

**MNPE-09425068494**

**In Collaboration with**

**Karnataka State Open  
University**

**Manasagangotri, Mysore-6**

**Syllabus**

**Certificate in Fire & Safety Management**

**[www.maanarmadaedu.org](http://www.maanarmadaedu.org)**

## Certificate in Fire & Safety Management Program Structure (Face to Face)

**ELIGIBILITY** - 10th Class pass under 10+2 system.

**COURSE PERIOD:** Six Months

**TOTAL MARKS:** 500

**TOTAL SEMESTER:** 1

### SEMESTER I

SUBJECT TITLE	SUBJECT CODE	MARKS		
		Theory	Practical	Total
FUNDAMENTALS OF FIRE ENGINEERING SCIENCE	CFS-101	50	50	100
FIRE CONTROL TECHNOLOGY	CFS-102	50	50	100
PRINCIPLES OF INDUSTRIAL SAFETY AND ACCIDENT PREVENTION	CFS-103	50	50	100
RISK MANAGEMENT AND HAZARD CONTROL SYSTEM	CFS-104	50	50	100
PRACTICAL	CFS-105		100	100

SEMESTER I		
CODE	COURSE TITLE	CREDITS
CFS-101	FUNDAMENTALS OF FIRE ENGINEERING SCIENCE	4
CFS-102	FIRE CONTROL TECHNOLOGY	4
CFS-103	PRINCIPLES OF INDUSTRIAL SAFETY AND ACCIDENT PREVENTION	4
DFS-104	RISK MANAGEMENT AND HAZARD CONTROL SYSTEM	4
DFS-105	PRACTICAL	2
<b>TOTAL CREDIT</b>		<b>18</b>

# DETAILED SYLLABUS

## SEMESTER I

### CFS 101: FUNDAMENTALS FIRE ENGINEERING SCIENCE

Total Credit : 4

#### Block 1

##### Unit 1

- History of fire service
- Basic physics
- Units

##### Unit 2

- Guidelines for writing the units
- Force, resultant force
- Laws of force
- Laws of motion

##### Unit 3

- Mass and weight, work, power, energy
- Law of conservation of energy

##### Unit 4

- Mechanics – rest and motion
- Distance and displacement
- Speed and velocity

#### Block 2

##### Unit 1

- Acceleration, retardation
- Acceleration due to gravity
- Newton laws of motion

##### Unit 2

- Machines and engines
- Efficiency
- Friction

##### Unit 3

- **Basic Chemistry and physics of fire**
- Atomic structure
- Elements, compounds

##### Unit 4

- Pure substance and mixture
- Physical and chemical changes
- Condition for the changes

### **Block 3**

#### Unit 1

- Energy changes
- Effects of heat on matter
- Combustion
- Temperature
- Specific heat capacity

#### Unit 2

- Catalyst
- Neutralization
- Sublimation
- Heat of decomposing
- Chemical reaction
- Exothermic reaction and endothermic reaction

#### Unit 3

- Transmission of heat
- Flash and fire point
- Ignition temperature
- Flammables and combustible chemicals

#### Unit 4

- Spontaneous combustion
- Triangle of combustion
- Tetrahedron fire
- Spread of fire

### **Block 4**

#### Unit 1

- Classification of fire
- General Causes of fire
- Detection of fire
- Extinguishing methods
- First aid fire fighting equipments

#### Unit 2

- 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

### Unit 3

- 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 4

- Fixed fire fighting installations not using water
- Complete CO2 flooding system
- Complete DCP spraying system
- Complete Halon flooding system
- Investigation of fire
- Point, Time and cause of ignition
- Arson and detection of fires

## **CFS 102: FIRE CONTROL TECHNOLOGY**

**Total Credit : 4**

### **Block 1**

#### Unit 1

- Hose
- Types of hose
- Characteristic
- Frictional lose
- Material used
- Cause and prevention of mildew

#### Unit 2

- Causes and prevention of shock
- Causes and prevention of 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 3

- Foam making branches
- Nozzles
- Collecting head and suction hose fittings

#### Unit 4

- Breechings
- Adapters
- Maintenance of hose fittings

### **Block 2**

#### Unit 1

- Fire alarm
- Introduction of Electronics and Electricity:-
- Semi conductor Physics
- Circuit Control And Protective Devices

#### Unit 2

- Transistors
- Principles of fire detectors
- Parts of fire alarm unit
- Control panel

#### Unit 3

- Type of detectors
- Automatic fire detection
- Classification of detector
- Control and indicating equipment

#### Unit 4

- Trouble shooting and maintenance
- Intruder alarms

### **Block 3**

#### Unit 1

- **Rope, Lines, knots and ladders**
- Introduction
- Manufacturing materials
- Types of ropes and size

#### Unit 2

- Cordage
- Causes of deterioration of ropes and lines
- Different type of knots
- Different type of lines

### Unit 3

- Purpose of knots
- Ladders
- Introduction
- Hook ladder, escape ladder, turn table and extension ladder
- Hook ladder belts

