GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

COMPETENCY BASED CURRICULUM

FIRE TECHNOLOGY AND INDUSTRIAL SAFETY MANAGEMENT

(Duration: One Year)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 3.5

SECTOR – SAFETY & SECURITY

Directorate General of Training

FIRE TECHNOLOGY AND INDUSTRIAL SAFETY MANAGEMENT

(Non-Engineering Trade)

(Revised in March 2023)

Version: 2.0

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL – 3.5

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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CONTENTS

1. COURSE INFORMATION

During the one-year duration of "Fire Technology and Industrial Safety Management" trade a candidate is trained on professional skill, professional knowledge and Employability skill related to job role. In addition to this a candidate is entrusted to undertake project work, extracurricular activities and industrial visit to build up confidence. The broad components covered under Professional Skill subject are as below:-

During the one-year duration trainee learns about the following:-

- Chemistry of Combustion- Triangle of fire, Fire tetrahedron, classification of fire, fire behavior, stages of fire, method of fire extinguishment and some important definitions like, flash point, fire point- ignition temperature, Auto-ignition temperature, flammability Range etc.
- Discipline: - introduction, importance of discipline, General principles of discipline, essentials for discipline and outward signs.
- Fire Extinguishers; - Types of fire extinguishers, method of operation and care & maintenance.
- Hose & hose fittings: types of hose-suction hose, delivery hose, and hose reel hoes, decay and prevention method of hosed, care & maintenance. Marking & repairing of hose, standard test of suction hose, types & construction of suction hose. Types of hose fittings and its use. Branches & nozzles, adapters, breaching, couplings, hose ramps, collecting heads and other miscellaneous tools and equipment.
- Hydrant & Fittings: - types of water supply, water distribution system, types of hydrants, hydrant gears, and equipment marking, testing care & maintenance & Operation.
- Pump &Primers:- classification of pump, why centrifugal pump is suitable for firefighting- types of primers, testing , fault finding, care and maintenance and standard test.
- Foam & Foam Making equipment: - water as an extinguishant -its merits and demerits, introduction to all types of foam concentrations, properties of foams and techniques of extinguishment by foam, types of foams, characteristics of good foam, foam making equipment, mechanical. High expansion and low expansion foam storage of foam compound. Foam compatibility with Dry chemical powder.
- Extension Ladder: - types of ladders, construction features of conventional ladders, operational use, elementary knowledge of TTL. & snorkel.
- Breathing Apparatus set: -introduction of types of BA Sets in use, working principles and care and maintenance.
- Anatomy of Fire: Definition of combustion, elements of combustion, production of combustion, heat of reaction a calorific value.

- Basic Physics:- Definition of matter and energy, physical properties of matter like density, vapour density, melting & boiling point latent heat, effects of density on behaviour of gases, basics of oxidizing and reducing agents Acids, Classification of flammable liquids, dust & explosion, liquid and gas fire, LPG.
- Small & Special gears: - Function & Construction of small gears, function & construction of -breaking in and cutting tools, Pulley blocks, function & construction-Lighting and rescue tools, operation of hydraulically operated, diesel operated and electrically operated tools, care & maintenance.
- Hydraulics
- Electricity
- First Aid & Resuscitation,
- Hazards & Risk
- Hydrocarbon & industrial fires & fire prevention.
- Accident Prevention
- Safety Concept
- Factory Act- 1948
- Health
- Safety
- Welfare
- Construction industry
- Lighting ventilation &work-related stress).
- Fixed firefighting equipment
- Fire Detection & suppression systems
- Rescue Procedures
- Ropes & Lines
- Rural Fire
- Water Relay
- Salvage
- Practical fireman ship
- Ventilation
- Watch room procedure & mobilizing
- Disaster management
- Prevention, Public education and Pre-incident planning
- Personal Protective Equipment
- Means of Escape
- Aircraft Fire and Rescue
- Ship & Dock Fires

- Building Construction
- Occupational hazards & dangerous chemicals
- Working at height, confined space
- Material handling
- Housekeeping and waste disposal
- Hazardous chemicals
- Safety in Engineering industries.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under the aegis of Directorate General of Training (DGT). Craftsman Training Scheme (CTS) with variants and Apprenticeship Training Scheme (ATS) are two pioneer schemes of DGT for strengthening vocational training.

'Fire Technology and Industrial Safety Management' trade under CTS is one of the popular courses delivered nationwide through network of ITIs. The course is of one-year duration. It mainly consists of Domain area and Core area. The Domain area (Trade Theory & Practical) imparts professional skills and knowledge, while Core area (Employability Skills) imparts requisite core skill & knowledge and life skills. After passing out the training programme, the trainee is being awarded National Trade Certificate (NTC) by DGT having worldwide recognition.

Candidates need broadly to demonstrate that they are able to:

- Read and interpret technical parameters/ documents, plan and organize work processes, identify necessary materials and tools;
- Perform task with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge & employability skills while performing jobs.
- Document the technical parameters related to the task undertaken.

2.2 PROGRESSION PATHWAYS

- Can join industry as Technician and will progress further as Senior Technician, Supervisor and can rise to the level of Manager.
- Can become Entrepreneur in the related field.
- Can join Apprenticeship programme in different types of industries leading to National Apprenticeship certificate (NAC).
- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming instructor in ITIs.
- Can join Advanced Diploma (Vocational) courses under DGT as applicable.

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of one year: -

S No.	Course Element	Notional Training Hours
1	Professional Skill (Trade Practical)	840
2	Professional Knowledge (Trade Theory)	240
3	Employability Skills	120
	Total	1200

Every year 150 hours of mandatory OJT (On the Job Training) at nearby industry, wherever not available then group project is mandatory.

On the Job Training (OJT)/ Group Project	150
Optional Courses (10th/ 12th class certificate along with ITI certification or add on short term courses)	240

Trainees of one-year or two-year trade can also opt for optional courses of up to 240 hours in each year for 10th/ 12th class certificate along with ITI certification, or, add on short term courses.

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of course through formative assessment and at the end of the training programme through summative assessment as notified by the DGT from time to time.

a) The **Continuous Assessment** (Internal) during the period of training will be done by **Formative Assessment Method** by testing for assessment criteria listed against learning outcomes. The training institute has to maintain an individual trainee portfolio as detailed in assessment guideline. The marks of internal assessment will be as per the formative assessment template provided on www.bharatskills.gov.in.

b) The final assessment will be in the form of summative assessment. The All India Trade Test for awarding NTC will be conducted by Controller of examinations, DGT as per the guidelines.

The pattern and marking structure are being notified by DGT from time to time. **The learning outcome and assessment criteria will be the basis for setting question papers for final assessment.** The examiner during final examination will also check the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

For the purposes of determining the overall result, weightage of 100% is applied for six months and one-year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking the assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising some of the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work
- Computer based multiple choice question examination
- Practical Examination

Evidences and records of internal (Formative) assessments are to be preserved until forthcoming examination for audit and verification by examining body. The following marking pattern to be adopted for formative assessment:

Performance Level	Evidence
(a) Marks in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices.	• Demonstration of good skills and accuracy in the field of work/ assignments. • A fairly good level of neatness and consistency to accomplish job activities. • Occasional support in completing the task/ job.
(b) Marks in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices.	• Good skill levels and accuracy in the field of work/ assignments. • A good level of neatness and consistency to accomplish job activities. • Little support in completing the task/job.
(c) Marks in the range of more than 90% to be allotted during assessment	
For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	• High skill levels and accuracy in the field of work/ assignments. • A high level of neatness and consistency to accomplish job activities. • Minimal or no support in completing the task/ job.

