

DETAILED CURRICULA

Advanced Diploma in Fire Safety Management

1st SEMESTER

Theoretical Papers

FSM – 101: Basics of Fire Science

		Marks	Hours	
			Th	Tu
		100	50	10
Group A	Chemistry of Fire			
	Definition of Fire; Fire Triangle; Tetrahedron of Fire; Essential Prerequisites of Fire; Basic Elements of Fire and Their Properties.			
Group B	Physics of Fire			
	Kinetic and Potential Energy; Speed; Velocity; Acceleration; Force; Pressure; Momentum; Transmission of Heat; Gas Laws.			
Group C	Fire Science			
	Classification of Fire; Spread of Fire; Source of Ignition; Methods of Extinguishing Fire; Fire Load; Chemical Reaction – Influencing Factors.			
Group D	Products of Combustion			
	Combustion; Special Kinds of Combustion; Combustion Toxicology – Harmful Effect on Human Life; Factors Involved in Combustion. Flame; Smoke; Heat; Toxic Gases.			

FSM – 102: Fire Risk in Hazardous Elements

		Marks	Hours	
			Th	Tu
		100	50	10
Group A	Fire Risk in Explosives, Plastics & Rubbers, Radioactive Materials			
	Explosives: Types of Explosives; Fire Safe Guards; Explosion Protection; Deflagration Venting. Plastics & Rubbers: Types of Plastics; Effects of Heat and Fire on Plastic; Combustibility of Plastic; Types of Rubbers & Behaviour in Fire Situations; Fire Protection of Plastics and Rubbers. Radioactive Materials: Radioactive Elements & Radioactive Hazards; Radioactive Emissions; Biological Effects; Radiation Doses.			
Group B	Fire Risk in Flammable Liquids and Gases & Dust			
	Flammable Liquids: Names, Physical Properties; Classification of Flammable & Combustible Liquids; Burning Characteristics of Flammable Liquids with Rate of Burning; Hazard Classification of Flammable Liquids; Extinguishing Media and			

	<p>Methods of Application.</p> <p>Flammable Gases: Names, Vapour Density, Occurrence & Preparation, Colour & Smell, Combustible Properties; Classification of Gases by Chemical Properties, Physical Properties, Uses.</p> <p>Combustible Dusts: Types, Safety Precautions, Explosion Protection, Deflagration Venting, Safe Guards; Classification of Dusts - Influencing Factors.</p>		
Group C	Electricity and Fire Risks		
	Common causes of electrical fire and its remedial measures, electrical hazards including static electricity, electrocution and protective measures. Electrical safety and use of electrical equipment in hazardous area.		
Group D	Aircraft & Ship Fire		
	<p>Aircraft Fire and Rescue: fire hazards in Aircraft, Rescue and firefighting, Resource of Fighting Fire in Air Ports. Different types of Aircrafts, Air craft firefighting and rescue procedures, Hangers; types, fire protection and firefighting.</p> <p>Ship Fires: fire protection, fire fighting & rescue from ship. Dock Fires, Fire protection of jetty.</p>		

FSM – 103: Fire Fighting Agents & Appliances

		Marks	Hours	
			Th	Tu
		100	50	10
Group A	Fire Fighting Agents			
	<p>Water: Physical Properties, Extinguishing Properties.</p> <p>Foam: Categories of Foam, Contributory Factors.</p> <p>Carbon Dioxide: Properties, Extinguishing Mechanism.</p> <p>Dry Chemical Powder: Types, Physical Properties, Uses and Restrictions.</p> <p>Halon Alternative: Physical Properties, Application & Limitations.</p>			
Group B	Fire Fighting Equipments			
	<p>Portable Fire Extinguisher: Importance, Types of Extinguishers; Methods of Operation of Different Types of Extinguishers.</p> <p>Fire Tender: Various types of Fire Tenders.</p>			
Group C	Fire Service Equipments – Pumps, Hoses, Ladders, etc.			
	Pumps and Primers, Hose and Hose Fittings: Classification, Types, Working Principle, Methods of Operation.			

	Ladders, Ropes & Lines, Foam Making Equipment, Small Gears: Different Types of Ladders Used in Fire Services, Operational Use.		
Group D	Personal Protective Equipments		
	Breathing Apparatus: Elementary Physiology and Respiration; Compressed Air Breathing Apparatus, Working Principle and Wearing Sequences, Fire Safety Suits & Fire Protective Clothings.		

FSM – 104: Fundamentals of Fire Protection & Control Technology

		Marks	Hours	
			Th	Tu
		100	50	10
Group A	Hydraulics and Water Relay			
	Relationship Between Fluid Pressure and Water Head; Nozzle Discharges, Flow through Orifices; Types of Water Relay with Practical Consideration.			
Group B	Fire Hydrant System and Sprinkler System			
	Fixed Fire Protection System: Classifications; Fire Pumps; Hydrant System; Wet Riser; Dry Riser; Down Comer, etc. Automatic Sprinkler System: Thermal Response of Sprinkler; Fire Control Capability, Fire Suppression; Types of Sprinkler Head & Deflector Design; Water Supplies; Operating Principle of Sprinkler; Different Types of Sprinkler; Design Criteria of Sprinkler System; Hazard Classification.			
Group C	HV & MV Water Spray and Foam System			
	HV, MV, Water Mist & Foam Fire Suppression System: Performance Objectives and Area of Operation of the System; Principles of System; Spray Characteristics.			
Group D	Fire Detection & Alarm System			
	Necessity of the System and Other Considerations; Basic Electrical Circuits for Fire Detection and alarm System; Types and Categories of the Detector. Automatic/Manual Fire Detection and Alarm System; Public Address System with Talk Back. Generation of Fire Detection Alarm System. Conventional System, Analogue System and Intelligent System.			

