

# CURRICULUM FOR DIPLOMA IN FIRE SERVICE ENGINEERING (FR)

(State Government Approved Short Term Diploma Course)

DURATION	Two Years
SCHEME	I
PATTERN	Full Time - Yearly

(To be implemented from the Academic Year 2017 – 2018)





MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI  
(AUTONOMOUS)

*ISO 9001-2013 Certified*

49, Kherwadi, Bandra (East), Mumbai – 400 051





 <b>MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI</b> <b>TEACHING AND EXAMINATION SCHEME</b>																		
<b>COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING</b>																		
<b>COURSE CODE : FR</b>																		
<b>DURATION OF COURSE : TWO YEARS</b>									<b>DURATION : 32 WEEKS</b>									
<b>YEAR : FIRST</b>									<b>WITH EFFECT FROM 2017-18</b>									
<b>PATTERN : FULL TIME - YEARLY</b>									<b>SCHEME : I</b>									
SR. NO.	SUBJECT TITLE	SUB CODE	Abbreviation	TEACHING SCHEME			EXAMINATION SCHEME										TOTAL	SW (23100)
				TH	TU	PR	PAPER HRS.	TH		PR		OR		TW				
								MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN			
1	Fire Service Organization	23116	FSO	02	01	--	03	100	40	--	--	--	--	--	--	100	100	
2	Safety Management	23117	SAM	02	01	--	03	100	40	--	--	--	--	--	--	100		
3	Business Communication Skills-I	23118	BCS	02	01	--	03	100	40	--	--	--	--	50@	20	150		
4	Fire Engineering Science	23141	FES	02	01	--	03	100	40	--	--	--	--	--	--	100		
5	Special Fire Hazards	23142	SFH	02	01	--	03	100	40	--	--	--	--	--	--	100		
6	Fire Fighting Drills-I	23004	FFD	--	--	05	--	--	--	50#	20	--	--	50@	20	100		
7	Fire Service Equipments & Appliances	23005	FSE	--	--	05	--	--	--	50#	20	--	--	50@	20	100		
8	Field Work	23006	FIW	--	--	07	--	--	--	50#	20	--	--	50@	20	100		
<b>TOTAL</b>				<b>10</b>	<b>05</b>	<b>17</b>	<b>--</b>	<b>500</b>	<b>--</b>	<b>150</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>200</b>	<b>--</b>	<b>850</b>	<b>100</b>	

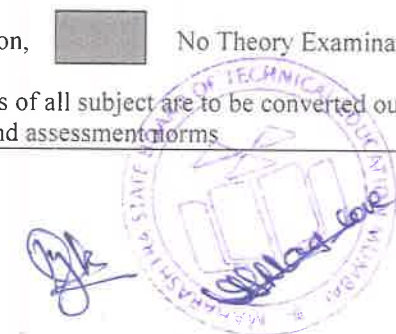
Student Contact Hours Per Week: **32 Hrs.**  
**Theory and Practical periods of 60 minutes each.**  
**Total Marks : 950**  
**Note – Internship during Summer vacation for Six Weeks at the end of First Year**  
 @ Internal Assessment, # External Assessment, Ø Common to All Conventional Diploma, #\* Online Examination,  No Theory Examination.  
 Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Term work, SW- Sessional Work

- Conduct two class tests each of 25 marks for theory subject having theory exam. Sum of the total test marks of all subject are to be converted out of 100 marks as sessional work.
- Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms



 <b>MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI</b> <b>TEACHING AND EXAMINATION SCHEME</b>																		
<b>COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING</b>																		
<b>COURSE CODE : FR</b>																		
<b>DURATION OF COURSE : TWO YEARS</b>									<b>DURATION : 32 WEEKS</b>									
<b>YEAR : SECOND</b>									<b>WITH EFFECT FROM 2017-18</b>									
<b>PATTERN : FULL TIME - YEARLY</b>									<b>SCHEME : I</b>									
SR. NO.	SUBJECT TITLE	SUB CODE	Abbreviation	TEACHING SCHEME			EXAMINATION SCHEME										TOTAL	SW (23200)
				TH	TU	PR	PAPER HRS.	TH		PR		OR		TW				
								MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN			
1	Internship*	23030	INT	--	--	--	--	--	--	--	--	50@	20	50@	20	100	100	
2	Industrial Safety	23201	INS	02	01	--	03	100	40	--	--	--	--	--	--	100		
3	Fire Prevention, Rescue And Paramedics	23202	FPR	02	01	--	03	100	40	--	--	--	--	--	--	100		
4	Fire Detection and Fire Fighting Systems	23203	FDF	02	01	--	03	100	40	--	--	--	--	--	--	100		
5	Fire Safety in Buildings	23204	FSB	02	01	--	03	100	40	--	--	--	--	--	--	100		
6	Business Communication Skills-II	23205	BCS	02	01	02	03	100	40	--	--	50#	20	50@	20	200		
7	Fire Fighting Drills-II	23031	FFD	--	--	06	--	--	--	50#	20	--	--	50@	20	100		
8	Rescue Techniques	23032	RET	--	--	06	--	--	--	50#	20	--	--	50@	20	100		
9	Project	23033	PRO			05				50#	20			50@	20	100		
<b>TOTAL</b>				<b>10</b>	<b>05</b>	<b>19</b>	<b>--</b>	<b>500</b>	<b>--</b>	<b>150</b>	<b>--</b>	<b>100</b>	<b>--</b>	<b>250</b>	<b>--</b>	<b>1000</b>	<b>100</b>	

Student Contact Hours Per Week: 34 Hrs.  
**Theory and Practical periods of 60 minutes each.**  
**Total Marks : 1100**  
**\*Internship during Summer vacation for Six Weeks at the end of First Year.**  
 @ Internal Assessment, # External Assessment, Ø Common to All Conventional Diploma, #\* Online Examination,  No Theory Examination.  
 Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Term work, SW- Sessional Work  
 ➤ Conduct two class tests each of 25 marks for theory subject having theory exam. Sum of the total test marks of all subject are to be converted out of 100 marks as sessional work.  
 ➤ Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms



COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING  
 COURSE CODE : FR  
 YEAR : FIRST  
 SUBJECT TITLE : FIRE SERVICE ORGANIZATION  
 SUBJECT CODE : 23116

## TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
02	01	--	03	100	--	--	--	100

## NOTE

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 100 and to be entered in mark sheet under the head Sessional Work (SW)

## RATIONALE

The persons trained in fire fighting processes must also know about fire service organizations and their functioning. They must also know the acts related to fire services which give information about the duties and responsibilities of fire service people and also the procedures to be followed in the event of a fire or disaster. Organization and acts is a core subject which is useful in job

## OBJECTIVES

The student will be able to:

- Identify job responsibilities.
- Select proper personnel.
- List equipments.
- Label records.
- Diagnose the events.
- Read plans, maps and methods.



## DETAILED CONTENTS

CHAPTER	CONTENTS	HOURS	MARKS
1	<b>Fire Service Training:</b> Need of training as a first responder, Classification of training, Training methodology, Methods of instructions, Fire reports and Statistics. <b>Special skills required for investigating a fire:</b> Introduction, Importance and reasons for thorough investigation, Process of investigation, Source of ignition, Role of scientific forensic laboratory in the investigation of fires, Preparation of investigation report, Arson-its meaning and detection, motives, Role of fire officer in investigation of arson fires.	14	20
2	<b>Fire Service Organization:</b> Fire service organization, State and Municipal, its functions, requirement thereof, Wings of Fire service organization, Chain of commands. Fire Service	10	16
3	<b>Fire Service Administration and Management:</b> Duties, responsibilities and fundamentals of fire station management, Public relation, Operational records, orders and instructions, Station administration, Maintenance of documents. Rank, uniform, rank marking and Helmet marking	10	16
4	<b>Control Room Procedure:</b> Control Room, Communication system in Fire Service, Duties and responsibilities of ground in charge, Mobile van and drill requirements.	10	16
5	<b>Watch Room procedure:</b> Watch room procedure to cover in details about Fire calls handling procedure, Equipments in watch room, mobilizing board and drill requirements.	10	16
6	<b>Fire laws:</b> Basic knowledge of acts, regulations, rules and orders which are related to fire service administration and operation, Petroleum Act, calcium carbide act, Explosives act, Maharashtra Fire Prevention and Life Safety Measures Act.	10	16
<b>Total</b>		<b>64</b>	<b>100</b>

## LIST OF ASSIGNMENTS

SR. NO.	ASSIGNMENTS
1	Preparing a chart showing "Fire service organization" and its hierarchy.
2	Prepare a list of various documents and records maintained in Fire station with its significance
3	State the contents of a Investigation report
4	Draw a neat diagram of "Fire control room" with all details
5	List the purpose of "Mobile van" and functions of the accessories.
6	State the duties and responsibilities of Ground In-charge.
7	Visit to Disaster control cell and write a report on its functioning.
8	State any five rule, rules and orders which are related to fire service administration and

SR. NO.	ASSIGNMENTS
	operation
9	State the procedure for Handling Fire Calls in Control Room
10	"Fire investigation Form"- Write down the Contents

**SUGGESTED LEARNING RESOURCES**

HMSO : Her Majesty's S Office

NFPA : National Fire Protection Association

SR. NO.	TITLE	AUTHOR	PUBLICATION
1	Memorandum of Emergency Fire Brigade Organization	HMSO	HMSO
2	Manual of firemanship	HMSO	HMSO
3	The Fire Chief's Handbook: IVth Edition.	HMSO	HMSO
4	Management in Fire Service	NFPA	NFPA
5	Municipal Fire Safety Organization	NFPA	NFPA
6	Public Fire Safety Organization	NFPA	NFPA
7	Industrial Fire Brigade Training Manual	NFPA	NFPA
8	Principles of Management	BS Mathur	--
9	Fundamentals of Modern Management	James Brodio	--
10	Fire Service Manuals	--	Akademia Books International Pvt. Ltd.
11	Fire and Emergency Law Case Book	Thomas D. Schneider	--

**VIDEO CASSETTES/ CDS**

Investigation Series VC10, Akademia Books International Pvt. Ltd.

COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING

COURSE CODE : FR

YEAR : FIRST

SUBJECT TITLE : SAFETY MANAGEMENT

SUBJECT CODE : 23117

**TEACHING AND EXAMINATION SCHEME:**

TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
02	01	--	03	100	--	--	--	100

**NOTE**

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 100 and to be entered in mark sheet under the head Sessional Work (SW)

**RATIONALE**

Acquire the Knowledge, Skill and Mechanism of functioning of machine, tools and safe use of the same

**OBJECTIVES**

Equipping students with skills and techniques for:

- To prevent accident while working at different levels by following work permit systems.
- Ventilation: Health hazards due to improper ventilation, Types of ventilation, measurement of thermal environment and preventive measures.
- Noise Pollution: Hazard due to noise. Monitoring of the noise level and preventive measures to be taken.
- This topic deal with the work environment in shops. Physical hazards in the shop and preventive measures.



## DETAILED CONTENTS

CHAPTER	CONTENTS	HOURS	MARKS
1	<b>Safety Organisation</b> Safety Policy legal requirements and Procedures, Management Objectives and Planning, Safety committee, Documentation and Information Control, Safety awareness.	14	20
2	<b>Management Control Systems</b> Permits to Work Systems, Hot work, working in confined space etc., Start-up and Shut-down of plant, Working at Height, Personal Protective Equipments (PPE), Respiratory Protection, Management of Noise, Control over Contractors.	10	16
3	<b>Area Classifications:</b> Introduction, Controlled Area, Restricted Area, Hazardous Area, Non-Hazardous Area, Hazardous Area Classification, Class. <b>Grouping Of Flammable Or Combustible Materials:</b> Class I Materials Gases And Vapors Class II Materials - Dust Class III Combustible Fibers <b>Division:</b> Relationship Between Division And Zone Area Classification For Work Permits Work Permit Area Work Permit Free Area	10	16
4	<b>Accident/Incident/Near Miss Reporting (Key element)</b> Definition of Accident, Reportable, Non- Reportable, Fatal, Non-Fatal, Near miss accident. Lost time accident. Disabling Injury, Temporary Disablement and Permanent Disablement Partial and Total Disablement, Reporting systems, Investigation procedures, Accident/Incident Statistics and Measures of Performance.	10	16
5	<b>Fire Control Systems</b> Fire Risk Assessment (Key Elements), Fire, Documentation, Alarm Systems, Fire Fighting Equipment, Emergency/Escape Lighting, Fire Risk Management Inspection, Security, Emergency Planning.	10	16
6	<b>Evacuation process</b> On site Emergency Plan, Evacuation Drill and Instruction, Escape Routes and Exits, Security, Emergency Planning, First Aid facilities & Employees involvement.	10	16
<b>Total</b>		<b>64</b>	<b>100</b>

## LIST OF ASSIGNMENTS

SR. NO.	ASSIGNMENT
1	Explain the legal requirement of safety policy
2	Explain what do you mean by 'MANAGEMENT OBJECTIVE
3	Write the use of Work permit systems and its type. Compile 4 types of work permits
4	Explain the risks associated with Start-up and shut down procedures
5	Compile the list of different PPE's used in the Industries for protection of Head to toe.
6	List the contents of Onsite Emergency Plan for a small chemical factory
7	Explain How Evacuation Drills are to be conducted and its purpose
8	Explain the needs of Emergency planning and its principles of preparedness
9	List the classification of disabling injuries
10	Explain Area classification. Relation between Division and Zones

## SUGGESTED LEARNING RESOURCES

SR. NO.	TITLE	AUTHOR	PUBLICATION
1	Safety code for Scaffolds and Ladders	Heinrich H.W	Ladders IS : 3696
2	The Fundamental Causative Factors of an Industrial Accidents	Antiac (Hepburn, H.A.)	The British Journal Industrial Safety, Vol. I, No. 13, 1950.
3	The Myth of Accident Proneness	Ghiselli, F.E	The British Journal of Industrial Safety, Vol. 6, No. 71, 1963
4	The Accident Syndrome	Schulzinger M.S	Charles C. Thomas Co., Springfield, 111, 1956.
5	Early Warning Smoke detection cum Fire Alarm System	Nilesh B. Ukunde	--
6	Work Permit System	OISD STD 105	--

## SUGGESTED E-LEARNING RESOURCES

- <http://www.osha-slc.gov/SLTC/machineguarding/index.html>
- <http://www.machinetoolsupplier.com/Buy-Used-Machine-Tools-and-CNC-Machines->
- <http://www.noise-vibration.co.uk/>



COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING  
 COURSE CODE : FR  
 YEAR : FIRST  
 SUBJECT TITLE : BUSINESS COMMUNICATION SKILLS - I  
 SUBJECT CODE : 23118

## TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME			EXAMINATION SCHEME					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
02	01	--	03	100	--	--	50@	150

## NOTE

- > Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- > Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)

## RATIONALE

The most commonly used medium to express oneself is language. English, being a global language, is used in all the spheres of human life i.e., professional, personal and social. A diploma student is expected to be proficient in English language and pursue the existing course of study to handle the future jobs. The content of the text includes the aspects related to language skills.

## OBJECTIVES

Students will be able to:

- Develop vocabulary.
- Apply the rules of grammar.
- Comprehend the given unseen passage.

## DETAILED CONTENTS

CHAPTER	CONTENTS	HOURS	MARKS
1	<b>Application of Grammar</b> <b>Articles:</b> Appropriate use of definite and indefinite Articles <b>Prepositions:</b> To use correct Prepositions as per context <b>Conjunctions:</b> Co-ordinating and sub-ordinating Conjunctions <b>Tenses:</b> Correct usages of past, present and future tenses <b>Active and Passive voice:</b> Use of Active and Passive voice <b>Direct and Indirect sentences:</b> Conversion of direct into indirect sentence and vice versa	14	20
2	<b>Text</b> Various Texts to make Articles (Answer the questions based on the articles)	10	16
3	<b>Text</b> Various Texts to make Articles(State the meanings of the given words from the articles)	10	16
4	<b>Paragraph Writing</b> <b>Paragraph Writing:</b> Elaborate and expand the ideas with cohesion, coherence and use of correct punctuation marks <b>Types of Paragraph:</b> Narrative, Descriptive, Technical, Comparison and Contrast <b>Dialogue Writing:</b> Based on various situations <b>Speech Writing based on situations:</b> Welcome Speech, Farewell Speech, Vote of Thanks and Introducing a Guest	10	16
5	<b>Comprehension</b> <b>Comprehension of Passage:</b> Comprehending questions and writing the answers on unseen passages	10	16
6	<b>Vocabulary Building</b> Words Often Confused Collocation Prefix and Suffix Synonyms and Antonyms	10	16
		<b>64</b>	<b>100</b>

## Skills to be developed in practical

## INTELLECTUAL SKILLS

1. Select appropriate words/verbs and formulate correct sentences
2. Develop ability of correct pronunciation
3. Report writing skills



## LIST OF ASSIGNMENTS

SR. NO.	ASSIGNMENT
1	Punctuate 25 sentences given by the teacher
2	Rewrite the passage/passages with correct form of verbs. [Teacher is expected to give passage /passages of verbs used <u>wrongly</u> [at least 25 verbs.]
3	Write 15 synonyms and 15 antonyms with the help of the thesaurus.
4	Write a paragraph each on descriptive, narrative, comparison, contrast and technical type in 75 to 100 words.
5	Write 10 words of prefixes and 10 words of suffixes and use them in sentences.
6	Select one news from any English newspaper. The news may be from any one of the following areas – Social, environmental, financial, economics, sports, etc. Prepare a summary of the news and make it presentable by using relevant photographs/graphics.
7	Students will be given ten collocations, develop three sentences for each collocation.
8	Listen and practice the dialogues with the help of interactive media/ interactive software

NOTE: The following assignment should be performed in the Language Laboratory/ with the help of interactive media.

## SUGGESTED LEARNING RESOURCES

SR. NO.	TITLE	AUTHOR	PUBLICATION
1	-----	MSBTE Textbook.	MSBTE
2	Raymond Murphy	Essential English Grammar	Cambridge
3	Wren And Martin	High School English Grammar And Composition	S Chand & Co.

COURSE NAME : ADVANCE DIPLOMA IN FIRE SERVICE ENGINEERING

COURSE CODE : FR

YEAR : FIRST

SUBJECT TITLE : FIRE ENGINEERING SCIENCE

SUBJECT CODE : 23141

## TEACHING AND EXAMINATION SCHEME

TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
02	01	--	03	100	--	--	--	100

## NOTE

- > Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- > Total of tests marks for all theory subjects are to be converted out of 100 and to be entered in mark sheet under the head Sessional Work (SW).

## RATIONALE:

Knowledge of Fire prevention, protection against fire and fire fighting process are very important to prevent loss life and property. This is a specialized training and the role of the Fire fighting agencies, departments is very important. Well trained manpower in this area is the need. Fire Science Is A Core Subject Which Is Useful In Job.

## OBJECTIVES

The student will be able to:

- Identify combustible matter.
- Select fire extinguishing method.
- List the extinguishing media or agent
- Label type of fire.
- Diagnose the cause of fire
- Read about properties of combustible matter.