3. JOB ROLE

Fire Fighters, Other; Fire Fighters, other includes all other Fire Fighters engaged in extinguishing or controlling fire not elsewhere classified.

Fire Inspectors, Other; include all other associate professionals engaged in government, industrial and other enterprises, who inspect different structures to ensure compliance with central/state government laws and with approved plans, specifications and standards, or inspect fire prevention systems and investigate fire sites to determine cause of fire not elsewhere classified.

Reference NCO-2015:

(i) 3119.1000 – Fire Fighters
(ii) 5411.9900 – Fire Inspector

Reference NOS:

i. ELE/N9432
ii. MEP/N7301
iii. MEP/N7302
iv. MEP/N7303
v. MEP/N7304
vi. MEP/N7305
vii. MEP/N7306
viii. MEP/N7307
ix. MEP/N9403
x. MEP/N9411
xi. MEP/N9414
xii. MEP/N9402
xiii. MEP/N9404
xiv. MEP/N9412

4. GENERAL INFORMATION

Name of the Trade	**FIRE TECHNOLOGY AND INDUSTRIAL SAFETY MANAGEMENT**
NCO – 2015	3119.1000, 5411.9900
NSQF Level	Level 3.5
Nos Covered	ELE/N9432, MEP/N7301, MEP/N7302, MEP/N7303, MEP/N7304 MEP/N7305, MEP/N7306, MEP/N7307, MEP/N9403, MEP/N9411 MEP/N9414, MEP/N9402, MEP/N9404, MEP/N9412
Duration of Craftsmen Training	One Year (1200 Hours+150 hours OJT/Group Project)
Entry Qualification	Passed class 10th Class Examination **The minimum physical requirements:** **i) For Male** **Height: -** Minimum 165 cms (Relaxable by 5 cms in the case of Garhwals, Assamese Gorkha and member of the Schedule tribes). **Chest: -** Minimum 81 cms Unexpanded and 86 cms. with expansion (Fully expanded with minimum of 5 cms expansion) **Weight: -** Minimum 50 Kgs **ii) For Female** **Height: -** Minimum 157 cms (Relaxable by 2.5 cms in the case of Garhwals, Assamese Gorkha and member of the Schedule tribes). **Weight: -** Minimum 46 Kgs ***Note: -*** *A registered MBBS doctor must certify that the candidate is medically fit to undertake the course.*
Minimum Age	14 years as on first day of academic session.
Eligibility for PwD	LD
Unit Strength (No. of Student)	24 (There is no separate provision of supernumerary seats)
Space Norms	1000 Sq. m (for practical Training area)
Power Norms	2 KW
Instructors Qualification for:	
(i) Fire Technology and Industrial Safety Management Trade	B.Voc/Degree in Fire & Safety Engineering/Fire Science from AICTE/UGC recognized university/ college with one-year experience in the relevant field. **OR**

	Advanced/Post Graduate Diploma (Minimum 2 years) in Industrial Safety Engineering/ Fire and Industrial Safety Engineering / Health, Safety & Environment or relevant Advanced Diploma (Vocational) from DGT from recognized board of education with two year' experience in the relevant filed. **OR** Defense/Paramilitary forces Officer JCOs/NCOs with 10 years of experience in the relevant field. **OR** Sub officer course/STO/DO course from NFSC, Nagpur (only) with 5 years' experience in the relevant field **OR** NTC/NAC passed in the trade of "Fire Technology and Industrial Safety Management" with three years' experience in the relevant field. **Essential Qualification:** Relevant Regular / RPL variants of National Craft Instructor Certificate (NCIC) under DGT **Note:- Out of two Instructors required for the unit of 2 (1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications. However, both of them must possess NCIC in any of its variants.**
(ii) Employability Skill	MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' experience with short term ToT Course in Employability Skills. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above) **OR** Existing Social Studies Instructors in ITIs with short term ToT Course in Employability Skills
(iii) Minimum Age for Instructor	21 Years
List of Tools and Equipment	As per Annexure – I

5. LEARNING OUTCOME

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

5.1 LEARNING OUTCOMES

1. Identify and select suitable chemicals (industr4ial, inflammable liquid) usable on the workplace following safety precautions. (NOS: MEP/N7306)
2. Identify, select and execute the application of different types of extinguishers, hoses and hose fittings. (NOS: MEP/N7302, MEP/N7303)
3. Select and prepare the hydrant and pump system for proper application. (NOS: MEP/N7301, MEP/N7303)
4. Plan and execute the concept of hydraulics in workplace. (NOS: ELE/N9432)
5. Select and categorize electrical hazard and risk and its mitigation. (NOS: MEP/N9402)
6. Identify and select methods of using ladder in practical field. (NOS: MEP/N9412)
7. Select the BA set and its application in appropriate place. (NOS: MEP/N9404)
8. Identify and use small and special gears. (NOS: MEP/N7305)
9. Plan and execute elementary treatment at any incidental spot. (NOS: MEP/N7304)
10. Utilize knots and hitches in different special job and fire. (NOS: MEP/N7305)
11. Plan and execute to uplift various gears with proper techniques, carry out Hazard and Risk evaluation selecting the proper method of rescue and F.F. (NOS: MEP/N7304)
12. Analyze the concept of accident caused and prevention, accident investigation, analysis and safety management. (NOS: MEP/N7306)
13. Select and apply provisions related to safety, health and welfare in respect of Factory Act, 1948. (NOS: MEP/N7306)
14. Assess available resources and their proper use. (NOS: MEP/N7301)
15. Interpret appropriate techniques of CPR. (NOS: MEP/N7304)
16. Identify the importance of lighting, ventilation, work related stress and its measurement. (NOS: MEP/N7306, MEP/N7307)
17. Plan and execute fixed firefighting installations for their effective utilization. (NOS: MEP/N7303, MEP/N7305)
18. Select and use PPE, demonstrate its care and maintenance. (NOS: MEP/N7304, MEP/N7303)
19. Select Automatic Fire Detection cum Alarm System to plan their effective utilization. (NOS: MEP/N7303,MEP/N7305)
20. Plan and execute fire station administration. (NOS: MEP/N7305)

21. Identify communication system in different organization and their scope of use. (NOS: MEP/N7307)
22. Get accustomed with different fire situations and firefighting using extinguishers. (NOS: MEP/N7302)
23. Plan and execute disaster response practices, IRS/JRT and salvage technique. (NOS: MEP/N7303)
24. Select and apply correct rescue method. (NOS: MEP/N7304)
25. Categorize building construction that can ensure fire and life safety.(NOS: MEP/N9414)
26. Plan and execute fire protection measures based on construction and occupancy. (NOS: MEP/N9414)
27. Plan and survey Airport and Aircraft, port and ship for rescue system and firefighting system on it. (NOS: MEP/N9403)
28. Identify occupational hazards associated with different dangerous chemicals, dust, gases, mist, vapours etc. to plan and execute rescue operations in these cases. (NOS: MEP/N7306)
29. Comply with safety precautions while working at height, confined place and work permit system. (NOS: MEP/N7304)
30. Identify the characteristics of various fire suppression agents including water and safety in manual and mechanical handling of materials. (NOS: MEP/N9411)
31. Demonstrate hazard evaluation and risk analysis exercise. (NOS: MEP/N7303)

