

NIRMA University
Institute of Architecture and Planning
Bachelor of Architecture
Semester-II

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Course Code	2AR265
Course Title	Structures - II

Course Learning Outcomes (CLO):

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

- Explain structural behavior of materials.
- Built about basic structural systems
- Make use of load mechanism in structural systems

Syllabus: 15 weeks (3 hours/week)

Total Teaching hours: 45 Hr

Unit No.	Syllabus: Topic	Sub Topic	Teaching hours:
1	Methods of categorization of structural system	<ul style="list-style-type: none"> • Structure types • Solid - wall, arch, vault etc. • Surface - Grid, plates, shells, stressed skin • Skeleton - truss and frameworks • Membrane - Cable/membrane tents, cable nets, pneumatics • Hybrids - Tension-assisted structures 	18 hours
2	Mechanical properties of structural material	<ul style="list-style-type: none"> • strength, stiffness, shape • Tensile, compressive, shear, torsion, bending • dead load, imposed load, thermal load, Dynamic load 	15 hours
3	Structural systems based on mechanism of transfer of load	<ul style="list-style-type: none"> • Strut, tie, beam, slab/plate, panel • Vertical, Horizontal, Rational • settlement and earthquake behavior • Tensile, compressive, shear, torsion, bending 	12 hours

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. Kara, Hanif. Design Engineering: AKT Adams Kara Taylor. Barcelona: Actar, 2008.
5. Biggs, John M., Introduction to Structural Dynamics, New Delhi, McGraw Hill Education India Pvt Ltd, 2014
6. Onouye, Barry S., Statics And Strength Of Materials For Architecture And Building Construction, Chennai, Pearson India Education Services Pvt Ltd., 2015
7. Charleson, Andrew., Structure as architecture : Source book for architects and structural engineers, London, Taylor & Francis, 2015
8. Parikh, Janak, Understanding Concept of Structural Analysis and Design, Anand, Charotar Publishing House, 2000
9. Seward, Derek, Understanding structures: analysis materials design, London, Palgrave, 2014
10. Schodek, Daniel L. Structures. Englewood Cliffs, NJ: Prentice-Hall, 1980. Print.
11. Salvadori, Mario. Structure in Architecture. Englewood Cliffs, NJ: Prentice-Hall, 1963. Print.
12. Corkill, P. A., H. L. Puderbaugh, and H. K. Sawyers. Structure and Architectural Design. Iowa City: Sernoll, 1974. Print.

13. Deplazes, and Söffker. *Constructing Architecture: Materials, Processes, Structures*. Basel: Birkhäuser Verlag, 2013. Print.
14. Muttoni, A. *The Art of Structures: Introduction to the Functioning of Structures in Architecture*. Abingdon, Oxford, UK: EPFL/Routledge, 2011. Print.
15. Sandaker, Bjørn Normann, and Arne Petter. Eggen. *The Structural Basis of Architecture*. New York: Whitney Library of Design, 1992. Print.
16. Cowan, Henry J. *Architectural Structures: An Introduction to Structural Mechanics*. New York: Elsevier, 1976. Print.
17. 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.
18. Salvadori, Mario, and Robert A. Heller. *Structure in Architecture: The Building of Buildings*. Englewood Cliffs, NJ: Prentice-Hall, 1975. Print.
19. 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.
20. Anderson, Stanford, and Eladio Dieste. *Eladio Dieste: Innovation in Structural Art*. New York: Princeton Architectural, 2004. Print.