POST DIPLOMA IN FIRE & SAFETY ENGINEERING TECHNIQUES

SYLLABUS

COURSE CODE:FSC001

COURSE NAME: POST DIPLOMA IN FIRE & SAFETY ENGINEERING TECHNIQUES

COURSE DURATION: ONE YEAR

SL	SUBJECT CODE	SUBJECT
1	FSC001-01	ACCIDENT PERVENTION & RISK MANAGEMENT
2	FSC001-02	FIRE HYDRAULICS & FIRE LOSS CONTROL
3	FSC001-03	SAFETY IN ELECTRICAL SYSTEMS
4	FSC001-04	OCCUPATIONAL HEALTH & SAFETY
5	FSC001-05	FIRE PERVENTION & CONTROL
6	FSC001-06	PRACTICAL - I
7	FSC001-07	PRACTICAL - II
8	FSC001-08	PRACTICAL - III
9	FSC001-09	PRACTICAL - IV
10	FSC001-10	PRACTICAL - V

ACCIDENT PERVENTION & RISK MANAGEMENT

Unit 1

Risk assessment – Risk Assessment method – Hazard – Hazard symbols – Hazard Analysis – Hazard Ranking – Risk Management – Definitions – Functions of Risk Management – Safety Management – Need concept – Terms Related with safety Management – safety officer – supervisor – safety committees- Role of Trade union – Role of Trade union – Role of workers – safety and the law

Unit 2

Disaster Management – Natural disaster- Cyclone – Tremor – storm – tropical cyclone – flood– Earthquake–landslide and avalanches – Nuclear and radiation accident – bio logical hazards.

FIRE HYDRAULICS & FIRE LOSS CONTROL

Fire Hydraulics and Water Supply

Course Description

Provides a foundation of theoretical knowledge in order to understand the principles of the use of water in fire protection and to apply hydraulic principles to analyze and to solve water supply problems.

Course Competencies

1. Apply the application of mathematics and physics to the movement of water in fire suppression activities.

2. Identify the design principles of fire service pumping apparatus.

3. Analyze community fire flow demand criteria.

4. Demonstrate, through problem solving, a thorough understanding of the principles of forces that affect water, both at rest and in motion.

5. List and describe the various types of water distribution systems.

6. Discuss the various types of fire pumps.

Topical Outline

I. Water as an extinguishing agent

a. Physical properties

b. Terms and definitions

II. Math review

a. Fractions

b. Ratios, proportions, and percentages

c. Powers and roots

III. Water at rest

a. Basic principles of hydrostatics

i. Pressure and force

ii. Six principles of fluid pressure

iii. Pressure as a function of height and density

iv. Atmospheric pressure

IV. Water in motion

a. Basic principles of hydrokinetics

b. Measuring devices for measuring flow

c. Relationship of discharge velocity, orifice size, and flow i. Water distribution systems