### Unit 4

- SCBA and foam making equipments
- Introduction
- Physiology of respiration

## **Block 4**

### Unit 1

- Effects of respiration
- Essential fetchers of BA set
- Description and technical details
- Care and maintenance various BA sets

### Unit 2

- Advantage and disadvantage of various BA set
- Foam & foam making equipments
- Definition
- Different type of foam concentrate

### Unit 3

- Storage
- Characteristics
- Foam branch and its type
- Mechanical foam generator
- Pumps, primers, tenders and water relays
- Introduction, definition
- Different types of pumps
- Different types of primers

### Unit 4

- 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
- Different type of tenders and Fire alarm system
- Operation and maintenance of various tenders
- Water, foam, Co<sub>2</sub>, DCP and emergency tenders

## **CFS 103: PRINCIPLES OF INDUSTRIAL SAFETY AND ACCIDENT PREVENTION**

**Total Credit : 4**

### **Block 1**

#### Unit 1

- Introduction to Safety
- Goals, Need, History of Safety.
- Importance of Industrial Safety

#### Unit 2

- Accident Causation
- Definition
- Case study

#### Unit 3

- Theories and principles of accident Causation
- The effect of accident,

#### Unit 4

- Unpredictable performance,
- Consequences of accident.
- Accident prevention programmes

### **Block 2**

#### Unit 1

- Cost analysis and Accident Prevention
- Direct accident,
- Indirect accident,

#### Unit 2

- Accident Prevention Methods
- Accident Investigation
- Accident Reporting

#### Unit 3

- Accident Investigation,
- Accident Investigation Report  
Promotion Role

#### Unit 4

- Pre- accident Strategy and Health Policy
- Safety Department
- Safety Committee and Function



### **Block 3**

#### Unit 1

- Housekeeping and Importance
- Advantages of good house keeping
- Post Accident strategy

#### Unit 2

- First Aid
- Fire fighting
- Accident Investigation.

#### Unit 3

- Role of government, Management, workers and trade unions
- promoting safety in industry

#### Unit 4

- First Aid
- Introduction
- Body structure and functions

### **Block 4**

#### Unit 1

- Position of causality
- The unconscious casualty
- Fracture and dislocation

#### Unit 2

- Injuries to muscles and joints
- Resuscitation
- Bleeding

#### Unit 3

- Management of shock
- Burns, scalds and accidents caused by electricity
- Rescue and transport of casualty

#### Unit 4

- Unsafe Act
- Unsafe condition,

## **CFS 104: RISK MANAGEMENT AND HAZARD CONTROL SYSTEM**

**Total Credit: 4**

### **Block 1**

#### Unit 1

- Hazards
- Definition
- Glossary of Terms

#### Unit 2

- Risk Management
- Hazards Control System
- System safety
- Job Hazard analysis

#### Unit 3

- Hazop
- Fault tree Analysis
- Failure mode and effect Analysis

#### Unit 4

- Physical and chemical properties of hazardous materials
- Introduction
- Major industrial hazards

### **Block 2**

#### Unit 1

- Types and consequences of major industrial hazard
- Effects on human body
- Precautions while fire fighting

#### Unit 2

- Stages of combustion
- Hazards of combustion
- Stability and inflammability

#### Unit 3

- BLEVE
- Fire extinguishment  
Flammable Solids, Liquids and Gas

#### Unit 4

- Petrochemicals and other hydrocarbons
- Tank fire – storage tank, trucks, service stations
- High pressure pipe lines

### **Block 3**

#### Unit 1

- Pressurized and liquefied gases
- Natural gas
- Petroleum gases
- Refrigerants etc.

#### Unit 2

- Acetylene
- Metals
- Non metals

#### Unit 3

- Other hazardous properties
- Harmful contamination of air and water
- Toxicity

#### Unit 4

- Corrosiveness
- Radioactive hazards
- Special precaution for handling

### **Block 4**

#### Unit 1

- Emergency preparedness
- Pesticides
- Explosion

#### Unit 2

- Deflagration and detonation of gas
- Dust explosion
- Confined and unconfined vapor cloud explosion

#### Unit 3

- Safety Management and legislation
- Functions of safety management

#### Unit 4

- Factories Act 1948 (chapter 3,4,5)
- Workmen compensation Act 1923 (objectives and coverage's)

1. Courseware to be provided by the institution
2. Reference books are enclosed in annexure 1

## **CFS 105: PRACTICAL**

**Total Credit: 2**

### **Block 1**

#### Unit 1

- Drills
- Squad drill
- Hose drill

#### Unit 2

- Knots and lines
- Hydrant drill

#### Unit 3

- MTU drill
- Ladder drill
- Picking up drill

#### Unit 4

- Practical training
- First Aid Fire Fighting Equipments

### **Block 2**

#### Unit 1

- Breathing apparatus
- Hydraulic pressure testing
- Industrial exposure training

#### Unit 2

- Practical training
- Personal Protective equipment
- Fire alarm

#### Unit 3

- First aid
- Smoke chamber/confined space
- Industrial exposure training

#### Unit 4

Safety Precautions

### **NOTE:**

- 1) Drills and practical training will continue through out the year according to unit wise.
- 2) Industrial exposure training may conducts at various industries and organizations.