

4th Semester	RAG4D002	Strength of Materials and Structures	L-T-P 3-0-0	3 CREDITS
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MODULE- I (09 hrs)

Design of Steel Structures - Loads and use of BIS codes; rivet connections, specifications, use of code; Welded connections, specifications, use of code; design of structural steel members in tension – identification of tension members in a structure – specifications for maximum stresses- use of code for design; design of structural steel members in compression - identification of tension members in a structure – specifications for maximum stresses- use of code for design; design of structural steel members in bending - identification of tension members in a structure – specifications for maximum stresses- use of code for design; design of steel roof truss – analysis of roof truss – structural components of a roof truss- design of compression member and tension member – use of BIS code

MODULE- II (09 hrs)

Design of Reinforced Cement Concrete (RCC) - Loads and use of BIS codes; analysis and design of singly reinforced sections - under reinforced and over reinforced concrete – significance of design – use of BIS code for RCC; design of doubly reinforced sections – significance of doubly reinforced section – use of BIS code for the design; design for shear, bond and torsion – significance – calculation of stresses – use of BIS code; design of flanged beams – significance - use of BIS code for the design; design of slabs – one way and two way slabs - significance - use of BIS code for the design; design of columns – short and slender columns - use of BIS code for the design; design of foundations – shallow and deep foundations – design of isolated footing - use of BIS code for the design; design of retaining walls – load analysis – reinforcement arrangement - use of BIS code; design of silos – load analysis – reinforcement arrangement

MODULE- III (09 hrs)

Slope and deflection of Beam - Introduction to strength of materials, slope and deflection of beam using integration techniques, moment area theorems, conjugate beam method, problems of slope and deflection; Structures - Columns and Struts - Theory of columns and struts, problems of column and struts, Steel Connections - Analysis of rivet connections and welded connections, problems on connections, Masonry Dam - Stability analysis and problems on masonry dam
Statically Indeterminate beams - Analysis of continuous beams using superimposition and three moment equation, Moment Distribution- Analysis of beam using moment distribution method and solving problems

MODULE- IV (09 hrs)

Grain Storage Structures - Grain storage, moisture and temperature change in grain bins; Traditional storage structures and their improvement; Improved storage structures (CAP, hermitage storage, Pusa bin, RCC ring bin); Design consideration for grain storage go-down, bag storage structure; Shallow and deep bins, calculation of pressure in bins; Storage of seeds; Estimate of domestic power requirement; Sources of power supply, electrification; Electrification for rural housing

MODULE- V (09 hrs)

Farmstead Planning - Farmstead planning and lay out; Scope, importance and need for environmental control; Physiological reaction of livestock, environmental control, systems and design; Control of temperature, humidity and air ventilation

Animal Housing and Sanitation & Farm Structures - BIS standards for dairy, piggery and other farm structures; Design, construction and cost estimation of farm structures, animal shelters, compost pit, fodder silo; Farm fencing, implement shed, barn for cows, buffalo, poultry; Rural housing and development; Rural roads and types of roads in the farm; Construction methods, repair and maintenance of rural roads

Book:

1. Ray Choudhury K P. Engineering Materials, Oxford and IBH Pub. Co. New Delhi.
2. Rangwala S C. Engineering Materials, Charotar Pub. House, Anand-1, Gujrat.
3. Ahuja T D and Birdi G S. Fundamentals of Building Construction, Dhanpat Rai and Sons,
4. Ramamrutham S and Narayanan R. Design of Reinforced Concrete Structures, Dhanpat Rai Pub. Co (P) Ltd., New Delhi.
5. Sushil Kumar .Treasure of R.C.C Designs, Standard Book House, New Delhi-6
6. Khanna P N. Indian Practical Civil Engineer's HandBook, Engineers Publications, New Delhi
7. Khurmi R S. Strength of Materials, S.Chand & Company, New Delhi.
8. Ramamrutham S and Narayanan R. Strength of Materials, Dhanpat Rai Pub. Co. (P) Ltd,
9. Vazirani V N, Ratawani M M and Duggal S K. Analysis of Structures, Khanna Publishers, New Delhi – 6.
10. Leheri R S and Leheri R S. Strength of Materials, S.K.Kataria & Sons, New Delhi. Pandey, P.H. Principles and practices of Agricultural Structures and Environmental Control, Kalyani Publishers, Ludhiana
11. Ojha, T.P. and Michael, A.M. Principles of Agricultural Engineering, Vol.1, Jain Brothers, Karol Bag, New Delhi
12. Nathanson, J.A. Basic Environmental Technology, Prentice Hall of India, New Delhi
13. Garg, S.K. Water Supply Engineering, Khanna Publishers, New Delhi
14. Dutta, B.N. Estimating and Costing in Civil Engineering, Dutta & Co, Lucknow
15. Sahay, K.M. and Singh, K.K. Unit Operations of Agricultural Processing, Vikas pub.pvt. Ltd, Noida
16. Banerjee, G.C. A Text Book of Animal Husbandry, Oxford IBH Pub. Co., New Delhi