## DETAILED CONTENTS





CHAPTER	CONTENTS	HOURS	MARKS
1	<p><b>Combustible Matter:</b>  <b>Combustible Solids,</b> Physical and Chemical properties of Combustible Solids, Wood, Grass, Fibers, Cloth, Paper, Rubber And Plastics, Magnesium, Zirconium, Sodium And Potassium, Zinc, Aluminum Etc.</p> <p><b>Flammable/ Combustible Liquids:</b> Physical and Chemical properties of Flammable/ Combustible Liquids, Explosivity and flammability range, Auto ignition temperature, Spontaneous combustion, Combustible Liquids Oils And Condensate, Paints, Thinners, Lacquers, Fuels, Solvents, Chemicals, Petrochemicals, Alcohols, Hydrocarbons, Residue from stored Hydrocarbons.</p> <p>Classification of petroleum liquids as per NFPA/PESO</p> <p><b>Combustible Gases:</b> Physical and Chemical properties of Combustible Gases, toxic or infectious, corrosive etc.</p> <p><b>Combustion:</b> Combustion and it's types, oxygen content in air by weight and volume, combustion of solid, liquid and gases, Exothermic and Endothermic reactions, Jet and flash, flames and its types, premixed, diffusion, turbulent, stationary and propagating flames, Burning velocity, Flash point, Fire point, Transmission of heat by conduction, convection and radiation.</p>	14	20
2	<p><b>Fire:</b> Definition of Fire, Fire Triangle, Tetrahedron of Fire, Classification of Fires. Types of extinguishing media or Agent, Principles of Fire extinguishing methods. Cooling, Starvation, Smothering (Blanketing), Retarding chain reaction.</p>	10	16
3	<p><b>Fire extinguishing media or agents:</b> Extinguishing property of water, characteristics of ideal liquid extinguishing agent and various forms of water like solid stream, fog and spray.</p> <p><b>Dry Chemical Powder:</b> Various types of dry chemical powders and their uses.</p>	10	16
4	<p><b>Foam:</b> Types of foam concentrate, Protein, AFFF, fluoro protein, Alcohol type, Low, medium and high expansion foam, Physical and chemical properties of foam. Carbon dioxide, FM 200 and similar extinguishing clean agents</p>	10	16
5	<p><b>Hydraulics:</b> Flow of water through pipes, calculation of velocity and flow, Friction Loss, Velocity and Pressure, Water Hammer, Discharge through Fire Nozzle, Nozzle Velocity, Jet Reaction and Back Pressure</p>	10	16
6	<p><b>Electricity :</b> Definitions of current, voltage, resistance, insulation, conductor, electrical circuits, Power, Electrical Fire hazards such as short circuit, static electricity, lightning, A.C., D.C., Heating effect of electricity.</p>	10	16
<b>Total</b>		<b>64</b>	<b>100</b>

## LIST OF ASSIGNMENTS

SR. NO.	ASSIGNMENT
1	Make a checklist with minimum five reasons on the theme "Water is best extinguishing media"
2	A tanker full of Class A solvent is to be unloaded in underground tank in a tank farm. Explain with sketch the earthing management and other safety precautions to be taken prior to start unloading solvent from tanker.
3	Give two examples of each. a. combustible solid b. combustible liquid c. combustible gases
4	Define Exothermic & Endothermic reactions with examples and chemical reaction of each one.
5	Hazardous Areas / Locations: a. Write a short note on Concept of hazardous zones. b. Write a short note on Concept of Class and Divisions. c. Write a short note on divisions and zones.
6	Draw a sketch of DCP extinguisher and explain working of each component of extinguisher in order to release powder.
7	Name five combustible matters
8	Differentiate between earthing and bonding with proper sketch.
9	Give examples of Transmission of heat by a. Conduction b. Convection c. Radiation
10	Draw a neat sketch explaining flow of water through pipes and various causes of friction loss
11	Draw a neat sketch of "Ordinary fire nozzle" explaining velocity, pressure and flow
12	Draw a neat sketch of "Electrical Circuit" mentioning current, voltage and resistance.
13	List out various causes of Electrical fires
14	Make a chart mentioning Various electrical currents Vs adverse effect on human being
15	Explain and make a list of various Earth leakage protections

## SUGGESTED LEARNING RESOURCES

SR. NO.	TITLE	AUTHOR	PUBLICATION
1	Low Expansion Foam, National Fire Protection Association. Volume 11	National Fire Protection Association (NFPA)	NFPA
2	Carbon dioxide Extinguishing Systems, National Fire Protection Association. Volume 12	NFPA	NFPA
3	Dry Chemical Extinguishing Systems, National Fire Protection Association. Volume 17	NFPA	NFPA
4	Fire officer's guide to dangerous	C.W Bahme	NFPA

SR. NO.	TITLE	AUTHOR	PUBLICATION
	chemicals		
5	Manual of firemanship part- 6 c	HMSO	HMSO
6	Fire Technology Chemistry and Combustion.	Institution of Fire Engineers	--
7	Fire Fighting Manual	National Safety Council	--
8	Fire Service Manuals	--	Akademia Books International Pvt. Ltd.
9	Introduction of Fire Science	Bush	
10	Manual of Fire Safety	N. Shesha Prakash	CBS Publishers
11	Cases of Combustion, Flame and Explosion	B.Lewis and G.Ven, Elbe	Academic Press
12	Fire- Fundamentals and Control	Walter	--
13	Concepts and Calculations, Fire Service Hydraulics.	G. C. Mishra	Technip Books International

**VIDEO CASSETTES/ CDS**

1. Foam. VC07, Academia Books International Pvt. Ltd.
2. Fire Scenario and Simulator. VC09, Akademia Books International Pvt. Ltd.
3. Fire Concepts and Behaviour VC29 NFPA
4. Fire Power. VC30, NFPA

**IS/ INTERNATIONAL CODES**

IS 4308:1982	Specification for dry powder for fire fighting (1 <sup>st</sup> revision) Dec. 1998.
IS 4861:1984	Specification for dry powder for fighting fires in burning metals (1 <sup>st</sup> revision) June 2000.
IS 4989(Part-I): 1985	Specification for foam concentrate (compound) for producing mechanical foam for firefighting – Part-I, Protein foam (2 <sup>nd</sup> revision) June 2000.
IS 4989(Part-II): 1984	Specification for foam concentrate for producing mechanical foam for fire fighting: part-II Aqueous Film Forming Foam - June 2000
IS 4989(Part-III):1987	Specification for foam concentrate (compound) for producing foam for fire fighting: Part-III Fluoro Protein foam.
IS 11833:1986	Specification for dry powder fire extinguisher for metal fires Aug. 2000.
IS 14609:1999	Specification for ABC dry powder for fire fighting.

COURSE NAME : ADVANCE DIPLOMA IN FIRE SERVICE ENGINEERING

COURSE CODE : FR

YEAR : FIRST

SUBJECT TITLE : SPECIAL FIRE HAZARDS

SUBJECT CODE : 23142

**TEACHING AND EXAMINATION SCHEME**

TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
02	01	--	03	100	--	--	--	100

**NOTE**

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 100 and to be entered in mark sheet under the head Sessional Work (SW)

**RATIONALE**

Recently new types of industries have come up such as petrochemical, atomic, gas stations etc. In summer season fires due to dust and dry wood occur. These are special types of fires. There are also incidences of gas/petrol leakage causing fire and accidents. The study of this subject will enable the students to acquire relevant knowledge.

**OBJECTIVES**

- Identify various special hazards.
- Select prevention and protection measures
- List various fire fighting equipments.
- Label nature and behavior of special hazards.
- Diagnose the cause of fire in special hazards.
- Read precautions while handling special hazards.



## DETAILED CONTENTS

CHAPTER	CONTENTS	HOURS	MARKS
1	<b>Explosives:</b> Definition, General classification of explosives, Fire fighting classification for fighting explosives and ammunitions fires, general principals to be observed in the storage of explosives. <b>Dust Fires:</b> Dust and gas explosion, Nature and behavior of dust, Causes of dust explosion and fires, Explosions suppression system, Preventive measures, Precautions while fire fighting.	14	20
2	<b>Fuels:</b> Study of various types of fuels, Solid, Liquid and Gaseous fuels, Bio-mass, Fossil Fuels, Advantageous and Dis- advantageous of various types of fuels. Introduction to Radioactivity, Zone specification, Radio Active Safety Officers responsibility	10	16
3	<b>LPG and LPG bottling plant:</b> Properties of LPG, Nature and behavior in fire, Fire prevention and protection in bottling plant, Safety in bottling plant, Storage of LPG, Hazards of LPG.	10	16
4	<b>Petrochemical Plants and Refinery Fires:</b> Fire safety of vehicle at first entrance at petrochemical plant and refinery, Fire preventive and protective measures in and around plant, Jet fires, Pool fires BLEVE, VCE	10	16
5	<b>Fire Risks at Airports:</b> Various categories of Airports, Basic fire hazards, jettison, nature of air crash, Access and escape / egress problems, Safety belts, Ejection seat, Rescue and fire fighting technique, Categorisation of casualties and process of rescue at involving aircrafts, Hazards at air ports, Protection of hangers, draining out of fuel in aircraft- Jettison, Rescue and fire fighting equipments kept at airports, on site and off site emergencies.	10	16
6	<b>Urban, Rural and Urban Fire handling:</b> Firefighting difficulties, Causes of fires, Equipments and appliances useful in urban, rural and forest fires.	10	16
<b>Total</b>		<b>64</b>	<b>100</b>

## LIST OF ASSIGNMENTS

SR. NO.	ASSIGNMENT
1	Explain the favourable condition for Dust explosion to occur with diagram
2	Make a list of equipment's and appliances required for forest fire.
3	Explain BLEVE with a neat sketch
4	List out the fire hazards, preventive measures and fire fighting system at hanger.
5	List the procedure of LPG bottling – filling and hazards associated while its handling



SR. NO.	ASSIGNMENT
6	Explain the working of Ejection seat and its use
7	List of various classification of explosives
8	List the difficulties in handling Rural fires and how will you plan to overcome the difficulties
9	Explain the advantages of Gaseous fuels over solid fuels
10	Explain the advantages of liquid fuels over solid fuels
11	List out Adverse impact of forest fire on environment

