

Diploma in Fire Technology & Safety Management (DFTSM)

Eligibility – 12th Duration -1 Year

Subjects:

Sr	Subject Name	Subject Code	Theory	Practical
1	Safety Management	DFTSM -01	80	20
2	Fire Protection System & Design	DFTSM-02	80	20
3	Industrial Safety	DFTSM-03	80	20
4	Fire Engineering Science	DFTSM-04	80	20
5	Fire Fighting Drills	DFTSM-05	80	20
6	Fire Technology	DFTSM-06	80	20
7	Practical & Viva	DFTSM-07	80	20

Detailed Syllabus

1	Safety Management	DFTSM -01	36 Hrs
---	-------------------	-----------	--------

Unit I (08 Hours)

Key elements of a safety and Health Management System- Policy & commitment, Planning, Implementation and Operation, Measuring Performance, Auditing and Reviewing performance Initial Safety and health Management System Review, Safety and health Management System model, safety and Health policy- Developing a workplace Safety and Health Policy , Planning – safety and Health objectives and Targets, performance standards, Implementation and Operation – structure and responsibilities- management responsibilities, individual responsibilities, Safety Consultation.

Unit II (10 Hours)

Participation and Representation, Training , Awareness and competence, Communication- Information coming into the organization, Information Flow within the Organization, Information Flow from the Organization,; Document Control : Safety and Health Management System records: Operational Control – Workplace Precautions, Safety And Health training and Competence Training for Safety and Health; Identify Training Needs – Organizational Needs, job-related Needs, Individual Needs : Identify Training Objectives and Methods, Deliver Training , Evaluation and feedback, specialist Advice and Services – access to Specialist advice and services, relationships within the Organization , relationships Outside the organization , external specialist safety and safety support.

Unit III (08 Hours)

Risk assessment and control- the legal Basis for risk Assessment, key stages of Risk assessment and control- use trained Risk assessors, preparation and Inventory, Identify the hazards, assess the risk , identify Appropriate Action , Risk assessment records and control . A simple Risk estimation example – Hazards, remedial measures, Motivation of employees, Insurance coverage of Industrial plant & personnel.

Unit IV**(10 Hours)**

Stages in plant life and unsafe condition in factories, maintenance & safety, basics safety programming, safety department, Rules and regulation of safety department, Responsibility of management for safety in plant, safe guarding the public, Responsibility of government, social organization and public authorities. Safety activities of the ILO (International Labour Organization)

2	Fire Protection System & Design	DFTSM-02	42 Hrs
----------	--	-----------------	---------------

Unit I**(12 Hours)**

Fire extinguishing appliances. Selection, requirements, installation and maintenance of hand appliances. Mechanically driven fire engines and trailer pumps. Hydrant system, pumps, Fuel System, Fixed monitors, Hose pipes and Nozzles, Maintenance of pumps, Hydrants hose pipes and nozzles. Sprinkler system, installation of sprinkler system, piping and fittings. Pressure gauges, Installation of control valves, Maintenance of sprinkler installation, Fire protection requirements for buildings and riser system. Classification of buildings based on occupancy. Fire protection, static water storage tanks. Preparation of plans, Signs and symbols used in the drawing, Drawing instruments and their uses

Unit II**(08 Hours)**

Fire alarm Systems, Automatic fire detection, Principles of automatic fire detection, Types of system, definition of detector, Classification of detector, Success or failure operation, Fire Products, smoke detectors, optical detector, Radiation detector, infra red detector, ultra violet detector, heat detector, advantages and disadvantages of detector

Unit III**(10 Hours)**

Linear heat detectors., Radio based systems. Automatic fire detection circuits. Theory of open circuit and closed circuit, Detector and alarm circuits. Wiring and power supplies. Control and indicating equipment, general, Zones, Power supplies, Faults, Developments, Monitoring the system, Maintenance, Visual display, Examples of control and indicating equipment, Event location message, Remote manned centre. Detector positioning Manually operated fire alarms. Block diagram of a fire alarm systems. Case studies (examples of fire hazard in India)

Unit IV**(12 Hours)**

Practical: Hydrant fire drills, study operation, Maintenance, Visit to sprinkler fitted buildings/houses. Study of Fire Protection plan and drawings Emergency Evacuation mock drills, Periodically showing the method of operation by dismantling and assembling, smoke detector and sprinkler, Practical explanation by showing circuit and Fire alarm, Site Visit to visualize the installation of Fire extinguishing appliances in multi storied buildings, hotels etc..

3	Industrial Safety	DFTSM-03	30 Hrs
----------	--------------------------	-----------------	---------------

Unit-I (06 Hours)

Basics of industrial safety, various types of industries, Understanding the types of safety systems and equipments, Safety policy and safety terminology

Unit-II (10 Hours)

The Work permit systems, Job safety analysis, Hazop study, Fault tree analysis

Unit-III (06 Hours)

Emergency planning, Safety inventory systems, Safety inventory card, Safety survey, Occupational health hazards, Safety organization and duties of a safety officer

Unit-IV (08 Hours)

Accident prevention methods, Safety committee, Accident investigation, Safety management systems, Laws related to safety (Factories ACT 1948 Explosive ACT, Electricity ACT etc.)

