

## Course syllabus

Department of Civil Engineering, Indian Institute of Technology Madras

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### CE5110 – Building Services

**Credit Distribution:** C:9 L:3 T:0 P:0 E:0 O:6 TH:0

**Course Type:** Theory

**Description:** Building services constitute 30 to 50% of the total construction cost in multistorey buildings and occupy around 10 to 15% of the space. This course deals with a host multidisciplinary services design issues like Plumbing, HVAC, lighting, electrical distribution, vertical transportation systems, safety, and security services.

**Course Content:** Plumbing Services: Design of pipe sizing in Multistorey Buildings for cold and hot water supply, sewage disposal, and storm water drainage. Design of underground and overhead storage tanks. HVAC: Climate classification; Types of comfort classifications; Climate conscious design features; Design of fenestration for Natural ventilation; Mechanical ventilation; Passive heating and low energy cooling alternatives; Heating and cooling load estimation Lighting: Quality and quantity of lighting requirements; Design of fenestration for Natural lighting in Industrial and non-industrial buildings; Artificial lighting design; Electrical cable sizing. Vertical Transportation: Design of elevator systems, Express and local elevators, Double deck elevators, Escalators, moving walks and moving ramps; Elevator lobby area requirements. Safety and security services: Fire safety- Active and passive systems; Security systems design: CCTV, Access control and intruder protection systems; Lightning protection systems.

#### Textbooks

- Frank Dagostino and Joseph B. Wujek. Mechanical and Electrical Systems in Architecture, Engineering and Construction, Printice Hall., 5th Edition, 2010
- Walter T. Grondzik, and Alison G. Kwok. Mechanical and Electrical Equipment for Buildings, John Wiley & Sons, Inc., 12<sup>th</sup> Edition, 2015.
- IS SP35 [S&T] - 1987 Handbook on water supply and drainage [with special emphasis on plumbing]
- IS SP41 [S&T]-1987 Handbook on functional requirements of buildings [other than industrial buildings]
- IS SP32 [S&T]-1986 Handbook on functional requirements of industrial buildings [lighting and ventilation]

#### Reference Books:

- IS SP7-2005 National building code of India
- IS SP30-1990 National electrical code

**Prerequisite:** NIL