6. ASSESSMENT CRITERIA

LEARNING OUTCOMES	ASSESSMENT CRITERIA
1. Identify and select suitable chemicals (industrial, inflammable liquid) usable on the workplace following safety precautions. (NOS : MEP/N7306)	Identify various types of acids in the trade.
	Identify the type of acids and their uses in the place.
	Select the suitable acids on the workplace.
	Analyze the effect of acids on the suitable jobs.
2. Identify, select and execute the application of different types of extinguishers, hoses and hose fittings. (NOS: MEP/N7302, MEP/N7303)	Identify of fire and types of extinguishers.
	Install the wall fitting and test it.
	Technique of fire extinction smoothing cooling and Starvation.
	Observe the safety/precaution during the operation Extinguisher.
	Identify type of suction and delivery hoses.
	Causes of hose decay & its prevention.
	Use of percolating & non-percolating hose.
	Identify of hose reel, causes of decay and its care & maintenance.
	Importance of hose reel hose in first aid firefighting in buildings and industries.
	Plan of work in compliance with standard tests of delivery hoses.
	Standard test of Suction hose.
	Identify the different groups of hose fitting.
	Measure of deep lift suction fittings.
	Type of Breechings and its uses.
	Identify the hose ramps, care and maintenance of hose fittings.
3. Select and prepare the hydrant and pump system for proper application. (NOS : MEP/N7301, MEP/N7303)	Knowledge of Hydrant and Water supplies.
	Identify the hydrant gear and equipment.
	Observe the making of hydrants and testing.
	Prepare the care and maintenance of operation.
	Identify the common type in use.
	Methods of priming.
	Select and testing fault finding.
	Working of centrifugal pump.
	Observe care and maintenance of pump.
4. Plan and execute the concept of hydraulics in workplace. (NOS: ELE/N9432)	Check the hydraulic system.
	Check the pressure.
	Calculate the water capacity of tank.
	Check the working of flow meter.

5. Select and categorize electrical hazard and risk and its mitigation. (NOS: MEP/N9402)	Identify common causes of electrical fire.
	Select remedial measures.
	Identify electrical hazards.
	Apply PPE.
	Follow the electrical document for safety.
6. Identify and select methods of using ladder in practical field. (NOS: MEP/N9412)	Select the appropriate ladder.
	Pitching of ladder.
	Pitching of ladder.
	Climbing the ladder.
	Use leg Lock.
7. Select the BA set and its application in appropriate place. (NOS: MEP/N9404)	Identify and operate B. A. set and relevant drill
	Donning & doffing of SCBA.
	SCBA Operation & Emergency Procedures.
	Inspection and Maintenance of SCBA.
8. Identify and use small and special gears. (NOS: MEP/N7305)	Identify, select and operate different small and special gears.
	Drill with different small and special gears.
10. Plan and execute elementary treatment at any incidental spot. (NOS: MEP/N7304)	Donning, running and Rescue of casualty through tunnel.
	Apply Sylvester's Method, Holgar Nielsen Method, Rocking Stretcher Method, Emerson Method
	Perform Mouth to Mouth Respiration.
10. Utilize knots and hitches in different special job and fire. (NOS: MEP/N7305)	Practical use of different knots and hitches in rescue & fire fighting
	Testing of different type of lines.
	Care and maintenance.
11. Plan and execute to uplift various gears with proper techniques, carry out Hazard and Risk evaluation selecting the proper method of rescue and F.F. (NOS: MEP/N7304)	Causes, Identification, Evaluation & Control of hazard and risk.
	Hauling up gears and combined drill.
12. Analyze the concept of accident caused and prevention, accident investigation, analysis and safety management.	Identify different industrial accidents.
	Prepare accident reports.
	Identify Methods Adopted for Reducing Accidents.
	Investigation and analysis of Accidents.
	Safety Slogans, Safety Precautions adopted in the Plant.

(NOS: MEP/N7306)	Apply Safety Management, Safety Policy, Safety Committee, Responsibility of Management, Safety Officers Duties & Responsibilities, Safety Targets, Objectives, Standards, Practices and Performances in workplace.
13. Select and apply provisions related to safety, health and welfare in respect of Factory Act, 1948. (NOS: MEP/N7306)	Select & apply provisions related to safety.
	Observation of provisions of the legislation applicable to different factories.
14. Assess available resources and their proper use. (NOS: MEP/N7301)	Practical Use of equipments like cutting tools.
	Lifting tools Maintenance of tools.
15. Interpret appropriate techniques of CPR. (NOS: MEP/N7304)	Identify techniques of CPR.
	Apply appropriate techniques of CPR.
	Identify and apply Methods for rescue without equipment.
16. Identify the importance of lighting, ventilation, work related stress and its measurement. (NOS: MEP/N7306, MEP/N7307)	Measurement of sound level
	Measurement of vibration of machine and equipments.
17. Plan and execute fixed firefighting installations for their effective utilization. (NOS: MEP/N7303, MEP/N7305)	Identify Sprinkler System and their care and maintenance and operational Procedure.
	Plan and execute fixed firefighting installation.
	Utilize fixed firefighting.
	Identify Elementary requirements of Drenchers, Rising Mains, Hose Reels and Down-comer, Fire pump control panel.
	Install Fixed Foam.
18. Select and use PPE, demonstrate its care and maintenance. (NOS: MEP/N7304, MEP/N7303)	Identify various Personal Protective Equipments.
	Select and use Respiratory and Non-respiratory Personal Protective Equipment, their Care & Maintenance.
	Observe standard and regulation related to PPE.
19. Select Automatic Fire Detection cum Alarm System to plan their	Identify various types of detectors.
	Select Automatic Fire Detection cum Alarm System as per need.
	Plan Automatic Fire Detection cum Alarm Systems effective

effective utilization. (NOS: MEP/N7303, MEP/N7305)	utilization.
20. Plan and execute fire station administration. (NOS: MEP/N7305)	Identify various important duties of a fire station.
	Drill with ladder and water tender.
	Foam Drill with FBI0X single delivery.
	Foam Drill with FB5X single delivery.
	Wet Drill with double delivery.
	Dry Drill with double delivery.
21. Identify communication system in different organization and their scope of use. (NOS: MEP/N7307)	Identify different communication required at various fire service departments.
	Identify, select and apply various lines, communication Equipment in Fire Service.
	Select & use Method of receiving report of emergencies.
	Identify and use Radio Communication and VHF.
	Practices Writing of Occurrence Book, Duty Card/ Register, Logbook, Hose Book, Stock Register and their maintenance.
	Apply fire affected room searching techniques.
22. Get accustomed with different fire situations and firefighting using extinguishers. (NOS: MEP/N7302)	Perform Live fire extinction using all kind of extinguisher.
	Identify Fire Hazards in rural areas and cause of fire.
	Identify, select and apply Method of Firefighting in rural areas.
	Identify Difficulties in dealing with Rural fires.
23. Plan and execute disaster response practices, IRS/JRT and salvage technique. (NOS: MEP/N7303)	Identify Natural and Man-made Disaster.
	Use various agencies, first responders, control of situation.
	Identify different types of disasters.
	Simulated Practices to control life and properties damages from natural disaster.
	Perform Water relay drill (All types).
	Identify and select Equipment for Salvage & working at Fires.
	Use salvage sheets &equipments and there care & maintenance.
	Identify, select and apply Methods of entry into building.
	Identify, select and apply Different searching methods to locate & rescue a trapped causality.
24. Select and apply correct rescue method. (NOS: MEP/N7304)	Observe safety Precautions when working in smoke laden buildings.
	Identify, select and apply various Emergency methods of rescue.
	Identify hazards associated with various rescue operations.