d. Water sources

e. Public & private water distribution systems

f. Friction loss in piping systems

g. Fire hydrants and flow testing

V. Fire pumps

a. Pump theory

b. Pump classifications

c. Priming systems

d. Pump capacity

e. Pump gauges and control devices

f. Testing fire pumps

VI. Fire streams

a. Calculating fire flow requirements

b. Effective horizontal and vertical reach

c. Appliances for nozzles

d. Performance of smooth-bore and combination nozzles

e. Hand-held lines

f. Master streams

g. Nozzle pressures and reaction

h. Water hammer and cavitations

VII. Friction loss

a. Factors affecting friction loss

b. Maximum efficient flow in fire hose

c. Calculating friction loss in fire hose

d. Friction loss in appliances

e. Reducing friction loss

VIII. Engine pressures

IX. Standpipe and sprinkler systems

a. Standpipe systems

i. Classifications

ii. Components

iii. Supplying sprinkler systems

b. Sprinkler systems

i. Classifications

ii. Components

iii. Supplying sprinkler systems

SAFETY IN ELECTRICAL SYSTEMS

UNIT I	INDIAN ELECTRICITY RULES AND ACTS AND THEIRSIGNIFICANCE	9
Objective and scope – ground clearances and section clearances – standards on electrical safety - safe limits of current, voltage – earthing of system neutral – Rules regarding first aid and fire fighting facility.		
UNIT II	ELECTRICAL SAFETY IN RESIDENTIAL,COMMERCIAL AND AGRICULTURAL INSTALLATIONS	9
Wiring and fitting – Domestic appliances – water tap giving shock – shock from wet wall – fan firing shock – multi-storied building – Temporary installations – Agricultural pump installation – Do's and Don'ts for safety in the use of domestic electrical appliances.		
UNIT III	SAFETY DURING INSTALLATION, TESTING AND COMMISSIONING, OPERATION AND MAINTENANCE	9
Preliminary preparations – safe sequence – risk of plant and equipment – safety documentation – field quality and safety - personal protective equipment – safety clearance notice – safety precautions – safeguards for operators – safety		
UNIT IV	ELECTRICAL SAFETY IN HAZARDOUS AREAS	9
Hazardous zones – class 0,1 and 2 – spark, flashovers and corona discharge and functional requirements – Specifications of electrical plants, equipments for hazardous locations – Classification of equipment enclosure for various hazardous gases and vapours – classification of equipment/enclosure for hazardous locations.		
UNIT V	ELECTRICAL SAFETY IN DISTRIBUTION SYSTEM	9
Total quality control and management – Importance of high load factor – Disadvantages oflow power factor – Causes of low P.F. – power factor improvement – equipments – Importance of P.F. improvement.		

TOTAL: 45 PERIODS

OCCUPATIONAL HEALTH & SAFETY

Module 1

Occupational Hazard and Control Principles: Safety, History and development, National Safety Policy. Occupational safety and Health Act (OSHA), Occupational Health and Safety administration-Laws governing OSHA and right to know. Accident-causation, investigation, investigation plan, Methods of acquiring accident facts, Supervisory role in accident investigation.

Module 2

Ergonomics at Work Place: Ergonomics Task analysis, Preventing Ergonomic Hazards, Work space Envelops, Visual Ergonomics, Ergonomic Standards, Ergonomic Programs. Hazard cognition and Analysis, Human Error Analysis-Fault Tree Analysis-Emergency Response-Decision for action-purpose and considerations.

Module 3

Health Considerations at Work Place: types of diseases and their spread, Health Emergency. Personal Protective Equipment (PPE)-types and advantages, effects of exposure and treatment for engineering industries, municipal solid waste. Environment management plans (EMP) for safety and sustainability.

Module 4

Occupational Health and Safety Considerations: Water and wastewater treatment plants, Handling of chemical and safety measures in water and wastewater treatment plants and labs, Construction material manufacturing industries like cement plants, RMC Plants, precast plants and construction sites. Policies, roles and responsibilities of workers, managers and supervisors.

FIRE PERVENTION & CONTROL

Unit-I

History of fires, types of detecting devices and extinguishing agents and systems, construction techniques, and fire investigation

Unit-II

Classification of fire, different fire extinguishing methods, Portable fire extinguishers, Pumps and primers, Foam and foam making equipments. Hose and hose fittings, Water relay systems, types of detecting devices and extinguishing agents.

Unit-III

Breathing apparatus, Small gears, Fire protective clothing, Ladders, Ropes and lines, bends & hitches, Fire prevention, Special appliances, Fire fighting codes and standards, Electrical fire hazards, Structures under fire.

Unit-IV

Safety of People in the event of Fire, Recognition of possible fire sources and emergency procedures in the event of a fire,

Unit- V

Devising procedures in the event of fire, How people perceive and react to fire danger, The measures needed to overcome behavioral problems and to ensure the safe evacuation of people in the event of fire, Assisting disabled people to escape.