## SUGGESTED LEARNING RESOURCES

SR. NO.	TITLE	AUTHOR	PUBLICATION
1	LPG : The hazards and Fire Precautions	NFPA/ OISD 169/144	NFPA
2	Code of Practice for Hazardous Goods	NFPA	NFPA
3	Flammable Hazardous Materials	Mudi	--
4	Fireman's hand book of Hazardous Industries	HMSO	London fire Brigade
5	Fire Protection of Storage Buildings	NFPA	NFPA
6	Fire Loss Control	Planer	--
7	National fire codes	BIS	--
8	Explosives Identification Guide	Mike Pickett	--
9	Fire Protection facilities and Petroleum Refineries and Oil/Gas processing plants	OISD 116	--
10	Liquid Petroleum Gas LPG Installation	OISD 144	--
11	LPG – Tank Truck Incidents – Rescue & Relief Operation	OISD 161	--

## VIDEO CASSETTES/ CDS

- Regulatory Compliance OSHA set of 13 Videos. VC15, Academia Books International Pvt.
- LP Gases Emergencies, Planning and Response. VC21, Academia Books International Pvt.
- Petroleum Fire, VC22, NFPA
- Industrial Fire Hazards VC23, NFPA

COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING  
 COURSE CODE : FR  
 YEAR : FIRST  
 SUBJECT TITLE : FIRE FIGHTING DRILLS-I.  
 SUBJECT CODE : 23004

## TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	Total
--	--	05	--	---	50#	--	50@	100

## RATIONALE

Fire fighting drills is a core practical subject which gives practice to use various fire fighting equipment and accessories which is useful in job

## OBJECTIVES

The student will be able to:

- Identify various fire fighting drills.
- Select drill for proper event.
- List various movements for a particular drill.
- Label drill for equipments and squad.
- Diagnose errors in various drills.
- Read various applications of drills.



## LIST OF PRACTICAL

SR. NO.	ACTIVITY	HOURS
1	<b>TO PERFORM THE SQUAD DRILL AND TO VERIFY IT'S APPLICATIONS IN FIRE SERVICES:</b> Identification of Squad Drill, Working of Squad Drill, Importance of Squad Drill. What is Squad, Procedure for Formation of Squad, File, Rank, Sizing, Fall in, Fall Out, Various types of Cautions given to the Squad.	60
2	<b>TO IDENTIFY AND PERFORM THE MOVEMENTS OF A SQUAD :</b> Attention, Stand at ease, Stand easy, Mark time, Double mark time, Right dress, Left dress, Dress up, Open order march, Close order march, Forward march, Backward march, Steps to the right, Steps to the left, Directions of a Squad, Turning to the left, Turing to the right, Right about turn, From the right number, As you were, Proving of Parade.	60
3	<b>TO STUDY THE USE OF ROPES AND LINES IN FIRE SERVICE</b> Types and construction, material used in construction of ropes and lines. Different types of lines used in fire service for different purposes like rescue, lifting, lowering. Care and maintenance of ropes and lines.	40
<b>TOTAL</b>		<b>160</b>

## SUGGESTED LEARNING RESOURCES

SR. NO.	TITLE	AUTHOR	PUBLICATION
1	Fire fighting Drill Manual -	National Fire Service College, Nagpur	--
2	Practical Fire Safety And Ground Command Tips	National Fire Service College, Nagpur	--
3	Fire Fighters Drill Manual	A.S. Khan	Agni Seva Prakashan, Shikohabad

COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING  
 COURSE CODE : FR  
 YEAR : FIRST  
 SUBJECT TITLE : FIRE SERVICE EQUIPMENTS & APPLIANCES  
 SUBJECT CODE : 23005

## TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
--	--	05	--	--	50#	--	50@	100

## RATIONALE

A fire officer it is necessary to have complete knowledge of various firefighting equipment and machinery in terms of its working, use and maintenance. It is necessary for the students to have hands on experience of operating this equipment. This practice will be of importance on the job.

## OBJECTIVES

The student will be able to:

- Identify various fire service equipments.
- Select fire service equipment for proper event.
- List various uses for particular fire service equipment.
- Label various operations for particular equipment
- Diagnose faults in fire service equipment.
- Read methods of maintenance of equipments.



## LIST OF PRACTICAL

NOTE: Ten assignments one on each of below activities

SR. NO.	ACTIVITY	HOURS
1	<b>Perform Fire Fighting Hose Drill:</b> Hose Drill Actions: Lifting hose, Lowering hose, Carrying hose, Laying hose, Connect hose, Disconnect hose, Under running, Removal of the kink, Rolling Identification of different types of hose fittings and their uses.	10
2	<b>Perform Hydrant Drills:</b> 3 -man Hydrant Drill: Drill procedure with application of Hose and Hydrant Fittings: Add one length of hose, Remove one length of hose, Replace the burst Hose, Divide one line into two line using Dividing Breeching, Collect two line into one line using Collecting Breeching, Hydrant Gears and its operation.	10
3	<b>Perform Hydrant Drills:</b> 4 -man Hydrant Drill: Drill procedure with application of Hose and Hydrant Fittings: Add one length of hose, Remove one length of hose, Replace the burst Hose, Divide one line into two line using Dividing Breeching, Collect two line into one line using Collecting Breeching, Hydrant Gears and its operation.	10
4	<b>Identification, Selection, Operation And Maintenance Of Fire Extinguishers:</b> Identification of different types of Fire Extinguishers (Water Expelling type, Foam type, DCP type, CO <sub>2</sub> type) With respect to constructional feature, capacity operation and use in fires. It's effective application in extinguishment, Recharging procedure, Care and Maintenance, Performance test, Hydraulic test Inspection procedure -Weekly, monthly, quarterly, half yearly, yearly.	15
5	<b>To Identify The Use Of Fire Service Ladders</b> Types of ladders, their construction, uses, identification of parts, care and maintenance of ladders. <b>To Carry Out Standard Tests of Ladder</b> String test, round test, standard line test, acceptance test, deflection test.	15
6	<b>To Carry Out Four Men Drill</b> Formation of crew, individual working procedure on get to work command, ladder pitching, climbing, rescue operation, fire fighting, ventilation procedure, ladder carrying, drill report.	15
7	<b>Identify Foam Making Branch Pipes</b> Protein Foam, Aqueous Film Forming Foam (AFFF), Foam Making Branch 5X (FB 5X), Foam Making Branch 10 X (FB 10X), Inline inductor, Pick-up -tube.	15
	<b>Fire Tender Drill</b> 6 -man Water Tender Drill: Mounting procedure, Dismounting procedure, Individual working procedure like -working with ladder, Application of different types of signals applied during pump operation, working with	15

	B.A. set, Soft suction, Hard suction.	
9.	<b>To Study Breathing Apparatus Set</b> Study, working, identification of different parts of BA, Donning Procedure, Pre-Entry Test, BACO, Tally, Searching operation procedure with Guide Line and Personnel Line, <u>Entrapped Procedure</u> , Use of Y manifold.	20
10	<b>Study Of Small Gears Used In Fire Service</b> Grouping of Small Gears with examples – Fireman Axe, Ceiling Hook, Drag Hook, Fire Beater, Door Breaker, Steel shod lever, Pad Lock Remover, Persuader, Spreader, Cutter, Bending Bar, Quick Release Knife, Shears, Bolt cutter, Search light, Focusing light. Study of hydraulically operated small gears and their use in Rescue Operation Care and Maintenance of small gears.	20
	<b>TOTAL</b>	<b>160</b>

## SUGGESTED LEARNING RESOURCES

SR. NO	TITLE	AUTHOR	PUBLICATION
1	Fire Fighting Drill Manual	NFSC	--
2	Practical Fire Safety And Ground Command Tips	NFSC	--
3	Fire Fighters Drill Manual	A.S. Khan	Agni Seva Prakashan, Shikohabad

**COURSE NAME** : DIPLOMA IN FIRE SERVICE ENGINEERING  
**COURSE CODE** : FR  
**YEAR** : FIRST  
**SUBJECT TITLE** : FIELD WORK  
**SUBJECT CODE** : 23006

## TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
--	--	07	--	--	50#	--	50@	100

## RATIONALE

Field Work will provide opportunity to the students to study various fire fighting systems used at various locations. This will be useful for the student in their job.

## OBJECTIVES

The student will be able to:

- Identify various fire risks.
- Select various fire service equipments for particular fire risk.
- List various firefighting systems for a particular fire risk.
- Label various operations for fighting a particular fire risk.
- Diagnose faults in a particular fire risk.
- Read methods of operation and maintenance of equipments in a particular fire risk.



## LIST OF PRACTICAL

Students shall submit report on their visits on continuous basis on any two of the following at Sr No. 1 to 11 and also shall submit their report on topics at Sr. No. 12 & 13

SR. NO.	LIST OF ACTIVITIES	HOURS
1	To identify fire risks in a hospital in a city/ town and evaluate firefighting, safety and rescue measures provided. Presentation in the class.	14
2	To identify fire risks at an airport building and firefighting, safety and rescue measures provided. Presentation in class.	21
3	To identify fire risks in a cement industry and evaluate firefighting, safety and rescue measures provided. Presentation in the class.	21
4	To identify fire risks in a ware house/ godown and evaluate firefighting, safety and rescue measures provided. Presentation in the class.	21
5	To identify fire risks at LPG bottling plant/ petroleum depot and firefighting, safety and rescue measures provided. Presentation in the class.	21
6	To identify fire risks in a steel industry and evaluate firefighting, safety and rescue measures provided. Presentation in the class.	21
7	To identify fire risks in a petroleum depot and evaluate firefighting, safety and rescue measures provided. Presentation in the class.	14
8	Attachment with any fire brigade service.	7
9	To identify fire risks in a textile industry and evaluate firefighting, safety and rescue measures provided. Presentation in the class.	14
10	To identify fire risks in a high rise building and evaluate firefighting, safety and rescue measures provided. Presentation in the class.	14
11	To identify fire risks in any particular class of hazard which falls as intermediate to High hazard category as per hazards classification and evaluate firefighting, safety and rescue measures provided. Presentation in the class.	14
12	Microsoft Internet Explorer 5 & the Internet Connecting to the Internet The Internet Explorer program window The on-line web tutorial Using hyper links Responding to an email link on a web page	21
13	Searching the Internet for fire/ firefighting/ fire prevention related topics Searching the web via Microsoft Internet Explorer Searching the Internet using Web Crawler Searching the Internet using Yahoo Commonly used search engines	21
<b>TOTAL</b>		<b>224</b>

## SUGGESTED LEARNING RESOURCES

Related is/ International Codes/ Websites: National Building Code Of India, And Building Bye Laws of The City.

COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING

COURSE CODE : FR

YEAR : SECOND

SUBJECT TITLE : INTERNSHIP

SUBJECT CODE : 23030

## TEACHING AND EXAMINATION SCHEME

TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
--	--	--	--	--	--	50@	50@	100

## NOTE

- Internship shall be completed by the students for a duration of Six weeks at the end of First Year during the vacation. The student must submit the Log book of daily activities performed and learnings, Certificate from the Organization and the training report. The same shall be assessed by the Internal Examiner at the beginning of the Second Year and the marks shall be submitted to MSBTE at the end of Second Year.

## RATIONALE

There are various activities related to fire prevention and fire fighting in an individual industry based on the industry specific requirements and regulatory provisions. The internship will be related to acquiring knowledge and skill w.r.t. fire services as deployed in a particular industry where the student is engaged for his internship.

## OBJECTIVES

Student will be able to get hands on experience of various aspects of industrial fire prevention and fire fighting aspects.

COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING  
 COURSE CODE : FR  
 YEAR : SECOND  
 SUBJECT TITLE : INDUSTRIAL SAFETY  
 SUBJECT CODE : 23201

## TEACHING AND EXAMINATION SCHEME:

Teaching Scheme				Exam Scheme & Maximum Marks				
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
02	01	--	03	100	--	--	--	100

## NOTE

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 100 and to be entered in mark sheet under the head Sessional Work (SW)

## RATIONALE

Acquire the Knowledge, Skill and Mechanism of functioning of machine, tools and safe use of the same

## OBJECTIVES

Equipping students with skills and techniques for:

1. To prevent accident while working at different levels by following work permit systems.
2. Ventilation: Health hazards due to improper ventilation. Types of ventilation, measurement of thermal environment and preventive measures.
3. Noise Pollution: Hazard due to noise. Monitoring of the noise level and preventive measures to be taken.
4. This topic deal with the work environment in shops. Physical hazards in the shop and preventive measures.

## DETAILED CONTENTS

CHAPTER	CONTENTS	HOURS	MARKS
1	<b>HAZCHEM CODE:</b> Importance of Hazchem, Objectives of Hazchem, Basic features of MSDS (Material Safety Data Sheet). Emergency Information Panel (EIP) <b>Transportation Of Hazardous Materials:</b> Trem card, Guidelines of United Nations in Transportation of Hazardous Material. <b>Major Accident Hazards (MAH) (KEY ELEMENTS) :</b> Major Accident Control: Definition, Major Accident Hazards, Identification and Assessment of MAH Units. Role of Govt., Role of Management, Local Authorities and Public	14	20
2	<b>Principles of Accidents Prevention:</b> Definition: Incident, accident, injury, dangerous, occurrences, unsafe acts, unsafe conditions, hazards, error, oversight, mistakes etc. Incident Control and duties/ functions of ICO's (Incident control officer) Duties of operation, liaison and report to control room and competent authority. <b>Accident Prevention:</b> Theories/Models of accident occurrences. Principles of accident Prevention. Accident and Financial implication- Cost of accident, Measurement and Evaluation of Performance.	10	16
3	Important features of Factories Act 1948 and applicable Maharashtra Factory Rules in relation to Industrial Safety.	10	16
4	Code Of Practice (Safe Work Practices) For Safety In Industries and important Features of Formats for Work Permit System, for Hot Work, Cold Work, Vessel Entry, Working at Height, Excavations, Safety Tag System, salient features of Safe Operating Procedures. OISD 105.	10	16
5	<b>Working at Heights:</b> Incidence of accidents. Safety features associated with ladders, scaffolds, safety belt and Full body safety harness. Working on roofs, Other safety requirements while working at heights.	10	16
6	<b>Personal Protective Equipments:</b> OISD 1551, 1552 Respiratory Protection, Management of Noise: Various types of PPE's, their importance and uses. Helmets, Safety goggles, Ear plugs, mufflers, safety shoes, canisters, chemical resistant and Fire Retardant suits.	10	16
<b>Total</b>		<b>64</b>	<b>100</b>





## LIST OF ASSIGNMENTS

SR. NO.	ASSIGNMENTS
1	Explain the importance and features of Hazchem code
2	Explain with diagram Emergency Information Panel ( EIP)
3	List out criteria of the MAH unit.
4	Explain the various sections and rules associated with safety as per FA & MFR.
5	Explain various Theories of Accident Prevention
6	Draw a sketch of Noise meter. Label each component.
7	Differentiate between unsafe conditions and unsafe acts giving examples
8	Explain the procedure and precautions w.r.t. work permit for working on fragile roof
9	Explain the functions and duties of an INCIDENT CONTROL OFFICER
10	Explain the use and need of TREM Card along with its content.
11	Make a broad list of contents (16 points) of Material Safety Data Sheet (MSDS)

Note: The faculty are expected to at least perform two more assignments over and above the list as per the curriculum.

COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING  
 COURSE CODE : FR  
 YEAR : SECOND  
 SUBJECT TITLE : FIRE PREVENTION, RESCUE AND PARAMEDICS  
 SUBJECT CODE : 23202

## TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME				EXAM SCHEME & MAXIMUM MARKS				
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
02	01	--	03	100	--	--	--	100

## NOTE

- > Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- > Total of tests marks for all theory subjects are to be converted out of 100 and to be entered in mark sheet under the head Sessional Work (SW)

## RATIONALE

It is always said that prevention is better than cure and as such the students of this course must also know how to prevent fire to avoid loss of property and human beings. Thus must also know how to provide protection in the event of a fire.

## OBJECTIVES

The student will be able to:

- Identify the causes of fire.
- Select proper protection facilities.
- List prevention activities.
- Label instructions and safety signs.
- Diagnose the faults in the system.
- Read rules and regulation.



FR

## DETAILED CONTENTS

CHAPTER	CONTENTS	HOURS	MARKS
1	<b>Fire Prevention and Protection:</b> Organization for fire prevention, inspection enforcement of codes, public education and community relation, Fire loading, Access for firefighting, Causes of fire and their preventive methods, housekeeping, Standing fire orders, fire practice and mutual aid scheme. Fire Prevention and Protection for flammable Gas and Liquid plants. Fire protection, fire prevention and its importance, means of escape in case of fire, fire separation and compartmentation fire notices	14	20
2	<b>Chemical Leak:</b> Prevention and protective measures to be taken in case of Gas/ Liquid leak from Chlorine tonner, LPG tanker, Ammonia container.	10	16
3	<b>Storage of Hazardous Material:</b> Warehouse and its requirements, Ventilation, entrance and exits, Types of storages and various methods of stacking of goods, Firefighting arrangements and action in case of fire as per rules, Factors involved in fire risk, standard basis, Fuel storage and gas cylinders.	10	16
4	<b>Salvage:</b> Damage due to fire, smoke and water, Equipment for salvage work, salvage covers, Forced entrance, salvage works, Packing and Storing, Salvage before entering fire ground, After entering fire ground, Salvage following fire ground, saving property. <b>Rescue:</b> Lift rescue, Rescue by Hydraulic Platform, Rescue by Chutes, rescue from sewers, road, railway and highway accidents, rescue from collapsed building, rescue of animals, rescue from debris, rescue from wells, rivers. Rescue from train and aircraft accidents.	10	16
5	<b>Paramedics And First Aid:</b> Provision and siting of first aid firefighting equipments, ventilation systems including fire and smoke venting. Study of paramedics and approach to casualty, structure and function of human body, Respiration, Circulatory system and Asphyxia, Dressings and Bandages, Wounds, bleeding and shock, Injuries of bones(fractures), Injuries to muscles and joints, Nervous system and unconsciousness, Burns and Scalds, Poisoning and its assessment e.g. Rule of NINE, Poisoning	10	16
6	<b>Miscellaneous conditions,</b> Approach to casualty, Psychological aspects and first aid, Labeling of casualties, Handling and transportation of injured persons, Ambulances and Types.	10	16
<b>Total</b>		<b>64</b>	<b>100</b>

## LIST OF ASSIGNMENTS

SR. NO.	ASSIGNMENT
1	Explain the importance of Compartmentation
2	What are different types of bandaging methods? Explain with diagram
3	List the different methods of transportation of victims
4	Explain in detail with diagram various Rescue methods using chute system
5	Explain the method of containing a leakage from a chlorine tonner
6	List the procedure of arresting leakage from LPG container.
7	List the various safety measures for a LPG bottles storage warehouse
8	Explain in details the fire fighting arrangement in a LPG Bullet yard
9	Explain the importance of Mutual aid and its benefits
10	List the first aid measures in case of Asphyxiation, Burns and inhalation of smoke

## SUGGESTED LEARNING RESOURCES

SR. NO.	TITLE	AUTHOR	PUBLICATION
1	National Building Code-Part IV	BIS	--
2	General Fire Hazards and Fire Protection	JJ Williams	--
3	Fire Prevention Notes for Industrial Premises	Kestern Fire Brigade	NFPA
4	Hand book of Fire Protection	NFPA	NFPA
5	Fire Prevention Standard Recommendations	Ernest Beam Ltd.	--
6	Early Warning Smoke Detection cum Fire Alarm System	Nilesh B. Ukunde	--
7	Fire protection in Factory Buildings	HMSO	HMSO
8	Automation - A Challenge to Fire Protection Engineers	Warren J Baker	--
9	Fire Protection- Technical Information and Useful General Knowledge	Mather and Platt.	--
10	Forster Hand Book of Fire Protection.	Crosby-Fiske	--
11	Industrial Fire Hazards	Danna and Milne	--
12	Fire protection for the design professional	Rof Jensen	--
13	Introduction to Fire science and Fire protection	William K. Bare	--
14	Encyclopedia of Fire Protection	Dennis P. Nelan	--
15	Fire Suppression and Detection	Bryan	--



	System		
16	Fire Prevention: Inspection and Code Enforcement	David Diamentas	--
17	Automatic Sprinkler System, Handbook 2002m	Dubey	--

**IS/ INTERNATIONAL CODES/ WEBSITES**

IS 6382:1984	Code of practice for design and installation of fixed carbon dioxide fire extinguishing system. (1 <sup>st</sup> Revision)
IS 15105-2002	Design and installation of fixed automatic sprinkler fire extinguishing system
IS 2175:1988	Specification for heat sensitive fire detectors for use in automatic detectors for use in automatic alarm system (2 <sup>nd</sup> Revision)
IS 2189:1999	Code of practice for selection installation and maintenance of automatic fire detection and alarm system (2 <sup>nd</sup> Revision )
IS 9457:198	Safety colours and safety signs.