	Select & apply various rescue equipments.
25. Categorize building construction that can ensure fire and life safety. (NOS: MEP/N9414)	Familiarization at construction site.
	Identify building materials.
	Plan escapes routine.
	Practical training about Care and maintenance of sprinklers.
	Use of Automatic fire alarm system, fire exit drill.
26. Plan and execute fire protection measures based on construction and occupancy. (NOS: MEP/N9414)	Classification of building in the country.
	Identify Building materials and their behavior under fire conditions.
	Identify and apply various types of occupancies and firefighting techniques.
	Identify Important fire escapes with respect to there positioning.
27. Plan and survey Airport and Aircraft, port and ship for rescue system and firefighting system on it. (NOS: MEP/N9403)	Identify Different types of Aircrafts, Air craftfire fighting and rescue procedures.
	Identify types of emergencies and apply method of dealing with each emergency.
	Recognize ship fire protection and firefighting& rescue from ship.
28. Identify occupational hazards associated with different dangerous chemicals, dust, gases, mist, vapours etc. to plan and execute rescue operations in these cases. (NOS: MEP/N7306)	Identify HVAC system.
	Identify various equipments used in rescue of causality.
	Ladder Drill with Fireman Lift.
	Sewer Rescue drill.
	Stretcher drill.
	Identify Occupational Hazards & Dangerous Chemicals.
	Identify Dangerous Properties of Chemicals, Dust, Gases, Fumes, Mist, Vapours, Smoke and Aerosols.
29. Comply with safety precautions while working at height, confined place and work permit system. (NOS: MEP/N7304)	Perform High elevation drill.
	Perform Confined space rescue.
	Observe safety precaution related to Scaffolds, Ladders, and Work at height including Roof Work.
30. Identify the characteristics of various fire suppression agents including water and safety in manual and mechanical handling of materials. (NOS: MEP/N9411)	Identify the characteristics of various fire suppression agents including water.
	Perform Mechanical and Manual Material Handling.
	Observe Safety related to Mechanical and Manual Material Handling, Lifting Appliances, Transport / Earthmoving& Material Handling Equipments.

31. Demonstrate hazard evaluation and risk analysis exercise. (NOS: MEP/N7303)	Perform exercise on Hazard evaluation and risk.
	Use safety belt, helmets, gloves and goggles.
	Identify Transportation and handling of dangerous chemicals and explosives.

SYLLABUS FOR FIRE TECHNOLOGY & INDUSTRIAL SAFETY MANAGEMENT TRADE			
DURATION: ONE YEAR			
Duration	**Reference Learning Outcome**	**Professional Skills (Trade Practical) With Indicative Hours**	**Professional Knowledge (Trade Theory)**
Professional Skill 50 Hrs; Professional Knowledge 18 Hrs	Identify and select suitable chemicals (industrial, inflammable liquid) usable on the workplace following safety precautions.	1. Familiarization with the Institute, Documentation of Student, Issuance of Dress, Books, Hostel Accommodation (If required) and Store. 2. Importance of trade training, Equipments used in the trade, types of work done by the trainees in the trade. 3. Introduction to safety equipments and their uses. Introduction of first aid, Road safety, operation of Electrical mains. 4. Knowledge of General Safety, Occupational health and hygiene. 5. Demonstration of Various acids. 6. Demonstration of different water reactive substances. 7. Organic flammable liquids and commonly used industrial chemicals. 8. Alkalis & Gases.	**Discipline:** Introduction, Importance of Discipline, General Principles of discipline, essentials for discipline and outward Signs. Meaning & Definitions of Discipline **Basic Physics and Chemistry related to Fire** : Definition of Matter and energy, Physical properties of matter like Density, specific gravity, Relative density, Vapor density, Melting & Boiling point, flammable limits, latent heat, Effects of density on behavior of gases,, Basics of oxidizing and reducing agents, Acids. Flammable liquids- classification and types of tanks, Dust and Explosion, Liquid and Gas Fires, LPG. UCVE, BLEVE, Slope-over and Boil over, Gas laws,P-V-T relation for perfect gas. **Anatomy of Fire:** Definition of Combustion, Elements of Combustion, Products of Combustion, Heat of reaction and calorific value, Flash point, Fire point, Ignition temperature and spontaneous combustion. Fire Triangle, Tetrahedron and Pyramid, source of heat(chemical, mechanical.

			Electrical & Nuclear), Classification of fire and methods of fire extinguishment, Oxygen and its effects on combustion, Mode of heat transfer (Conduction, Convection & Radiation).
Professional Skill 52 Hrs; Professional Knowledge 12 Hrs	Identify, select and execute the application of different types of extinguishers, hoses and hose fittings.	9. Identification and selection according to suitability of following extinguishers: (i) water type (ii) foam type (iii) powder type (iv) gas type (v) Trolley mounted 10. Hose drill (i) hose pick up (ii) hose laying (iii) hose joining (iv) hose replacement at different position 11. Familiarization of foam making branch i. Use of FB2X, FB5X and FB10X, ii. Care and maintenance of foam equipments 12. Wet drill using foam and foam making equipments.	**Classification of Fire & Extinguishers** - Classification of Fire and types of extinguishers, As per Indian standard and NFPA code, maintenance, method of operation. Techniques of fire extinction- Smothering cooling and starvation. Halon and its detrimental effect on environment. Alternatives of Halon. introduction and function of Fire extinguishing ball and automatic modular fire extinguisher. Types of fire extinguishing agents, Rating system for portable fire extinguishers, Limitation of fire extinguishers, Inspection requirement. **Hose and Hose Fittings:** Types of Suction and Delivery Hoses, Hose-reel, causes of decay, Care and Maintenance, Marking of Hose, Repair of hose, Standard tests of Delivery Hoses, Definition and different groups of Hose Fittings. Types and Construction of Suction; Monitors, Water-cum-foam Monitor, Nozzles & branch holders, collecting head and suction hose, Fittings; frost valve, Deep lift suction fittings, Breechings, Adaptors and Blank cap suction reduction piece, Hose Ramps, Care &

			Maintenance of Hose Fittings. Definition of fire stream, solid tip or stream, special purpose. **Foam & Foam Making Equipment:** Water as an extinguish ant- its merits, demerits and modification. Introduction to all types of foam concentrate, properties of foams and techniques of extinguishment by foam, types of foams, Characteristics of good foam, foam making Equipment- Mechanical. High Expansion and Low Expansion Foam. Storage of foam Compound. Dry Chemical Powder- Types and application. Carbon dioxide as extinguisher. Method of High expansion foam generation and special use. Methods of foam applications.
Professional Skill 56 Hrs; Professional Knowledge 12 Hrs	Select and prepare the hydrant and pump system for proper application.	13. Familiarization and demonstration of Hydrant and its associated equipments. i. Hydrant Drill I: Opening of single line of three hoses. ii. Hydrant Drill. II: Change of burst hose. iii. Hydrant Drill. III: Increase one length hose. iv. Hydrant Drill. IV: Decrease one length hose. v. Hydrant Drill. V: Use of the collecting breaching. vi. Hydrant Drill.VI: Disconnect collecting Breaching. vii. Hydrant Drill.VII: Use dividing breaching viii. Hydrant Drill. VIII:	**Hydrant & Fittings:** Introduction of Hydrant and Water supplies, Hydrant Gears and Equipment, Marking, Testing, cares maintenance Operation. Source of water supply, Water distribution system, Rural water supply, Determining Static, Residual and Flow Pressure Pump & Pump Operation**:** Classification of common types in use, Methods of Priming, Testing and Fault-finding, care and Maintenance and standard Test, Introduction of centrifugal pump, care and maintenance. Advantages and disadvantages of centrifugal pump, importance of Atmospheric pressure Cooling systems.

