COURSE TITLE : FIRE, SAFETY AND SECURITY IN BUILDING
COURSE CODE : 5006
COURSE CATEGORY : E
PERIODS/WEEK : 4
PERIODS/SEMESTER : 72
CREDITS : 4

TIME SCHEDULE

MODULE	TOPIC	PERIODS
I	BASIC FIRE ENGINEERING	18
II	FIRE SAFETY IN BUILDINGS	18
III	SAFETY IN CONSTRUCTION	18
IV	SECURITY SYSTEMS	18
	TOTAL	**72**

OBJECTIVES

Upon completing subject, the students should be able to

MODULE I

1.1.0 Understand the definition of terms
1.1.1 Understand the use and maintenance of fire Service Equipments
1.1.2 Understand the Effect of temperature on the properties of structural materials
1.1.3 Know the spread of fire, coefficient of fire resistance and fire duration.
1.2.0 Understand the importance of fire detection
1.2.1 Understand the different types of Fire Extinguishers
1.2.2 Appreciate the items used in first aid fire protection

MODULE II

2.1.0 Understand the importance of fire separation between buildings.
2.1.1 Understand different types of Fire doors,
2.1.2 Assess the fire damage to building parts
2.1.3 Evaluate the reparability of fire damaged structures.
2.1.4 Identify the General fire safety requirements.
2.1.5 Understand the Fire alarm systems
2.2.1 Understand General exit requirements as per NBC
2.2.2 Selection and distribution of portable fire protection equipments and systems for different occupancy classification as per NBC

MODULE III

3.1.0 Realises the safety issues in construction
3.1.1 Understand Roles of various groups in ensuring safety in construction
3.1.2 Understand the Relevance of ergonomics in construction safety
3.1.3 Understand the National Building Code Provisions on construction safety
3.2.0 Discuss the legal aspects of safety
3.2.1 Define the Contract Labour Act and Central Rules
3.2.2 Define the Workmen's Compensation Act

3.2.3 Define the ESI Act and Rules-
3.3.0 Understand the first aid and emergency procedures
3.3.1 Understand the sequence of action on arrival at scene
3.3.2 Understand the respiratory system
3.3.3 Understand the circulatory system
3.3.4 Identify the injuries causing
3.3.5 Understand the types of Personal protective equipments

MODULE IV
4.1.0 Identify the security systems required
4.1.1 Understand the different types of security systems
4.1.2 Identify the security system required for a building

COURSE CONTENT

MODULE –I
BASIC FIRE ENGINEERING
Introduction- temperature, heat, specific heat, flash point, fire point, ignition, combustion, explosion. Classification of fire based on material. Spread of flames in solids and liquids, Use of fire Service Equipments-Hydrants and stand pipes, Introduction to fire fighting vehicles and appliances, safety devices
Effect of temperature on the properties of structural materials- concrete, steel, masonry and wood; Behavior of non-structural materials on fire- plastics, glass, textile fibers and other house hold materials; Spread of fire in rooms, within building and between buildings. coefficient of fire resistance, fire duration; Fire detection- Basic concept of fire fighting with water, carbon dioxide, powders, foams, inert gases halons; Description- different types of portable fire extinguishers water type, foam type, dry powder type, CO2 type, vaporizing liquid type;
First aid fire protection – fire bucket, sand bucket, fire blanket, fire pails & water barrels, hosereels;

MODULE –II
FIRE SAFETY IN BUILDINGS
Fire separation between buildings- safe distance. fire resistant walls and ceilings; Fire resistant screens- Fire doors- Low combustible, Non combustible and Spark-proof doors; suspension of doors. Reparability of fire damaged structures- Assessment of fire severity, Assessment of damage to concrete, steel, masonry and timber structures, Repair methods to reinforced concrete Columns, beams and slabs, steel structural members, and masonry. General fire safety requirements applicable to all individual occupancies. Fire alarm system- classification of alarm system as per NBC- manually operated system-automatic alarm system;
General exit requirements as per NBC; Internal staircases; Pressurisation of stair staircases; horizontal exits; fire tower; ramps; fire lifts; external fire escape ladders;. Selection and distribution of portable extinguishers and other fire protection equipments and systems for different occupancy classification as per NBC; Fire safety audits - Risk assessment -Fire insurance. Fire Investigation

MODULE –III

SAFETY IN CONSTRUCTION

Safety issues in construction - Human factors in construction safety management. Roles of various groups in ensuring safety in construction. Framing Contract conditions on safety. Relevance of ergonomics in construction safety. Indian Standards on construction safety- National Building Code Provisions on construction safety. Training of Building workers, General Safety, Purpose of lighting. Advantages of good illumination.
Safety audit, MSDS, On-site & Off-site Emergency Plan, Giving safety information to public.

LEGAL ASPECTS OF SAFETY - Contract Labour Act and Central Rules: Definitions, Registration of Establishments, Licensing of Contractors. Factories Act– Definitions, Preliminary, Inspecting staff, Safety, Welfare, Working hours of adults. Workmen's Compensation Act – Definitions. ESI Act and Rules-Applicability to Construction. Public Liability Insurance Act and Rules- Definitions,

FIRST AID AND EMERGENCY PROCEDURES - Aims and Objectives. Role of the first aider-sequence of action on arrival at scene. Vital signs-breathing -pulse. The respiratory system-respiratory failure. The circulatory system-heart attack-chest compression. Shock -causes - signs and symptoms - Eye injuries. Classification-types of wounds-The skin. Burns. Casualty handling. Personal protection in the working environment, Types of Personal protective equipments

MODULE –IV

SECURITY SYSTEMS – purpose – uses – Different types
Access Control Machine- Metal Detector - Attendance Recorder-Time Attendance System-Finger print Identification Systems. Customized Payroll Software/Visitor Management System. Home Security System -Video Door Phone, - Door Security Device- Electronic Security System, Security Alarm Systems. CCTV Security Camera - Dome Camera, Hidden Spy Camera, Night Vision Camera, Wireless IP Camera, Digital Video Recording System. Building Automation System

REFERENCE BOOKS

1. Gupta R.S., " *A Hand Book of Fire Technology*",
2. Jain V.K., " *Fire Safety in Buildings*", New Age International (P) Ltd., New Delhi, 1996
3. Roytman M. Ya., "*Principles of Fire Safety Standards for Building Construction*", Amerind
Publishing Co. Pvt. Ltd., New Delhi, 1975
4 BIS, "*IS-12777- Fire safety-flame-spread of products- Method for classification*, Bureau of Indian
Standards, New Delhi, 1989.
5. BIS, "*IS 3614 (Part-1&2) – Specification of fire check doors-part 1&2:* Bureau of Indian Standards, New Delhi, 1966.
6.Hubert Walker, " *Preventive maintenance/Apparatus*" ,
7. Marchant E.W., "*A Complete Guide to Fire and Building*",
8. National Building Code of India
9. Relevant Indian Standards published by BIS
10 *First aid text book* : American National Red Cross