FSM – 105: Fire Safety in Buildings

		Marks	Hours	
			Th	Tu
		100	50	10
Group A	Building Studies			
	Practical Building Mechanics: Different Kinds of Load in Building.			

	Properties of Building Material: Bricks; Timber; Concrete; Metal; Glass; Plastic; Building Boards. Elements of Structure: Column and Beam; Wall; Floor, Roof, Ceiling; Internal Staircases; External Staircases; Spiral & Protected Staircases; Fire Tower; Pressurisation of Staircases and Lift Lobby/Well.		
Group B	Smoke Movement in Building		
	Smoke Venting System; Smoke Control System; Smoke Zone Areas; Smoke Production & Control; Smoke Movement in Building.		
Group C	Heating, Ventilation & Air Conditioning System		
	Heating & Ventilation: Types of Heating and Ventilation System; Purpose of the System; Factors Influencing Effective Ventilation. Air Conditioning System: Types of System; System Characteristics; Equipment Location.		
Group D	Fire Safety Requirements		
	Fire Safety Requirement in Underground Structure: Problems and Difficulties; Essential Constructional Features and Compartmentation. Fire Safety Requirement in Building under Construction: General Risks and Hazards; Common Causes of Fire.		

FSM – 106: Fundamentals of Industrial Safety

		Marks	Hours	
			Th	Tu
		100	50	10
Group A	Safety Hazards			
	Safety hazards & Risk, Major hazards in industry – electrical, chemical, fire, material handling, working at height, confined space etc. Occupational Risk assessment (HIRA) & how to do this assessment, Risk mitigation - 4 T principals & its applicability			
Group B	Safety Incidents			
	Safety incidents – accidents, near miss, medical injury, LTI, Reportable incidents, Analysis of accidents – RCA & Fish bone Diagram, Loss causation model, Accident pyramid (Iceberg model), Hierarchy of accident control			
Group C	Personal Protective Equipments			
	PPE & GPE, Different types of PPE to protect head, hand, foot, Ear, Eye, arrest from fall etc; Use & maintenance of PPE, LOTO practices-different types of LOTO & its use.			
Group D	Behaviour Based Safety			
	Behaviour Based Safety (BBS); Improvement of safety culture by BBS; Implementation of BBS practices in industry; Commuting safety – different best practices in Road Safety; Legal aspects of Safety, Safety			

	policy & commitment, Safety objectives & Targets.		
--	---	--	--

Sessional Papers**FSM – 107: Practical/Field Training**

		Marks	Hours
		200	100
	<ol style="list-style-type: none"> 1. Laying of Hose & Hose Fitting Drill: Demonstration of the application of hoses, hose fittings and explaining the characteristics of firefighting agents. Pick up and laying of delivery hose. 2. Fire Extinguisher Drill: Identification of fire extinguishers, testing and maintenance. Demonstration of the application of different types of extinguishers. 3. Fire Hydrant Drill. Demonstrate operation and testing of hydrant. 4. Fire Detection & Alarm System: Demonstration of the automatic fire detection cum alarm system, fixed firefighting installations and communication systems. 5. Ladder Drill - climbing, leg locking, alarm holding, testing, etc 6. Pump drill (6 Men & 4 Men). Demonstrate operation and testing of pump system. Wet pump drill using Different Firefighting equipments. 7. Wearing and Working with Breathing Apparatus. Demonstration of the use of PPE, its care and maintenance. Execute MFR and Demonstrate elementary treatment at incidental spot. 8. Small Gears and Rescue Gears Drill: Demonstration of the use of small and special gears used in firefighting viz. cutting tools, pulley blocks, lifting, lighting and rescue tools etc. 9. Checking Testing of Fire Pumps, Life Safety Equipments, Small Gears, Ladders. Demonstration of BA set – wearing, testing etc. Demonstration of Ropes & Lines, Knots & hitches. 10. Care & Maintenance of the Equipments 		

FSM – 108: Dissertation (would be conducted concurrently throughout the Semester)

Marks	Hours
200	250

Basic Study on Different Types of Establishments for understanding of Fire and Industrial Safety Measures including Preparation of Dissertation Paper of Any One of the Following:

1. Highrise Residential Building.

2. Business Building.
3. Shopping Mall/Departmental Store/Mixed Occupancy.
4. Starred Hotel.
5. Hospital/Nursing Home.
6. Educational Building.
7. Warehouse.
8. Fire Station.
9. Others.