		Disconnect dividing Beaching. 14. 4 men pump drill. 15. 6 men pump drill (dry and wet both)	
Professional Skill 30 Hrs; Professional Knowledge 06 Hrs	Plan and execute the concept of hydraulics in workplace.	16. Water volume calculation of different water reservoirs. 17. Practical use of flow meter and different pressure gauges. 18. Fire ground calculation and theoretical calculation.	**Hydraulics:** Pressure and Head, pressure and Flow, mensuration, Nozzle's discharge, calculation of water capacity of tank, requirement for specific fire size. Composition of Water, Atmospheric Pressure, Weight & Capacity of Water per cu.ft. Practical & Theoretical Suction Lift, Friction Loss, & Water Hammer.
Professional Skill 23 Hrs; Professional Knowledge 06 Hrs	Select and categorize electrical hazard and risk and its mitigation.	19. Visit to thermal power plant and electrical sub-station.	**Electricity**: Fundamentals of electricity, Generation and Distribution, Common causes of electrical fire and its remedial measures, electrical hazards including static electricity and protective measures and fire-fighting procedure, Elementary knowledge of Fire Protection and firefighting in different premises, electrocution. Electrical safety in non-industrial installation, Industrial Installation and mines. Hazardous area classification and use of electrical equipment in hazardous area, Case studies etc.

Professional Skill 28 Hrs; Professional Knowledge 06 Hrs	Identify and select methods of using ladder in practical field.	20. Demonstration and familiarization of Extension Ladder i. Introduction of parts of extension ladder. ii. Rescue Operation from buildings. iii. Drill I: Pitching of ladder iv. Drill II: Climbing the ladder v. Drill III: Use leg Lock vi. Drill IV: Ladder Drill with Fireman Lift vii. Drill V: L2 Drill	**Ladders:** Introduction, Types of Ladders, Construction features of conventional(terminology and parts) Ladders, Operational use, Elementary Knowledge of T.T.L. & Snorkel visit at regular fire service having these appliances. (As per Bureau of I.S.). Method of ladder pitching and climbing, use of Arm-Hold and Leg-Lock
Professional Skill 23 Hrs; Professional Knowledge 06 Hrs	Select the BA set and its application in appropriate place.	21. Familiarization and demonstration of B. A. set and relevant drill. 22. Donning & doffing of SCBA. 23. SCBA Operation & Emergency Procedures. 24. Inspection and Maintenance of SCBA.	**Water Tender and Special Appliance** : Introduction and description of Rescue/ Emergency Tender, C02 tender, DCP Tender, Hose laying lorry, Water Bouser and High pressure pumps, special appliances. (Type & Operation of Foam tender, Multipurpose fire tender, Crash fire tender, Hydraulic Elevated Platform.)
Professional Skill 26 Hrs; Professional Knowledge 06 Hrs	Identify and use small and special gears.	25. Familiarization and demonstration of different small and special gears. 26. Drill with different small and special gears.	**Small & Special gears:** Function & Construction-G.R. Tools; Function & Construction-Breaking in and Cutting tools, Pulley blocks; Function & Construction-Lighting Function & Construction-Lifting & Rescue tools; Operation of hydraulically operated, diesel operated and electrically operated tools,. Care & maintenance of equipment.
Professional Skill 25 Hrs; Professional Knowledge 06 Hrs	Plan and execute elementary treatment at any incidental spot.	27. Drill I: Donning, running and Rescue of casualty through tunnel. i. Familiarization and study First Aid Box. ii. Stretcher Drill.	**First Aid:** Definition of First-Aid, Qualities of first aider, Shock-Signs and Symptoms, Asphyxia-Signs and Symptoms, Wounds and Hemorrhage -Classification of injuries, Signs, Symptoms and

		iii. Fireman Lift Drill. iv. Use Bandage. v. Standard drills on Ambulance 28. Rescue drill. 29. Sylvester's Method 30. Holgar Nielsen Method. 31. Eve Rocking Stretcher Method. 32. Emerson Method 33. Mouth to Mouth Respiration.	management, Burns, Scalds and frost Bits signs and symptoms and management. Causes and types of fractures Sprain & Dislocation-Signs and symptoms, Snake Bite-Treatment.
Professional Skill 27 Hrs; Professional Knowledge 06 Hrs	Utilize knots and hitches in different special job and fire.	34. Practical use of different knots and hitches in rescue & fire fighting. 35. Testing of different type of lines. 36. Care and maintenance.	Ropes and Lines : Construction & Fibers used for rope(Rope materials-Natural and synthetic & their characteristics), types and uses of lines, causes of Deterioration Inspection and tests, methods of testing, care and maintenance, standard knots and their uses. (Method of rope construction- Hauser laid, Braided etc)
Professional Skill 17 Hrs; Professional Knowledge 06 Hrs	Plan and execute to uplift various gears with proper techniques, carry out Hazard and Risk evaluation selecting the proper method of rescue and F.F.	37. Hauling up gears and combined drill.	**Hazard and Risk:** Causes, Identification, Evaluation & Control. HAZOP + HIRA Sources for Information on Hazard Evaluation. Risk and Risk Analysis confined space.
Professional Skill 14 Hrs; Professional Knowledge 06 Hrs	Analyze the concept of accident caused and prevention, accident investigation, analysis and safety management.	38. Site visit for post analysis of different incidents.	Accident: Industrial Accidents (Definition), Classification of Accidents, Need for the Analysis of Accidents(Objective of accident prevention), Accidents Reports, Methods Adopted for Reducing Accidents, Investigation and analysis of Accidents, Safety Slogans, Safety Precautions adopted in the Plant. (Causes and cost of Accident/ incident, Accident prevention technique

			Safety Concept: Introduction to Safety Management, Safety Policy, Safety Committee, , Responsibility of Management, Safety Officers Duties &Responsibilities, Safety Targets, Objectives, Standards, Practices and Performances.
Professional Skill 22 Hrs; Professional Knowledge 06 Hrs	Select and apply provisions related to safety, health and welfare in respect of Factory Act, 1948.	39. Visit to factories. 40. Observation of provisions of the legislation applicable to different factories. according to factories Act-1948	Safety, Health and environment legislation. 1. FACTORIES ACT 1948 (Amended) & relevant statutory rules:- Health - Cleanness, Disposal of Waste, Ventilation and Temperatures, Dust & Fumes, Drinking Water, Lighting, Latrines & urinals. **Safety** - Fencing of machineries, Work on or near machinery in motion, Hoists and lifts, Pressure plants, Floors, Stairs and means of escape, Protection against fumes & gases, Safety offers. **Welfare** - Washing facilities in Dry clothing, Storing, Sitting, First Aid Appliances, Canteen, Shelters for rest & lunch, Crèches, Welfare officers, Right & Obligation of workers. 2. Workmen compensation act and rules. 3. ESI Act and rules. 4. Contract labour act. 5. Indian boiler act. 6. Static and mobile (unfired) pressure vessel rules. 7. BOCW act and rules. 8. Introduction to Fire & safety Audit.
Professional Skill 15 Hrs;	Assess available resources and their proper use.	41. Practical Use of equipment's like cutting tools. 42. Lifting tools Maintenance of	**Construction Industry:** General Safety Provisions related to construction industry, Safety in