**COURSE NAME** : DIPLOMA IN FIRE SERVICE ENGINEERING  
**COURSE CODE** : FR  
**YEAR** : SECOND  
**SUBJECT TITLE** : FIRE DETECTION AND FIRE FIGHTING SYSTEMS  
**SUBJECT CODE** : 23203

**TEACHING AND EXAMINATION SCHEME:**

TEACHING SCHEME				EXAM SCHEME & MAXIMUM MARKS				
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
02	01	--	03	100	--	--	--	100

**NOTE**

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 100 and to be entered in mark sheet under the head Sessional Work (SW)

**RATIONALE**

It is always said that prevention is better than cure and as such the students of this course must also know how to prevent fire to avoid loss of property and human beings. Thus must also know how to provide protection in the event of a fire.

**OBJECTIVES**

The student will be able to:

- Identify the causes of fire
- Select proper protection facilities.
- List prevention activities.
- Label instructions and safety signs.
- Diagnose the faults in the system.
- Read rules and regulation.



## DETAILED CONTENTS

CHAPTER	CONTENTS	HOURS	MARKS
1	<b>Detection System:</b> Need of detection system in fire service, Automatic fire detectors, General Principle of working of common detectors, Various types of detectors viz. heat detectors, Smoke detector, Beam detectors, (VESDA) Very Early Smoke Detection System, photo-electric relay, ionization chamber, their operational principle, Infra-red heat detectors, General test for heat detector. <b>DPITC of Detection System:</b> Various components of a smoke detection system, Study of Code of Practice for Selection, Installation and maintenance of Automatic Fire Detection and Alarm System I.S. 2189 / 1988	14	20
2	<b>Primers - Reciprocating primer, Exhaust ejector primer, Water ring primer and Rotary primer, Uses, Advantages and disadvantages of various primers. Deluge system, Drenchers, sprinkler system IS 9972-2002</b>	10	16
3	<b>Water Supply:</b> Water supply from designing point of view, Types of Water supplies, IS 9668-1990 provision and Maintenance of water supply for fire fighting. Pumps: Definition, Working Principles of Pumps, Types of Pumps. Positive Displacement Pump, Force Pump, Lifts Pump, Rotary Pump, Submersible pumps etc.. Centrifugal pump, Multistage pumps. Characteristics of centrifugal pump.	10	16
4	<b>Fire Hydrant System:</b> Hydrants, IS 908-1975 Fire hydrant stand post type, IS 909-1992 sluice valve type, IS 5714-1981 Hydrant stand pipe, Screw down type as per IS. I.S. 13039-1991 External Hydrant system provision and Maintenance	10	16
5	<b>Designing Point Installation, Testing &amp; Commissioning of Fire Hydrant System:</b> Input about various components of a fire hydrant system, its basic design criteria, installation, testing & commissioning.	10	16
6	<b>First Aid Fire Fighting System [ Hose Reel ]:</b> Details of Fire Assessment, Fire Fighting System and its use, Rising Mains : Down Comer, Wet Riser, Dry Riser	10	16
<b>Total</b>		<b>64</b>	<b>100</b>

## LIST OF ASSIGNMENTS

SR. NO.	ASSIGNMENT
1	Explain with sketch Down comer and wet riser
2	Explain the provision to be made for water supply for fire fighting
3	Explain in detail the working of sprinklers and its bulb colour code for temperature applications
4	Draw diagram and explain the Fire hydrant stand post type as per IS 908-1975
5	List and explain different types of pumps used in integrating the hydrant system
6	Explain the components of fixed Fire fighting system that are installed in an industry
7	Explain the method of maintenance and testing of Alarm and hydrant system
8	Explain the method of maintenance and testing of smoke detectors
9	Explain the method of maintenance and testing of sprinkler system
10	Explain advantages and disadvantages of different types of primers

## SUGGESTED LEARNING RESOURCES

SR. NO.	TITLE	AUTHOR	PUBLICATION
1	National Building Code-Part IV	BIS	--
2	Fire Prevention Hand Book	NFPA	NFPA
3	Hand book of Fire Protection	NFPA	NFPA
4	Fire Prevention Notes for Industrial Premises	Kestern Fire Brigade	NFPA
5	General Fire Hazards and Fire Protection	JJ Williams	--
6	Fire protection in Factory Buildings	HMSO	HMSO
7	Forster Hand Book of Fire Protection.	Crosby-Fiske	
8	Encyclopedia of Fire Protection	Dennis P. Nelan	
9	Industrial Fire Hazards	Danna and Milne	
10	Fire Prevention Standard Recommendations	Ernest Beam Ltd.	--
11	Early Warning Smoke Detection cum Fire Alarm System	Nilesh B. Ukunde	--
12	Fire Protection- Technical Information and Useful General Knowledge	Mather and Platt.	--
13	Automation - A Challenge to Fire Protection Engineers	Warren J Baker	--
14	Fire protection for the design	Rof Jensen	



	professional		
15	Introduction to Fire science and Fire protection	William K. Bare	
16	Fire Suppression and Detection System	Bryan	--
17	Fire Prevention: Inspection and Code Enforcement	David Diamentas	--
18	Automatic Sprinkler System, Handbook 2002	Dubey	--

**IS/ INTERNATIONAL CODES/ WEBSITES**

IS 6382:1984	Code of practice for design and installation of fixed carbon dioxide fire extinguishing system. (1 <sup>st</sup> Revision)
IS 15105-2002	Design and installation of fixed automatic sprinkler fire extinguishing system
IS 2175:1988	Specification for heat sensitive fire detectors for use in automatic detectors for use in automatic alarm system (2 <sup>nd</sup> Revision)
IS 2189:1999	Code of practice for selection installation and maintenance of automatic fire detection and alarm system (2 <sup>nd</sup> Revision)

**COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING**  
**COURSE CODE : FR**  
**YEAR : SECOND**  
**SUBJECT TITLE : FIRE SAFETY IN BUILDINGS**  
**SUBJECT CODE : 23204**

**TEACHING AND EXAMINATION SCHEME:**

TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
02	01	--	03	100	--	--	--	100

**NOTE**

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 100 and to be entered in mark sheet under the head Sessional Work (SW)

**RATIONALE**

Knowledge of National Building Code, Map Reading to understand the layout of the building which indicates the fire escape routes, Emergency exits. It is also necessary to know about the storage of hazardous materials. This is essential for safety and rescue operations.

**OBJECTIVES**

The student will be able to:

- Identify various types of buildings.
- Select means of escape and rescue.
- List fire safety arrangements.
- Label fire protection installations.
- Diagnose the cause of fire, fire risks.
- Read building plans and layouts.



## DETAILED CONTENTS:

CHAPTER	CONTENTS	HOURS	MARKS
1	Study of National Building Code of India with specific reference to part –IV: Classification of buildings as per NBC.	14	20
2	Fire Protection facilities at High Rise Buildings	10	16
3	<b>Plan Reading</b> : Importance of plan with methods of readings, Requirements of standards, Preparation of standard symbols, Designation of floors, Symbols and abbreviation of fixed firefighting equipment structural symbol and small-scale drawings, Miscellaneous symbols for small-scale drawings, Fire protection symbols for small scale. Drawings and layout plans. Basic construction features in buildings viz. walls, floors, Plinth, roofs, Construction of building by wood versus construction by using RCC	10	16
4	<b>Hazards Associated In High Rise Buildings:</b> Domestic and firefighting water storage. Lift and fireman's lift. Compartmentation and refuge area.	10	16
5	<b>Means of Escape:</b> Evacuation drill in HRB and precautions, IS 9457-1980 safety colours and signs, IS 12349-1988 Fire protection safety signs, IS 12407-1988 Graphic symbols for fire protection plans, IS 13716-1993. Precautions relating to personal safety in various occupancies, Constructional features of exits and type of exit, their location and travel distance, Roof exits, probable means of escape and their maintenance	10	16
6	<b>Lobbies &amp; AHUs:</b> Concept & basic details about Pressurized Lobbies and AHU Units in Buildings	10	16
<b>Total</b>		<b>64</b>	<b>100</b>

## LIST OF ASSIGNMENTS:

SR. NO.	ASSIGNMENT
1	Explain the importance of Fire man's lift
2	Explain the main focus of NBC with reference to safety
3	Explain in details Pressurized lobbies
4	Explain the application and working of AHU's
5	List the classification of types of buildings as per NBC
6	Explain the different types and importance of safety signs as per colour w.r.t IS 9457-1980
7	Explain in details the constructional features of EXITS and type of EXITS as per NBC for high rise buildings
8	Draw different fire protection safety signs as per IS 12349-1988
9	Explain the fire protection provision to be made while building is under construction
10	Explain the provisions of Refuge Area as per NBC