4	Fire Engineering Science	DFTSM-04	38 Hrs
----------	---------------------------------	-----------------	---------------

Unit I (10 Hours)

History of fire service, Basic physics, Units, Guidelines for writing the units, 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, Acceleration, retardation, Acceleration due to gravity, Newton laws of motion, Machines and engines, Efficiency, Friction loss.

Unit II (10 Hours)

Basic Chemistry and physics of fire, Atomic structure, Elements, compounds, Pure substance and mixture, Physical and chemical changes, Condition for the changes, 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 III (08 Hours)

Fixed fire fighting installations using water, Hydrant or fire water system, Classification of hydrant system, Sprinkling system, Major foam pourer system, Steam drenching system, Emulsification, Special fires and fire fighting, Air craft fire, Ships fire

Unit IV (10 Hours)

Classification of fire, General Causes of fire, Detection of fire, Extinguishing methods, First aid fire fighting equipments, Fire bucket, Fire beater, hose reel hose, Portable extinguisher, depends on weight, depends on operating method, depends on content, Depends on position of nozzle, Construction, Operation, Maintenance, Refilling

5	Fire Fighting Drills	DFTSM-05	45 Hrs
----------	-----------------------------	-----------------	---------------

Unit I (03 Hours)

Drill I : Water CO2 Extinguisher Drill 9L · Drill II :Chemical Foam Extinguishing 9 L · Drill III :Mechanical Foam Extinguisher 9L · Drill IV :Stored Pressure Water Extinguisher 9 L · Drill V :Dry Chemical Powder 5 Kg · Drill VI :Dry Chemical Powder 10 Kg · Drill VII : ABC Extinguisher 5 Kg/ 10 Kg · Drill VIII : CO2 Extinguisher 4.5 Kg

Unit II (10 Hours)

Drill I : Hose pick up Drill · Drill – II : Hose Running Drill with one hose · Drill – III : Hose Running with two hose · Drill – IV : Hose Running with Three hose

Unit III (12 Hours)

Hydrant Drill I : Opening of single line of three hoses. · Hydrant Drill II : Change of burst hose · Hydrant Drill III : Increase one length hose · Hydrant Drill IV : Decrease one length hose · Hydrant Drill V : Use of Collecting, breaching · Hydrant Drill VI : Disconnect collecting breaching · Hydrant Drill VII : Use of Dividing Breaching · Hydrant Drill VIII : Disconnect of Dividing Breaching Techniques to Handle various branches.

Unit IV (10 Hours)

Drill I : Pitching of ladder · Drill II : Climbing the ladder · Drill III : Use leg Lock · Drill IV : Ladder Drill with Fireman Lift · Drill V : L2 Drill Familiarization and Demonstration of Parts of BA Set. Drill I : Donning, running and Rescue of casualty through tunnel

Unit V (10 Hours)

Information and study First Aid Box · Stretcher Drill · Fireman Lift Drill · Use Bandage · Standard drills on Ambulance, Techniques of CPR, Fireman lift, CPR drill, Choking, Shaffer's Method, Rescue drill, Mouth to Mouth Respiration.

6	Fire Technology	DFTSM-06	38 Hrs
----------	------------------------	-----------------	---------------

Unit I (10 Hours)

Fire, change of state and latent heat, thermal expansion of solids, liquids and gases. Transmission of heat, combustion, Fire tetrahedron, and combustible solid, liquids and gases. Classification of Fire and different fire extinguishing methods, portable fire extinguishers, types and operating procedure. Fundamental Principles of Hydraulics, Atmospheres pressure and suction lift, use of Nozzle discharges. Advantages and disadvantages of Centrifugal pumps. Types of pumps and primers. Operation of pumps and primers, Types of ladders and trolleys. Pitching and climbing hints

Unit II (08 Hours)

Maintenance of ladders and trolleys. Design of turntable ladders, water tender and special equipment. Types of water relay system. Arrangements of water relay system. Capacity of hoses, ropes, lines and knots. Hose reel and hose fittings. Types and construction and maintenance of hoses. Hose drying

cabinets. Repairing of hoses. Hose fittings, Branches and nozzles. Collecting head, Suction hose fittings and stand pipe. Branches, Adaptors. Miscellaneous hose fitting, Hose clamp

Unit III

(10 Hours)

Strainers and maintenance of hose fitting. Foam and foam making equipments, Synthetic based foam concentrates, Foam concentration and induction and ignition equipments. Pressure control valve. Fire protective clothing, technical description and specifications of protective clothing. Breathing apparatus, types of breathing apparatus, care and maintenance of breathing apparatus. Life line signals , small gears and hand tools, conventional tools, non conventional tools, non powered equipments. Maintenance of small gears.

Unit IV

(10 Hours)

Conducting wet and dry drills using various Nozzles, Identification Rehearsals of Portable extinguishers, Filling of DCP powder in Portable Extinguisher and wearing Protective clothing, Mock drills, Positioning of ladder and Demonstration of Ropes and lines, Laying out and Rolling of fire hoses, Priming of water from fire tenders using suction hose, static tank Hydrant fire drills, Site visit.

7	Practical & Viva	DFTSM-07	30 Hrs
----------	-----------------------------	-----------------	---------------