

Subject Code: 1ET0010101	Subject Name: Fire Prevention & Control
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Unit I : Fire Prevention and Protection

Sources of ignition fire triangle – principles of fire extinguishing –active and passive fire protection systems – various classes of fires – A, B, C, D, E – types of fire extinguishers – fire stoppers – hydrant pipes –hoses –monitors –fire watchers –layout of stand pipes –fire station

Unit II : Fire Detection System and Accessories

Addressable & Non Addressable systems – Communication devices - Fire alarms and sirens – maintenance of fire trucks – foam generators – escape from fire rescue operations –fire drills –first aid for burns. Hose, Types of hose and its Characteristics, Frictional loss, Material used, Causes and prevention of mildew, shock & rubber acid - Care and maintenance, Types of hose fittings, Couplings, Component parts of inter locking couplings, Suction coupling wrenches, Branches, nozzles and branch holders.

Unit III : Industrial Fire Protection Systems

Sprinkler – hydrants – standpipes – special fire suppression systems like deluge and emulsifier, selection criteria of the above installations, reliability, maintenance, evaluation and standards – alarm and detection systems, Other suppression systems –CO₂ system, foam system, Dry Chemical Powder (DCP) system, halon system –need for halon replacement –smoke venting. Portable extinguishers –flammable liquids –tank farms – indices of inflammability-fire fighting systems.

Unit IV : Explosion Protecting Systems

Principles of explosion - detonation and blast waves - explosion parameters – Explosion Protection, Containment, Flame Arrestors, isolation, suppression, venting, explosion relief of large enclosure - explosion venting - inert gases, plant for generation of inert gas- rupture disc in process vessels and lines explosion, suppression system based on carbon dioxide (CO₂) and halons- hazards in LPG, ammonia (NH₃), sulphur dioxide (SO₂), chlorine (Cl₂) etc

Unit V : Hydraulic System

Pumps, primers, tenders and water relay, Introduction, definition, Different types of pumps, Different types of primers, Working principle of various pumps primers, Maintenance and trouble shooting, Testing of pumps, Advantages and disadvantages, Water relay system, Open circuit system, Closed circuit system.

Subject Code: 1ET0010102	Subject Name: Fire Hydraulic & Loss Control
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Unit I : Physics of Fire

History of fire service - Basic physics - Units – Measurement system - Force, resultant force - Laws of force - Laws of motion - Mass and weight, work, power, energy Law of conservation of energy - Mechanics – rest and motion - Distance and displacement -Speed and velocity

Unit II : Chemistry of Fire

Fire properties of solid, liquid and gases -fire spread -toxicity of products of combustion -theory of combustion and explosion –vapor clouds –flash fire –jet fires –pool fires – unconfined vapor cloud explosion, shock waves -auto-ignition –boiling liquid expanding vapor explosion.

Unit III : Characteristics of Fire

Energy changes - Effects of heat on matter - Combustion - Temperature - Specific heat capacity - Catalyst – Neutralization – Sublimation - Heat of decomposing - Chemical reaction - Exothermic reaction and endothermic reaction - Transmission of heat - Flash and fire point - Ignition temperature - Flammables and combustible chemicals - Spontaneous combustion - Triangle of combustion - Tetrahedron fire - Spread of fire.

Unit IV : Regulations for Safety and Environment

Factories act and rules - Indian explosive act - Gas cylinder rules - SMPV Act - Indian petroleum act and rules. Environmental pollution act - Overview of OHSAS 18000 and ISO 14000

Unit V : Case Studies

Flixborough - Mexico disaster - Pasedena Texas - Piper Alpha - Peterborough - Bombay Victoria dock ship explosion – Bhopal Gas Tragedy.

Subject Code: 1ET0010103	Subject Name: Safety in Electrical System
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Unit 1 : FIRST AID

Definition, benefits of first aid, Dressing, tool kit, types of dressing,

Unit 2 : SMALL AND SPECIAL GEARS

Classification of small gears, Cutting tools, Rescue tools, Lighting tools, Transport gears, Turning over tools, Miscellaneous tools, detail description of small gears, uses of gears, ceiling hook, rolling spreader, persuader

Unit 3 : ELECTRICITY

Types of electricity, reasons of short circuit, prevention of electricity, how to use electrical equipments, how to provide electricity, what is resistance: unit, Factors affect on resistance, Conductors, insulator, semi conductors, static electricity,

Unit 4 : FIREALARM & DETECTION SYATEM

Types of detector, smock detector, heat detector, fire alarm penal, electronic heater, fire detector & alarm system,

List of Experiments

1. PPE (Personal Protective Equipment) & their Application.
 - Safety Helmet
 - Safety Goggles & Face Protection
 - Safety Shoes
 - Mask
 - Hand Protection
 - Ear Plug & Ear Muff
 - Safety Harness
 2. Hands on operation of Fire Safety Equipment
 - Fire Detector & Alarm System
 - Fire Suit
 - Fire Extinguishers & Its types
 3. Study of Principle and working of Instruments Used In Industrial Safety
 - Lux Meter
 - Noise Level Meter
 - Dust Sampler
 4. Self Contained Breathing Apparatus (SCBA)
 5. Safety Inspection and Audit
 6. Tool Box Talk
 7. Mock drill
 8. Hazard Identification and Risk Assessment
 9. Safety Training
 10. Accident/ Incident/ Near miss Investigation, analysis and reporting
- Project report