Professional Knowledge 06 Hrs		tools.	the use of Construction Machinery, Safe Access / Egress Importance of Good House Keeping.
Professional Skill 26 Hrs; Professional Knowledge 06 Hrs	Interpret appropriate techniques of CPR.	44. **Techniques of CPR** i) One Sitter. ii) Two Sitter. iii) Three Sitter. iv) Four Sitter. v) Fireman lift. vi) CPR drill. vii) Choking. viii) Shaffer's Method. Above said methods sl. no. I to viii are rescue procedures. Methods for rescue without equipment	Resuscitation Resuscitation means' Artificial Respiration and following methods are being used. i. Holger Neilson ii. Silvestor iii. Shepherd iv. Mouth to mouth and v. Nose to mouth Cardiopulmonary Resuscitation method is different.
Professional Skill 15 Hrs; Professional Knowledge 06 Hrs	Identify the importance of lighting, ventilation, work related stress and its measurement.	43. Measurement of sound level. 44. Measurement of vibration of machine and equipments.	**Lighting, Ventilation &Work-related stress:** Introduction to Lighting, Ventilation, Heat Stress, Cold Stress, Noise, vibration and color codes. Difference between Flux and Lux (lumen), Measurement and Management of work-related stress, Heat stress, and cold stress.
Professional Skill 30 Hrs; Professional Knowledge 06 Hrs	Plan and execute fixed firefighting installations for their effective utilization.	45. Familiarization and demonstration of fixed fire fighting installations.	Fixed Fire Fighting Installations: Introduction of Sprinkler System and their care and maintenance and operational Procedure, Elementary requirements of Drenchers, Rising Mains, Hose Reels and Down-comer, Fire pump control panel. Types of F FF Installations- water based, non-water based. Fixed Foam installation, Foam pours, foam makers, HVWS, MVWS, Total flooding system CO2, FM-200 etc.
Professional Skill 17 Hrs;	Select and use PPE, demonstrate its care and	49. Familiarization and demonstration of PPE and other life saving equipments.	Personal Protective Equipment : Need for Personal Protection Equipment, Selection, Use, Care

Professional Knowledge 06 Hrs	maintenance.		& Maintenance Respiratory and Non-respiratory Personal Protective Equipment, Head Protection, Ear Protection, Face and Eye Protection, Hand Protection, Foot Protection, Body Protection. Standards & regulations
Professional Skill 17 Hrs; Professional Knowledge 06 Hrs	Select Automatic Fire Detection cum Alarm System to plan their effective utilization.	50. Familiarization and demonstration of different Automatic Fire Detection cum Alarm System.	**Automatic Fire Detection cum Alarm System:** Introduction of Types of Detectors- Smoke, Heat, Flame/Gas Detectors, Operating principles, F.D.A. Panel M.C.P. & P.A. with talk back.
Professional Skill 20 Hrs; Professional Knowledge 06 Hrs	Plan and execute fire station administration.	51. Water tender drill. Drill I: L-2 Drill with ladder and water tender Drill II: Foam Drill with FBI0X single delivery. Drill III: Foam Drill with FB5X single delivery. Drill IV: Wet Drill with double delivery. Drill V: Dry Drill with double delivery.	**Fire Service Administration:** Fire Service Organization, Executive duties of Officer-in-Charge of a Fire Station, Administrative duties of Officer-in-Charge of a station a) Writing of a report, b) Occurrence Book, c) Hose Card/Register, d) Fire reports, e) Workshop Orders, f) Log books, g) Stock Registers, h) Orderly Room Registers, i) Defaulter Register, j) Leave Register, k) Station Discipline.
Professional Skill 22 Hrs; Professional Knowledge 06 Hrs	Identify communication system in different organization and their scope of use.	**Industrial/ Fire Service Station Visit** 52. Visit of modern control room and watch rooms of state fire service/ Industry. 53. **Visit to Fire Service Station.** A. Familiarization to Fire Station Writing practices of i) Occurrence Book ii) Duty Card/ Register iii) Log Book	Watch Room Procedure & Mobilizing: Identification of communication requirement of Fire Service, Watch Room, Control Room, Equipment Station Ground, Turn-out area, Area of Topography, and Telephone Call area, Mobilizing boards and maps. The log & occurrence book, introduction to Various lines, communication Equipment in Fire Service,

		iv) Hose Book v) Stock Register B. SOP, SDP, fire affected room searching techniques.	Introduction to Radio Communication and Use of VHF Sets. (Method of receiving report of emergencies,) Practical Fireman ship: Qualities of Fireman and his important duties at a Fire Station and Fire ground. Duties of fireman on the way to fire scene, on the fire ground, and after returning from the fire call.
Professional Skill 17 Hrs; Professional Knowledge 06 Hrs	Get accustomed with different fire situations and firefighting using extinguishers.	54. Live fire extinction using all kind of extinguisher.	Rural Fire: Fire Hazards in rural areas and cause of fire, Haystacks, Special appliance & equipment, Method of Firefighting in rural areas. Difficulties in dealing with Rural fires.
Professional Skill 37 Hrs; Professional Knowledge 12 Hrs	Plan and execute disaster response practices, IRS/JRT and salvage technique.	55. Simulated Practices to control life and properties damages from natural disaster. 56. Water relay drill (All types). 57. Practical use of salvage sheets &equipments and there care & maintenance. 58. SOP, SDP, Methods of entry into building, Different searching methods to locate & rescue a trapped causality.	**Water Relay:** Types of relay-systems, water distribution System. Advantages and disadvantages-Calculation of hose. spacing of intermediate pumps, important points for carrying out Relay & Study of gauges. Salvage - Introduction, Equipment for Salvage and working at Fires. list of Salvage tools and equipment, Safety consideration at the time of salvage Disaster Management: Natural and Man-made Disaster, Preparedness for disaster, use of various agencies, first responders, control of situation, Incident Command System (ICS)/ IRS/JRT. Understanding disasters, classification, significance, causes and effects. Remedy for mitigation.

Professional Skill 17 Hrs; Professional Knowledge 06 Hrs	Select and apply correct rescue method.	59. Precautions to be observed when working in smoke laden buildings. 60. Emergency methods of rescue.	Various Rescue techniques: Rescue technique from lift, Sewer, Collapsed building, motor vehicle accident, Well & river, Special equipment and training requirements for rescue operations. Hazards associated with Rescue operations, Search of Burning structure, Extrication from Motor vehicles, Machines, Specialized Rescue Situation and tools.
Professional Skill 21 Hrs; Professional Knowledge 06 Hrs	Categorize building construction that can ensure fire and life safety.	**Construction Site Visit** 61. Familiarization at construction site. 62. Introduction and identification of building material. 63. Planning of escape routine. 64. Familiarization and demonstration of fixed installation at visit to high rise building. 65. Practical training about Care and maintenance of sprinklers. Use of Automatic fire alarm system, fire exit drill.	Means of Escape: Classification of escape routes with reference to N.B.C. Fire exit drill. What is fire exit? places of relative safety, places of ultimate safety, Width of exits requirement and calculations.
Professional Skill 57 Hrs; Professional Knowledge 18 Hrs	Plan and execute fire protection measures based on construction and occupancy.	66. Visit to buildings with different types of construction& occupancy. 67. Construction Site Visit i. Practices of good House Keeping ii. Study of egress and safe access. iii. Hands on experience with Hand and power tools.	**Building Construction** : Introduction, highlighting importance of the subject, Classification of building in the country, Building materials and their behavior under fire conditions, signs of collapse of building, various types of occupancies and firefighting techniques, Importance's of fire escapes with respect to their positioning, Reference to NBC part II fire construction and provisioning of firefighting measures. Smoke management