## SUGGESTED LEARNING RESOURCES

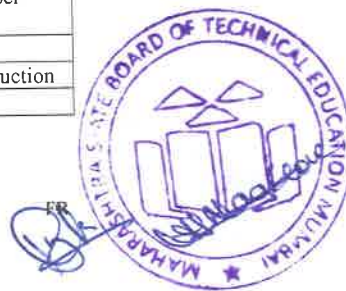
SR. NO.	TITLE	AUTHOR
1	National Building Code of India, 1983	BIS
2	Means of Escape in case of Fire in Offices Shops and Railway Premises	HMSO
3	Behaviour of Structural Steel in Fire Symposium	HMSO
4	Manual of Safety Requirement in theatres and other places of Public Entertainment	HMSO
5	Hazardous materials Response and Operation	HMSO
6	Fire Protection of Storage Buildings NFPA	NFPA
7	Fire Safety in High Rise Buildings NFPA	NFPA
8	Fire Protection for High Bay Ware-Houses NFPA	NFPA
9	National Fire Code of Sprinklers NFPA	NFPA
10	High Rise Buildings Fires and Fire Safety	NFPA
11	Relevant Code of practices for Fire safety of Building I. S.I.	Institution Of Engineers
12	Means of Escape - A guide for Fire Authorities	Institution of Engineers
13	Fire and Fire Risers UNISEF	UNISEF
14	Fire Protection Manual I & II	TAC
15	Fire Safety in Building	Adam & Charles Black
16	Concept in Building Fire Safety	Eagan
17	Building Construction	Rangwala
18	Hazardous Material Incidents	Hawley

## VIDEO CASSETTES/ CDS

1. Chemical Hazards Identification and Training Series. VC13, Akademia Books International Pvt. Ltd.
2. Emergency Preparedness and Crisis Management. VC14, Akademia Books International Pvt. Ltd.
3. Collapse of Burning Building, Technip Books International.

## IS/ INTERNATIONAL CODES/ WEBSITES

1. IS 12349:1988 Fire protection – Safety signs.
2. IS 12407:1988 Graphic symbols for fire protection plans.
3. IS 9457-1980 Safety COLOUR and Safety Sign



COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING  
 COURSE CODE : FR  
 YEAR : SECOND  
 SUBJECT TITLE : BUSINESS COMMUNICATION SKILLS-II  
 SUBJECT CODE : 23205

## TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
02	01	02	03	100	--	50#	50@	200

## NOTE

- > Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- > Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)

## RATIONALE

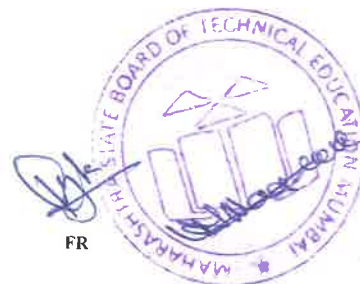
In this age of globalization, competition is tough. Hence effective communication skills are important. Communication skills play a vital and decisive role in career development. The subject of Communication Skills introduces basic concepts of communication. It also describes the verbal, non-verbal modes and techniques of oral & written communication.

It will guide and direct to develop a good personality and improve communication skills.

## GENERAL OBJECTIVES

Students will be able to:

- Utilize the skills necessary to be a competent communicator.
- Select and apply the appropriate methods of communication in various situations



FR

## DETAILED CONTENTS

CHAPTER	CONTENTS	HOURS	MARKS
1	<b>Introduction to Communication:</b> Definition of communication Process of communication Types of communication ~ Formal, Informal, Verbal, Nonverbal, Vertical, Horizontal, Diagonal Basic Principles of Communication	14	20
2	<b>Effective business communication</b> Principles of business communication. Barriers to communication <b>a. Physical Barrier:</b> Environmental (time, noise, distance & surroundings), Personal (deafness, stammering, ill-health, spastic, bad handwriting) <b>b. Mechanical:</b> Machine oriented <b>c. Psychological:</b> Day dreaming, prejudice, emotions, blocked mind, generation gap, phobia, status, Inattentiveness, perception. <b>d. Language :</b> Difference in language, technical jargons, pronunciation & allusions	10	16
3	<b>Nonverbal business communication</b> <b>Non-verbal codes:</b> Proxemics, Chronemics, Artifacts <b>Aspects of body language ( Kinesics):</b> Facial expression Eye contact, Vocalic, paralanguage, Gesture, Posture, <u>Dress &amp; appearance, Hepatics</u>	10	16
4	<b>Graphical business communication</b> Advantages & disadvantages of graphical communication Tabulation of data & its depiction in the form of bar graphs & pie charts.	10	16
5	<b>Listening</b> Introduction to listening Listening versus hearing Merits of good listening Types of listening Techniques of effective listening.	10	16
6	<b>Formal Written Business Communication</b> Office Drafting: Notice, memo & e-mail, Job application with resume. Business correspondence: Enquiry letter, order letter, complaint letter, adjustment letter. Report writing: Accident report, fall in production, investigation report. <u>Describing objects &amp; giving instructions</u>	10	16
<b>TOTAL</b>		<b>64</b>	<b>100</b>

## LIST OF ASSIGNMENTS

SR. NO.	ASSIGNMENTS
1	Draw the diagram of communication cycle for given situation. State the type and elements of communication involved in it.
2	<b>Graphics:-</b> a) Draw suitable bar-graph using the given data. b) Draw suitable pie-chart using the given data.
3	Business Letter writing under different situations

NOTE: The above assignments to be performed by using Language Software

## LIST OF PRACTICALS

SR. NO.	PRACTICAL	HOURS
1	<b>Role play:</b> Teacher should form the group of students based on no. of characters in the situation. Students should develop the conversation and act out their roles.	08
2	Collect five pictures depicting aspects of body language from different sources such as magazines, newspapers, internet etc. State the type and meaning of the pictures.	08
3	Practice conversations with the help of software.	16
4	Describe people/personalities with the help of software and present in front of your batch.	08
5	Prepare and present elocution (three minutes) on any one topic with the help of software.	16
6	Describe any two objects with the help of software.	08
<b>TOTAL</b>		<b>64</b>

## SUGGESTED LEARNING RESOURCES

SR. NO.	TITLE	AUTHOR	PUBLICATION
1	Text book of Communication Skills.	MSBTE, Mumbai.	MSBTE, Mumbai.
2	CD On Communication Skills	MSBTE, Mumbai.	MSBTE
3	Communication Skills	Joyeeta Bhattacharya	Reliable Series
4	Communication Skills	Sanjay Kumar, Pushpa Lata	Oxford University Press
5	Business Communication	Vandana Khetarpal	Excel Books. Pvt. Ltd.

## SUGGESTED E-LEARNING RESOURCES

1. [www.mindtools.com/page8.html-99k](http://www.mindtools.com/page8.html-99k)
2. [www.khake.com/page66htm/-72k](http://www.khake.com/page66htm/-72k)
3. [www.letstalk.co.in](http://www.letstalk.co.in)
4. [www.inc.com/guides/growth/23032.html-45k](http://www.inc.com/guides/growth/23032.html-45k)

COURSE NAME : DIPLOMA IN FIRE SERVICE ENGINEERING

COURSE CODE : FR

YEAR : SECOND

SUBJECT TITLE : FIRE FIGHTING DRILLS-II

SUBJECT CODE : 23031

## TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
--	--	06	--	--	50#	--	50@	100

## RATIONALE

Firefighting drills is a core practical subject which gives practice to use various firefighting equipment and accessories which is useful in job

## OBJECTIVES

The student will be able to:

- Identify various firefighting drills.
- Select drill for proper event.
- List various movements for a particular drill.
- Label drill for equipments and squad.
- Diagnose errors in various drills.
- Read various applications of drills.





## LIST OF PRACTICAL

SR. NO.	ACTIVITY	HOURS
1	<b>TO IDENTIFY THE MARCHING OF A SQUAD:</b> Quick march, Double march, Slow march, Right turn, Left turn, Halt, Forward, Break up, Change direction, Change formation, Reformation of Squad, Saluting, Reporting, Getting on Parade, Inspection Parade, Guard of honour.	84
2	<b>TO CARRY OUT STANDARD TESTS OF LINES</b> Test procedure by six fire personnel.	72
3	<b>TO STUDY DIFFERENT TYPE OF KNOTS</b> Rescue knots: Bow line, Running bow line, Bow line on the bight, Chair knot. Self-rescue knots: Slippery hitch, draw hitch. Other knots: Loop, Half hitch, Thumb knot, figure of eight, Clove hitch, Rolling hitch, Round turn two half hitch, fisherman's hitch, waterman's hitch, Cat's paw, Sheep shank, Single sheet bend, Double sheet bend, Reef knot, Carrick bend, midshipman hitch. Construction and application of guide lines.	36
<b>TOTAL</b>		<b>192</b>

**TW:** Detail report of above activities.

## SUGGESTED LEARNING RESOURCES

SR. NO.	TITLE	AUTHOR	PUBLICATION
1	Fire fighting Drill Manual	National Fire Service College, Nagpur	--
2	Practical Fire Safety And Ground Command Tips	National Fire Service College, Nagpur	--
3	Fire Fighters Drill Manual	A.S Khan	Agni Seva Prakashan, Shikohabad



**COURSE NAME** : DIPLOMA IN FIRE SERVICE ENGINEERING

**COURSE CODE** : FR

**YEAR** : SECOND

**SUBJECT TITLE** : RESCUE TECHNIQUES

**SUBJECT CODE** : 23032

## TEACHING AND EXAMINATION SCHEME:

TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
--	--	06	--	--	50#	--	50@	100

## RATIONALE

Rescue of people caught in fire or in disaster is very important. The hands on drills through this practical will help to handle the live situations effectively and efficiently

## OBJECTIVES

The student will be able to:

- Identify various rescue techniques.
- Select rescue techniques for proper event.
- List rescue techniques for a particular event.
- Label importance of rescue techniques.
- Diagnose errors in various rescue techniques.
- Read various applications of rescue techniques.

