strength of materials, basic terminology, brief history of strength of materials. • Concept & importance of the shear force and the bending moment. • Pure Bending stress & combined direct and bending stresses	12 hours
3	Stability, buckling of columns	• short and long columns • Deflection and its importance, code provisions, study of the deflected shape of	10 hours

		simple structures. • Solutions of problems.	
4	Concept of shear stress	• average and maximum shears stress. • Horizontal shear stress and its variation across the cross section of the beam	10 hours
5	Composite sections	• Sections made up of more than one material	4 hours

L= Lecture, W= Workshop, S= Studio, C= Credit

Suggested Readings:

1. Ching, Francis D. K., Building Structures Illustrated, New York, John Wiley & Sons, Inc., 2014
2. Deplazes, Andrea, Constructing Architecture Materials Processes Structures: A Handbook, Switzerland, Birkhauser- Publisher of Architecture, 2013
3. Barry, R., Construction of Buildings Vol. 1: Foundations and Oversite Concrete, Walls, Floors, Roofs, New Delhi, Affiliated East-West Press Pvt. Ltd., 1999
4. Biggs, John M., Introduction to Structural Dynamics, New Delhi, McGraw Hill Education India Pvt Ltd, 2014
5. Junnarkar, S. B., Mechanics of Structures Vol – 1, Anand, Charotar Publishing House, 2012
6. Onouye, Barry S., Statics And Strength Of Materials For Architecture And Building Construction, Chennai, Pearson India Education Services Pvt Ltd., 2015
7. Khurmi, R. S., Strength of Materials: Mechanics of Solids, New Delhi, S. Chand & Company Ltd., 2013
8. Laursen, Harold I., Structural Analysis, New Delhi, McGraw Hill Education India Pvt Ltd, 2014
9. Hibbeler, Russell C., Structural Analysis, India, Pearson Education Asia Pte. Ltd., 2013
10. Pandit, G. S., Structural Analysis: A Matrix Approach, New Delhi, Tata McGraw-Hill Publishing Company Ltd., 2008
11. Charleson, Andrew., Structure as architecture : Source book for architects and structural engineers, London, Taylor & Francis, 2015
12. Bali, N. P., Textbook of Engineering Mathematics, New Delhi, Laxmi Publications Pvt. Ltd., 2011
13. Parikh, Janak, Understanding Concept of Structural Analysis and Design, Anand, Charotar Publishing House, 2000
14. Schodek, Daniel L. Structures. Englewood Cliffs, NJ: Prentice-Hall, 1980. Print.
15. Millais, Malcolm. Building Structures: From Concepts to Design. London: Spon, 2005. Print.
16. Rosenthal, Hans Werner., and Hans Werner. Rosenthal. Structural Decisions: The Basic Principles of Structural Theory, Their Application to the Design of Buildings and Their Influence on Structural Form. London: Chapman & Hall, 1962. Print.
17. Cowan, Henry J. Architectural Structures: An Introduction to Structural Mechanics. New York: Elsevier, 1976. Print.
18. Miret, Eduardo Torroja, J. J. Polivka, and Milos Polivka. Philosophy of Structures: English Version by J.J. Polivka and Milos Polivka. Berkeley, CA: U of California, 1962. Print.
19. Morgan, William, Daniel Williams, and Frank Durka. Structural Mechanics: A Revision of Structural Mechanics. Harlow: Longman, 1996. Print.
20. Watson, Donald, Time saver Standards for Building Materials and Systems: Design Criteria and Selection Data, New Delhi, Tata McGraw Hill Education Private Limited, 2009
21. National Building Code of India, 1983, Part VI, Structural Design.