			&HVAC. Safety in Engineering Industries: Machine Operations & Guarding, Safety in the use of Machines, Safety precaution while using Hand Tools & Power Tools, Need for selection & Care of tools. Types of Guarding
Professional Skill 32 Hrs; Professional Knowledge 12 Hrs	Plan and survey Airport and Aircraft, port and ship for rescue system and firefighting system on it.	68. Industrial Visit: airport, aircraft, helicopter etc. 69. Visit to port Site and ships.	Aircraft Fire and Rescue: Some common terminology including 'Ejection Seats' etc, Preliminary about fire hazards in Aircraft and action required for Rescue and firefighting, Resource of Fighting Fire in Air Ports. Different types of Aircrafts, Air craft firefighting and rescue procedures, types of emergencies, and method of dealing with each emergency. Hagers- types, fire protection and firefighting. Ship Fires: Elementary knowledge of ship fire protection and firefighting& rescue from ship. Risk and fighting fires in ship, Types of emergencies, Dock Fires, Fire protection of jetti.
Professional Skill 25 Hrs; Professional Knowledge 06 Hrs	Identify occupational hazards associated with different dangerous chemicals, dust, gases, mist, vapours etc. to plan and execute rescue operations in these cases.	70. Familiarization HVAC system and demonstration of various equipments used in rescue of causality. 71. Ladder Drill with Fireman Lift 72. Sewer Rescue drill, 73. Stretcher drill	Occupational Hazards & Dangerous Chemicals. Introduction to Occupational Health Hazards & Dangerous Properties of Chemicals, Dust, Gases, Fumes, Mist, Vapours, Smoke and Aerosols, Concepts of Threshold Limit Values, Classification of Hazards. Hazchem codes, Chemical accidents source and causes, Transportation risk in rail and by road, emergency

			management for release or leakage of gas/chemicals during transportation.
Professional Skill 22 Hrs; Professional Knowledge 06 Hrs	Comply with safety precautions while working at height, confined place and work permit system.	74. High elevation drill. 75. Confined space rescue.	Working at Height, Confined Space: Safety precautions related to Scaffolds, Ladders, and Work at height including Roof Work, fall arrestors, Confined Space, Work Permit System, Excavation.
Professional Skill 17 Hrs; Professional Knowledge 06 Hrs	Identify the characteristics of various fire suppression agents including water and safety in manual and mechanical handling of materials.	76. Visit to industries to observe safety in material handling.	Material Handling: Safety related to Mechanical and Manual Material Handling, Lifting Appliances, Transport / Earthmoving& Material Handling Equipments - Cranes, Forklift Truck, Hoists, and Conveyors**.**
Professional Skill 40 Hrs; Professional Knowledge 12 Hrs	Demonstrate hazard evaluation and risk analysis exercise.	77. Hazard evaluation and risk analysis exercise. 78. Practical usages of safety belt, helmets, gloves and goggles. 79. Visit to industrial unit and adoption of safety Practice. 80. Visit to industrial unit to observe prevailing welfare measures and their condition.	House Keeping and Waste Disposal: Introduction of Good House Keeping & Maintenance, Introduction of Disposal of Waste Material. Japanese concept of 5 “S”. Hazardous Chemicals: Dangerous Chemicals and substances, Introduction to Transportation and handling of dangerous chemicals and explosives, Storage of hazardous chemicals, Fire Safety and firefighting. Interpretation and use of MSDS. Chemical labeling.
Project Work/ Industrial visit: **Broad Areas:** a) Water tender drill. (i) Drill I : L-2 Drill with ladder and water tender (ii) Drill II : Foam Drill with FBI0X single delivery (iii) Drill III: Foam Drill with FB5X single delivery. (iv) Drill IV: Wet Drill with double delivery.			

(v) Drill V: Dry Drill with double delivery.

b) Precaution to be observe when working in smoke laden buildings.

c) Familiarization HVAC system and demonstration of various equipment used in rescue of causality.

SYLLABUS FOR CORE SKILLS
1. Employability Skills (Common for all CTS trades) (120 Hrs)

Detailed syllabus of Core Skills subjects which is common for a group of trades, provided separately in www.bharatskills.gov.in /dgt.gov.in

List of Tools & Equipment			
FIRE TECHNOLOGY AND INDUSTRIAL SAFETY MANAGEMENT (For batch of 24 Candidates)			
S No.	**Name of the Tools and Equipment**	**Specification**	**Quantity**
A. TRAINEES TOOL KIT (For each additional unit trainees tool kit sl. 1-10 is required additionally)			
1.	Water $C0_2$ Type Fire Extinguisher	9 Liters	02 Nos.
2.	Stored pressure Type Fire Extinguisher	9 Liters	08 Nos.
3.	Chemical Foam type Fire Extinguisher	9 Liters	02 Nos.
4.	Mechanical Foam type Fire Extinguisher	9 Liters	08 Nos.
5.	$C0_2$Type Fire Extinguisher	4.5 Kg	08 Nos.
6.	BCType Fire Extinguisher	5/10 Kg	02 Nos.
7.	ABC Type Fire Extinguisher	5/10 Kg	08 Nos.
8.	Extension Ladder	Size-45/35 ft	02 Nos.
9.	All types of Branches or Nozzles		04 Nos.
10.	Fire Hose	a) 15m	12Nos.
		b) 30m	05Nos.
B. SHOP TOOLS, INSTRUMENTS – For 2 (1+1) units no additional items are required			
Lists of Tools:			
11.	First Aid Box		As required
12.	All Types of small gears - Fireman Axe, Crowbar, Cutter, Torch, Celling hook, Fire beater etc.		As required
13.	BA Set	Negative & Positive Pressure	02 Nos.
14.	a) Gas Cylinders		02 Nos.
	b) Steel Back Plates		02 Nos.
	c) Face Masks		02 Nos.
15.	Portable Fire Pump/TFP		02 Nos.
16.	All types of couplings		1 Set
17.	Hydrant-Stand Pipe with flange Type		02 Nos.
18.	Fire Trays		02 Nos.
19.	Manual call point		01 No
20.	Entry Suit/ Proximity Suit		02 Nos.
21.	Hose reel system		01 No
22.	Nitrogen Cylinder		01 No

23.	Hose Box		01 No
24.	Fire Fighting Point complete Set		01 No
25.	Suction Hose	10 ft	02 Nos.
26.	Suction Wrench		02 Nos.
27.	Metal Strainer		02 Nos.
28.	Basket Strainer		01 No
29.	Sprinkler with Sprinklers Head (Bulb Type, Fusible link Type)		02 Nos.
30.	Ropes	100 ft Long	01 No
31.	Lines 100 ft Long		01 No
32.	Control Panel – Model-Pump		01 No
33.	Personal Protective Equipment		
	a) Helmet	Type A,B,C	24Nos.
	b) Laser Welding Safety Goggles		12Nos.
	c) Face Shield		12 Nos.
	d) Welding Shield		12 Nos.
	e) Ear Muff		12 Nos.
	f) Ear Plug		12 Nos.
	g) Canal Caps		12 Nos.
	h) Safety Shoes		24Nos.
	I) Asbestos Gloves		12 Nos.
	j) Electrical Hand Gloves		12 Nos.
	k) Hand Gloves (Rubber)		12 Nos.
	l) Dust Mask		12 Nos.
34.	Personal Protective Clothing for men		
	a) Safety Shirt		12 Nos.
	b) Safety Trouser		12 Nos.
	c)Safety Jacket		12 Nos.
	d) Cooling Vest		03 Nos.
	e) Gum Boots		12 Nos.
C. LIST OF EQUIPMENT			
35.	Personal Fall Arrest System (PFAS)		02 Nos.
36.	Tripod		02 Nos.
37.	Pulley		02 Nos.
38.	Suspended Scaffold		02 Nos.
39.	Gas Detector		02 Nos.
40.	Plastic Tunnel (Sewer Rescue Drill)		04 Nos.
41.	Body Harness		01 No
42.	Collecting Breeching		02 Nos.
43.	Dividing Breeching (Hand control)		02 Nos.
44.	Hydrant Flange		02 Nos.

