NIRMA UNIVERSITY

Institute of Architecture and Planning

Bachelor of Architecture

Semester-I

L	W	S	C
1	2	-	2

Course Code	**2AR175**
Course Title	**Structure I**

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

- Explain conceptual understanding of structural behavior
- Relate basic structural systems.
- Apply technical vocabulary related to structural design.

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

Unit No.	**Syllabus**: **Topic**	**Sub Topic**	**Teaching hours**:
1	Process of building structure	• Structure and Structural form • Structure and its importance in Architecture	9 hours
2	Broad categorization of structural system	• Structural form - solid, Surface, skeleton, Membrane, hybrid • Structural form - in Nature • Structural form - man made	9 hours
3	States of stresses	• Tensile, compressive, shear, torsion, bending	9 hours
4	Basic requirements of structure	• Structural material: strength, stiffness, shape • Equilibrium: Vertical, Horizontal, Rational • settlement and earthquake behavior	9 hours
5	Types of loads & supports	• Structural Elements: Strut, tie, beam, slab/plate, panel • Structural Element behavior: Tensile, compressive, shear, torsion, bending	9 hours

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

Suggested Readings:

1. James Ambrose, Building Structure, Canada Wiley, 2012
2. Millias, Malcolm, Building structures from concept to design, London, Spon Press, 2005
3. Ching, Francis D. K., Building Structures Illustrated, New York, John Wiley & Sons, Inc., 2014
4. Biggs, John M., Introduction to Structural Dynamics, New Delhi, McGraw Hill Education India Pvt Ltd, 2014
5. Sandaker, Bjorn N. Structural Basis of Architecture, UK, Taylor & Francis, 2011
6. Charleson, Andrew., Structure as architecture : Source book for architects and structural engineers, London, Taylor & Francis, 2015
7. Schodek, Daniel L., Structures, New Delhi, PHI Learning Private Limited, 2014
8. Ramamrutham, S., Theory of Structures, Delhi, Dhanpat Rai & Sons, 2013
9. Kumar, Ashok, Theory of Structures, New Delhi, Laxmi Publications Pvt. Ltd., 2004
10. Parikh, Janak, Understanding Concept of Structural Analysis and Design, Anand, Charotar Publishing House, 2000
11. Levy, Matthys,Why Buildings Fall Down: How Structures Fail, New York, W. W. Norton and Co., 2002
12. Salvadori, Mario. Structure in Architecture. Englewood Cliffs, NJ: Prentice-Hall, 1963.
13. Corkill, P. A., H. L. Puderbaugh, and H. K. Sawyers. Structure and Architectural Design. Iowa City: Sernoll, 1974.
14. Deplazes, and Söffker. Constructing Architecture: Materials, Processes, Structures. Basel: Birkhäuser Verlag, 2013.
15. Hunt, Tony. Tony Hunt's Structures Notebook. Oxford: Architectural, 2003.
16. Mainstone, R. J. Structure in Architecture: History, Design, and Innovation. Aldershot, Hampshire: Ashgate, 1999.
17. Muttoni, A. The Art of Structures: Introduction to the Functioning of Structures in Architecture. Abingdon, Oxford, UK: EPFL/Routledge, 2011.
18. Salvadori, Mario, Saralinda Hooker, and Christopher Ragus. Why Buildings Stand Up: The Strength of Architecture. New York: Norton, 1980.
19. Cowan, Henry J. Architectural Structures: An Introduction to Structural Mechanics. New York: Elsevier, 1976.
20. Gordon, J. E. The New Science of Strong Materials, Or, Why You Don't Fall through the Floor. Princeton, NJ: Princeton UP, 1984.
21. Anderson, Stanford, and Eladio Dieste. Eladio Dieste: Innovation in Structural Art. New York: Princeton Architectural, 2004.