BCE-502	Structural Engineering	2L:1T:0P	3 credits

Pre-requisites: A broad specialization of civil engineering, structural engineering is all about analyzing, planning, designing and overlooking the construction of large structures.

Course Objectives:

CO1	To impart the principles of elastic structural analysis and behaviour of indeterminate structures.
CO2	To impart knowledge about various methods involved in the analysis of indeterminate structures.
CO3	To apply these methods for analyzing the indeterminate structures to evaluate the response of structures
CO4	To enable the student get a feeling of how real-life structures behave.

Module 1

Introduction- Classification of Structures, stress resultants, degrees of freedom per node, static and Kinematic determinacy. Classification of Pin jointed determinate trusses, analysis of determinate plane and space trusses (compound and complex)..

Planning and Design Process; Materials, Loads, and Design Safety; Behavior and Properties of Concrete and Steel; Wind and Earthquake Loads.

Module 2:

Materials and Structural Design Criteria:Analysis of fixed beams, Continuous beams and simple frames with and without translation of joint, , Slope-Deflection method, Moment Distribution method, Strain Energy method.

Module 3:

Strain Energy of deformable systems, Maxwell's reciprocal & Betti's theorem, Castigliano's first theorem, unit load & Conjugate beam methods.

Analysis of Arches, Linear arch, Eddy's theorem, three hinged parabolic arch, spandrel braced arch, moving load & influence lines. Analysis of cables with concentrated and continuous loadings, Basics of two and three hinged stiffening girders.

Course Outcomes: After the completion of the course the student will be able to:

CO1	Student will be able to analyze Fixed and continuous beams.
CO2	Student will be able to analyze moving loads and will be able to draw influence line diagrams for simply supported beams.
CO3	Student will also be able to analyze columns.

CO4	Student will also be able to analyze three hinge arches and three hinge suspension bridges.
CO5	Students are able to do the analysis of beam by using advance method of analysis.
CO6	Students are able to do analysis of portal frame.

Text/Reference Books:

1. Nilson, A. H. Design of Concrete Structures. 13th edition. McGraw Hill,2004
2. McCormac, J.C., Nelson, J.K. Jr., Structural Steel Design. 3rd edition. PrenticeHall,N.J.,2003.
3. Galambos, T.V., Lin, F.J., Johnston, B.G., Basic Steel Design with LRFD, PrenticeHall,1996
4. Segui, W. T., LRFD Steel Design, 2nd Ed., PWS Publishing,Boston.
5. Salmon, C.G. and Johnson, J.E., Steel Structures: Design and Behavior, 3rd Edition,Harper & Row, Publishers, New York,1990.
6. MacGregor, J. G., Reinforced Concrete: Mechanics and Design, 3rd Edition, PrenticeHall, New Jersey,1997.
7. Nawy, E. G., Reinforced Concrete: A Fundamental Approach, 5th Edition, PrenticeHall, NewJersey.
8. Wang C-K. and Salmon, C. G., Reinforced Concrete Design, 6th Edition, AddisonWesley, NewYork.
9. Nawy, E. G. Prestressed Concrete: A Fundamental Approach, Prentice Hall, NJ,(2003).
10. Related Codes of Practice ofBIS
11. Smith, J. C., Structural Analysis, Harpor and Row, Publishers, NewYork.

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