45.	Hydrant Key & Bar (With hydrant Spindle)		01 No
46.	Adopter for Air Store Pressure		01 Nos.
47.	Hydraulic Pressure Testing Machine		01 No
48.	Salvage Equipment -Salvage Sheet, Hoppers, Dollies, Buckets, Bolt Cutter, Hammer, Gloves, Ropes, Ceiling hook, Lamp etc.		As required
49.	Safety Belt		04 No
50.	Desktop computer	CPU: 32/64 Bit i3/i5/i7 or latest processor, Speed: 3 GHz or Higher. RAM:-4 GB DDR-III or Higher, Wi-Fi Enabled. Network Card: Integrated Gigabit Ethernet, with USB Mouse, USB Keyboard and Monitor (Min. 17 Inch. Licensed Operating System and Antivirus compatible with trade related software.	08Nos.
51.	Computer Table		08Nos.
52.	Computers Chairs		08Nos.
53.	White Board		01 No
54.	L.C.D. Projectors		01 Nos.
55.	UPS		As required
56.	All types of Detectors 1 Peps. of each		05Nos.
57.	Flux meter		05Nos.
58.	Dosi meter		01 No
59.	Cut model of Fire Extinguisher / Fire pump		02 Nos.
60.	Fire Suit		02 Nos.
61.	Fire Tender (one For the Institute)		01 No
62.	Rescue Van (one For the Institute)		01 No.
63.	Fire Extinguisher Ball		04 Nos
64.	Fire Extinguishing Robot		01 Nos
65.	Fire Extinguisher Dron		01 Nos
66.	Automatic modular Fire Extinguisher		01 Nos
67.	Safety Harness		03 Nos
D. SHOP FLOOR FURNITURE AND MATERIALS - For 2 (1+1) units no additional items are required.			
68.	Instructor's table		1 No.
69.	Instructor's chair		2 Nos.

70.	Metal Rack	100cm x 150cm x 45cm	4 Nos.
71.	Lockers with 16 drawers standard size		2 Nos.
72.	Steel Almirah	2.5 m x 1.20 m x 0.5 m	2 Nos.
73.	Black board/white board		1 No.
74.	Fire Extinguisher	Arrange all proper NOCs and equipment from municipal / competent authorities.	

Note:

1. *The items in bold italic are meant to be used for any of the two courses viz. Fireman/Fire Technology and Industrial Safety Management/Health Safety and Environment. If the institute is running any of the two trades, items in bold italic are not required to be purchased separately.*

ANNEXURE-II

The DGT sincerely acknowledges contributions of the Industries, State Directorates, Trade Experts, Domain Experts, trainers of ITIs, NSTIs, faculties from universities and all others who contributed in revising the curriculum.

Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

List of Expert Members participated/ contributed for finalizing the course curriculum of Fire Technology & Industrial Safety Management held on 06.06.2017 at CSTARI, Kolkata			
S No.	**Name & Designation Sh/Mr./Ms.**	**Organization**	**Remarks**
1.	H. V. Samvatsar, Director	CSTARI, Kolkata	Chairman
2.	L.K. Mukherjee, DDT	-Do-	Coordinator
3.	Soumitra Chatterjee, MD	Dhruvsatya Centre for personal Transformation Pvt. Ltd.	Expert
4.	Purna Chandra Barad, Chief Manager- HR & Admin	Dhruvsatya Centre for personal Transformation Pvt. Ltd.	Expert
5.	Kanailal Biswas, Ex- Plant in charge	Zamil Steel Tower and Galvanizing factory, Dumman, Soudi Arabia	Expert
6.	Krishnendu Sarkar, Director	Akass Infrastructure pvt. Ltd., Kolkata	Expert
7.	Dipak Rungta, Manager	Lalit Hardware, Expert in Disaster Management power tools &Equipments, Kolkata-1	Expert
8.	N.B. Reshamwal, Asst. Director	Regional Labour Institute, Kolkata	Member
9.	SourashisMitra, Junior Assistant	Indian Institute of Engineering, Science and Technology, Shibpur (IIEST), Howrah- 711103	Member
10.	Sujay Banerjee, Senior Instructor	West Bengal Fire & Emergency Services, Seal Para, Kolkata	Expert
11.	Shyam Chandra Mondal, Officer In Charge	West Bengal Fire & Emergency Services, Serampore, Mahesh Hoogly	Expert
12.	R.N. Bandhopadhaya, OSD	Directorate of Industrial Training- Govt. of West Bengal, Kolkata	Member
13.	Alok Sharma, Chief General Manager	Indraprastha Gas Limited, New Delhi	Expert
14.	Santokh Singh, Ex-Chief Fire Officer	Delhi Fire Services, New Delhi	Expert
15.	Capt. Krishan Kumar,	Delhi Institute of Fire Engineering,	Expert

	Chairman	New Delhi-77	
16.	Praveen Choudhari, Emergency Response Officer	Dolphin Energy Ltd., Quatar	Expert
17.	Lt. Col. RC Shukla, Principal	Delhi Institute of Fire Engineering, New Delhi-77	Expert
18.	P S Bhadana, Dy. Director	-do-	Expert
19.	B L Chauhan, Senior Instructor	-do-	Expert
20.	Bhagwati Prasad Ojha, HSE Engineer	-do-	Expert
21.	Praveen Kumar Garg, Sr. Manager HSE	Ouippo Oil & Gas Infrastructure Ltd., Gurgaon, Haryana	Expert
22.	DevkiNandan, HSE Expert	Indraprastha Ltd.	Expert
23.	Sanjay Kumar, JDT/HOO	CSTARI, Kolkata	Member
24.	A.K. Mandal, ADT	-Do-	Member
25.	M.K. Batabyal, TO	-Do-	Member

ABBREVIATIONS

CTS	Craftsmen Training Scheme
ATS	Apprenticeship Training Scheme
CITS	Craft Instructor Training Scheme
DGT	Directorate General of Training
MSDE	Ministry of Skill Development and Entrepreneurship
NTC	National Trade Certificate
NAC	National Apprenticeship Certificate
NCIC	National Craft Instructor Certificate
LD	Locomotor Disability
CP	Cerebral Palsy
MD	Multiple Disabilities
LV	Low Vision
HH	Hard of Hearing
ID	Intellectual Disabilities
LC	Leprosy Cured
SLD	Specific Learning Disabilities
DW	Dwarfism
MI	Mental Illness
AA	Acid Attack
PwD	Person with disabilities


कौशलं बलम्