



### Fire protection, Services and Maintenance Management for Building Civil Engineering

**Instructor Name:** Prof. B. Bhattacharjee

**Institute:** IIT Delhi

**Department:** Civil Engineering

**Course Intro:** : The objectives of this course is to expose the students to the concepts functional design of building for thermal aspects and energy efficiency; especially in tropical climates i.e. in Indian context. Further objective is to make the student capable of performing fenestration design for natural ventilation and daylighting & design of space for external and internal noise control.

**Pre Requisites:** : BE/BSc. Level Physics & Mathematics

**Core/Elective:** : Core\_Elective

**UG/PG:** : Both

**Industry Support** : All Industry involved in Building design and construction. L&T, TERI etc. CPWD and all other PWDs. Dr. Fixit Institute

**Reference** : 1. Bureau of Indian Standards, " HAND BOOK OF FUNCTIONAL REQUIREMENTS OF BUILDINGS, (SP-41 & SP- 32)", BIS 1987 and 1989. 2. Markus,T.A. & Morris, E.N., "BUILDING CLIMATE AND ENERGY" Pitman publishing limited. 1980. 3.Croome,J.D.&Roberts,B.M., "AIRCONDITIONING AND VENTILATION OF BUILDINGS VOL-1".Pergamon press. 4.Building Services Design - T.W.MEVER 5.Building Engineering & System Design - F.S.MERRIT & J. AMBROSE 6.SP-35 (1987): Handbook of Water supply & drainage-BIS 7.N.B.C.-2007 BIS 8.Concept of building fire safety - D.EGAN. 9.Design of fire resisting structures - H.L. MALHOTRA. List of reference materials/books/210. An introduction to fire dynamics -D.DRYSDALE 11. Structural fire protection Edt by T.T.LIE 12. Elevator technology - G.C.BARNEY 13. HEATING VENTILATING AND AIR CONDITIONING Analysis and Design - Faye C. McQuiston and Jerald D. Parker. 14.Building Maintenance Management-R.LEE 15.Developments In Building Maintenance -I.EJ. GIBSON 16.ConcreteStructures:materials,Maintenance And Repair D.CAMPBELL,ALLEN & H.ROPER

**About Instructor:** B.Bhattacharjee, B.Tech(IIT KGP:1978), M.Tech. (IIT D:1982) and Ph.D. (IITD:1990) Field Experience: M/s Gammon India Limited:1978-80. Professor Bishwajit Bhattacharjee is working with the Department of Civil Engineering, Indian Institute of Technology Delhi, New Delhi (India). His research interests pertain to the domains of building science, sustainable construction, concrete technology, and health monitoring of structures etc. His publications in these areas are well cited. He is also a recipient of the Indian Concrete Institute's Life Time Achievement Award. He has been teaching a similar course in IITD for last 31 years (Building Science[3-0-0])



### COURSE PLAN

SL.NO	Week	Module Name
1	1	Fire Protection: Process of combustion in fire, Effect of fire load & ventilation condition on enclosure fire, growth and decay of fire in enclosure
2	2	Concepts of fire resistant and severity, Effect of fire on materials. Simple Design of elements for given fire resistance.
3	3	Planning, Fire detection & suppression systems, Smoke venting
4	4	Lifts & Vertical Transportation: arrangement of lifts and Design for optimum service condition.
5	5	Building Services as a system, Capacity of storage and sizing, control system etc. & intelligent building.
6	6	HVAC System: Design Consideration. Basic psychometrics, Air conditioning process & system. Methods of Air Conditioning.
7	7	Water Supply, Hydraulic design, Storage Distribution, Component of cold & hot water supply system.
8	8	Waste water & Drainage systems: Fixture units & Design of system and elements of electrical services.
9	9	Definition, Role of building maintenance in construction process Maintenance generators, Expression of Standards, selection of level of maintenance and fixing standards.
10	10	Planned maintenance: Planning vis-a-vis adhoc maintenance, schedule & contingency maintenance, levels of planning, planned inspection, etc
11	11	Maintenance cycle, maintenance profile, repair & replacement models, statistical methods, decision models, optimal renewal cycle, budgeting etc
12	12	Effect of design on maintenance, Diagnosis, appraisal, structural defects & various methods of repair