## LIST OF PRACTICAL:

SR. NO.	ACTIVITY	HOURS
1	<b>To Study Breathing Apparatus Set</b> Study, working, identification of different parts of BA. Donning Procedure. Pre-Entry Test. BACO. Tally. Searching operation procedure with Guide Line and Personnel Line. Entrapped Procedure. Use of Y manifold.	24
2	<b>Study Of Small Gears Used In Fire Service</b> Grouping of Small Gears with examples – Fireman Axe, Ceiling Hook, Drag Hook, Fire Beater, Door Breaker, Steel shod lever, Pad Lock Remover, Persuader, Spreader, Cutter, Bending Bar, Quick Release Knife, Shears, Bolt cutter, Search light, Focusing light. Study of hydraulically operated small gears and their use in Rescue Operation Care and Maintenance of small gears	24
3	<b>Bandages And Their Respective Uses</b> Rolling Bandages: Width of roller bandage, application – Simple spiral, Reverse spiral. Figure of Eight, Triangular bandages – for the scalp, for the forehead, Eye, cheek or any part which is found in shape, Front or back of the chest, for the shoulder, for the elbow, for the hand, fore the hip and groin, for the knee, for the foot, stump, types of slings and its application, Arm sling, Collar and cuff sling, Triangular Sling, improvised Sling.	36
4	<b>Resuscitation Procedures</b> Methods of artificial Respiration like – Holger Nielson Method, Schaefer's Method, Sylvester's Method, Mouth to Mouth, Eve's rocking stretcher Method, Emerson Method.	48
5	<b>To Perform Drill For Transportation Of Casualties</b> 4-man Stretcher Drill – Objectives, Equipment, Drill procedure by individual No.1 to No.4 Rescuer, Loading Casualties to the Ambulance	60
<b>TOTAL</b>		<b>192</b>

TW: 10 Assignments based on above activities (2 for each activity).

## SUGGESTED LEARNING RESOURCES

SR. NO.	TITLE	AUTHOR
1	Firefighting Drill Manual	HMSO
2	Practical Fire Safety And Ground Command Tips	--

COURSE NAME : ADVANCE DIPLOMA IN FIRE SERVICE ENGINEERING

COURSE CODE : FR

YEAR : FIRST

SUBJECT TITLE : PROJECT

SUBJECT CODE : 23033

## TEACHING AND EXAMINATION SCHEME

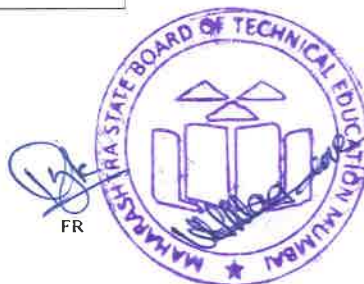
TEACHING SCHEME			EXAM SCHEME & MAXIMUM MARKS					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
--	--	04	--	--	--	50#	50@	100

## RATIONALE

The main aim of the preparation of project is to judge the knowledge gained by the students during their tenure of the programme, the transfer of learning that has taken place as well as their exposure to fire safety environment; so that many faceted development of the students can be achieved under various skills of domains such as Personal, social, professional & lifelong learning. The students will be benefited lot by this exercise of preparation of project on their fire safety and environmental management experiences which will certainly add values in their attitudes such as value for health, work commitment, hardworking, honesty, problem solving, punctuality, loyalty and independent study. The Student should also make a brief presentation about the project and the salient observations and findings.

The Project report should essentially consists of the following

1. TITLE OF THE PROJECT WORK
2. ACKNOWLEDGEMENT
3. PREFACE
4. CERTIFICATE FROM THE ORGANISATION
5. CERTIFICATE FROM THE STUDENT THAT PROJECT HAS BEEN DONE BY HIM/HER
6. EXECUTIVE SUMMARY
7. INDEX / CONTENTS
8. AIM, OBJECTIVE AND METHODOLOGY



9. INTRODUCTION
10. ABOUT THE ORGANISATION
11. FIRE PREVENTION AND PROTECTION ACTIVITIES IN THE ORGANIZATION
12. OBSERVATIONS AND FINDINGS
13. SUMMARY OF RECOMMENDATIONS
14. REFERENCES / BIBLIOGRAPHY
15. MY KEY LEARNING IN FIRE SAFETY AFTER PROJECT

#### SUGGESTED TOPICS FOR THE PROJECT

- Study of Electrical installations/fittings (Flame/ explosion proof etc.) in any Industry (LPG Bottling plant / Chemical or Petro-chemical plant / Engineering plant / Refinery etc.)
- Installation, servicing and maintenance of portable fire extinguisher installed in industry/buildings/malls.
- Any Civil /Industrial fire brigade service.
- Fire Safety for storage of Hazardous goods in Industry.
- Fire prevention and protection procedures/systems adopted in an industry for handling, storage and processing of hazardous chemicals.
- On Site Emergency Plan of a Chemical / Explosive / Steel Industry.
- Study of fire hazards associated in industrial process / activities and safety precautions taken for these hazards.
- Disaster Management Plan of an Industry
- District Disaster Management Plan /arrangement of Municipal Corporation/ District Collectorate
- Fire safety measures/arrangement at Public places including Mall, Theatres, Cinema Halls and Institutions.

#### IMPLEMENTATION STRATEGY

The project report is to be assessed by external and internal examiners equally for

- a) **Project assessment – 50 marks** (To be reported under title term work – TW)
- b) **Oral based on Project work – 50 marks** (To be reported under title Oral– OR)

#### IMPORTANT NOTE

- There should not be any sort of typographical, diagrammatic, chemical titles, chemical formulas / structures and any other mistake/s in the final bound copy of the project report submitted by the candidate.
- Refer General Guidelines given below.



#### GUIDELINES FOR PREPARING THE PROJECT REPORT

Project work is a basic requirement for the award of Advance Diploma. Project shall be prepared based on any one of the subjects of the Programme. The project work should be comprehensive and cover all aspects of the Fire Safety.

#### TITLE OF THE PROJECT WORK

Select an appropriate title, e.g., "Fire Safety in a Petrochemical Plant" or "Fire Safety in a Chlor-Alkali Plant", "Fire Safety in a High-Rise building", etc. The upper half of the first page of the project report should have the title of the project report in bold block letters and the lower half some important information like the year, the name of the author (report writer) and the name of the institute.

#### 1. CONTENTS

On the second page of the project report should be the table of contents. This table can be prepared after finishing the project report, i.e., when the typing work of the entire project report has been completed, the pages have been numbered and all annexures appended at the end.

#### 2. ACKNOWLEDGEMENT

It should appear on the third page and the report writer should acknowledge the guidance provided by the project guide. Here the author may also acknowledge other persons who might have rendered help or supplied the required data or information for completion of the project. It should be brief and crisp. Generally, one page should suffice for acknowledgement.

#### 3. PREFACE, OBJECTIVE AND METHODOLOGY

Preface should describe the choice of selected project work and its objective. The preface should be limited to one or two pages. It will be prudent to mention the objective and the methodology used for the project work, e.g., collecting data from various records available in the company, interviewing certain key employees, questionnaires, etc. Thereafter, briefly mention the scope of project work.

#### 4. INTRODUCTION

Brief description of the Organization, the main raw materials used, its processes and the main features of manufacturing and other key operations, including the potential fire hazards shall be the contents. It is recommended to limit the description to about 5 to 10 pages.

#### 5. FIRE SAFETY ACTIVITIES IN THE ORGANIZATION

This is the most important part of the project report and forms the main body of the project report. It needs very comprehensive coverage of all aspects of fire safety in the plant. It will usually require about 70 to 100 pages. However, do not try to increase the number of pages by giving unnecessary or irrelevant details or too much of theory. Write-up should include the details mainly in some of the following areas:

- Occupational health, safety and environment policy of the company and its implementation
- Fire Safety organisation

- Role of management in promoting fire safety and striving for continual improvement
- Fire incidents reporting and investigation system
- Case-studies (discuss at least five cases of different types of fire incidents)
- Selection and training of employees
- Fire Safety training of employees and contractor personnel
- Health and hygiene (including pre-employment and periodic medical examinations)
- Safety in transportation and training of drivers
- Plant layout
- Facilities and services
- Storage and handling of chemicals
- Built-in safety measures
- Fire prevention and fire-fighting measures
- Housekeeping
- Personal protective equipment (PPE)
- Various safety procedures (e.g., work permit system, hot job work, etc.)
- Preventive maintenance
- Safe operating procedures (SOPs) and operating manuals
- Safety manual, material safety data sheets (MSDS), Tremcards, etc.
- Fire safety audit / loss prevention assessment.

Relevant information and data presented in the form of tables and graphs (e.g., incident rates including fire statistics), incident analysis, work permit form, incident report form, medical attention form, block diagrams, plant layout, relevant photographs, MSDS, etc., which are required to supplement project report, should be included at the end as annexures with appropriate references in the main text of the project report. If an annexure is of more than one page, it should be provided with page numbering. Page numbering should be done individually for each annexure.

## 6. RECOMMENDATIONS

Based on the project work and study of safety management system, student should identify areas needing improvement and recommend measures for improvement. The recommendations should be specific, relevant and practically implementable.

## 7. PROJECT REPORT FORMAT

- |                             |   |
|-----------------------------|---|
| Paper Size                  | - A4  |
| Printing                    | - Only on one side of the sheet                               |
| Line Spacing of Paragraph   | - 1 ½   |
| Font Face                   | - Times New Roman   |
| Font Size                   | - 12 for Normal text, 14 for Sub-headings and 16 for Headings |
| No of Project Report copies | - Two   |
| Binding                     | - Hard bound copies with Black cover (Golden Embossing)       |



