

Course Contents

Category	Title	Code	Credits 4C			Theory Papers
DC-09	Laws related to Safety, Health & Environment	FT 601	L 3	T 1	P 0	Max Marks – 100 Min Marks - 35 Duration - 3 Hrs.

SEMESTER VI

Course : Laws related to Safety, Health & Environment

- Unit I Factories Act 1948, M.P. Factories rules 1962. Madhya Pradesh Control of Industrial Major Accident Hazard Rules 1999.
- Unit II Indian Explosive Act 1884, Gas Cylinder Rules 2004, Petroleum Act 1934 with Rules 2002, Calcium Carbide Rules 1987. Static & Mobile Pressure Vessel Rules. Fire prevention Legislation. Fire Insurance Assessment.
- Unit III Environment (Protection) Act 1986, MSIHC Rules. Water (Prevention and Control of Pollution) Act. Air (Prevention and control of pollution) Act. Chemical Accidents (Emergency, Planning, preparedness and response) Rules 1996.
- Unit IV Other Important Legislations.
Boilers Act 1923, Electricity Act 2003 with rules, Public Liability Act 1991, Dock workers (Safety, Health & Welfare) Act. Safety & Health provisions of Building & other construction workers (R.E.C.S.) Act 1986 and central rules 1998 and Mines Act.

References :-

All Relevant Acts & Rules.
Fire Services Acts & rules of different states.
Gen. Fire Insurance.
Safety and cases by Frank P Leas
Safety in chemicals & Petrochemical Industries.

Course Contents

Category	Title	Code	Credits – 4			Theory Papers
DC - 10	Fire Fighting Codes & Standardization	FT 602	L	T	P	Max. Marks – 100
			3	1	0	Min. Marks - 35 Duration – 3 hrs.

VI SEMESTER

FIRE – FIGHTING CODE AND STANDARDISATION

UNIT-I	Specification of Rescue and Fire – Fighting equipment and appliances viz., TP, Water Tender, C.F.T. AND I.S. Standard. (IS 948, IS 950, IS-6067, IS-10460, IS-4989 (Part-1), IS-4989 (Part-3), IS- 949, IS-951, IS-944, IS-2930, IS-947, IS-6070, IS-957, IS-946, IS-942, IS-8090, IS-2190, IS-903, IS-636
UNIT-II	Salvage Tender, Emergency Tender, Rescue Tender, DCP Tender IS-10993, IS-949,
UNIT-III	Code concerning construction and design of buildings. NBC-1983
UNIT-IV	Code of Practice for construction of temporary structures and pandals. IS-8758, Codes relating to fire ratings of materials used.
UNIT-V	Municipal Bye-Laws in relating to fire prevention, Industrial Fire Prevention and Protection enforcement.

- References**
1. National Building Code by Indian Standard Institution
 2. All relevant Indian Standard Specification & Code of Practices
 3. Related N.F.P.A. Codes, Standard and recommended Practice.
 4. DGMS (India) Director General of Mine Safety, Mines regulations.
 5. U.L. Standard, Specification
 6. Factory Act.

Course Contents

Category	Title	Code	Credits – 6C			Theory Papers
DC - 11	Fire Fighting & Safety Equipments	FT - 603	L	T	P	Max. Marks – 100 Min. Marks - 35 Duration – 3 hrs.
			3	1	2	

FIRE FIGHTING & SAFETY EQUIPMENTS

UNIT - I Hose and Hose Fitting:

Details study of hoses, coupling, branches, branch holders, Monitors, Nozzles, Stand Pipes, Collecting Heads, Suction hose fittings, Breaching, Adopters and Ramps.

UNIT - II Portable Fire Extinguishers: Constructional features, Specifications and applications. Extinguishers using water, Mech. Foam, CO2 Dry Powder Extinguishers and Light Water.

UNIT – III Foam and Foam Making Equipment :

Types of foam, Foam making equipment, properties and Characteristics of good foam, practical consideration, care and maintenance.

UNIT – IV: Personnel Protective Equipments:- (Complete Head to Toe protection)

Head Protection – Helmets, their types, material of construction and reliability

Eye Protection – Goggle their types, material of construction and reliability

Face Protection – Face Shields, their types, material of construction and reliability

Body Protection – Aprons, their types, material of construction and reliability

Hand Protection – Hand Gloves, their types, material of construction and reliability

Leg Protection – Shoes, Gum Boots, their types, material of construction and reliability

Fall Protection – Safety Belts, their types, material of construction and reliability

References

1. N.F.P.A. Codes
2. H.M.S.O. London manuals

List of Experiments(Pl. expand it)

1. To study the manufacturing and construction of various extinguishers
2. To study fire fighting foam & foam making equipments
3. To study various types of hose and hose fittings
4. To Study various types of ladders, parts care and maintenance
5. To study various types of small gears
6. To study Various types of B.A sets and their uses

Course Contents

Category	Course Title	Course Code	Credits – 6C			Theory Papers
DC - 12	Special Fire Hazards (Aviation, Marine & High Rise Buildings)	FT - 604	L	T	P	Max. Marks – 100
			3	1	2	Min. Marks - 35 Duration – 3 hrs.

A – AIRCRAFT FIRE SAFETY

UNIT-I Constructional features of an Air Craft, Types of Engines, Basic Fire-Hazards in Aircraft, Nature of Air Crashes, Emergency Landings including belly leading; Access to Fire Service Personnel and Escape of trapped persons problems, Types of Safety Belts, Ejection-Seats; and their methods of release; Rescue and Fires in Air Craft and methods of fire-fighting; Problems of fire-fighting. Problems in dealing with Air Craft carrying ammunition, bombs nuclear weapons; Action to be taken in case of accidents involving Radio Active Cargo

UNIT-II Hazards in Airport, Protection & Types of Hangers, Refueling and Defiling in Air Cargo, Crash Fire Tender: Provision of Crash, Fire Tenders including Rapid Intervening appliances, Categorization of Air-Port, their extinguishing media and determination of the appliances for each category as per International Standard.

B: Marine Fire

UNIT-III The maritime environment, organizational role, vessel types, construction & systems of fire detection & suppression systems, Vessel plans, drawings & documents, cargo vessel hazards & safety.

UNIT-IV Incident strategies & tactics training & planning, vessel fire incidents, Marine incidents & Rescue operations.

C:HIGH RISE BUILDINGS

UNIT-V Fundamentals of Fire Safe Building design, Building and site planning for fire-safety, structural integrity during fire confinement of fire in building, Life safety systems for high, rise structures. Evacuation: Need of Evacuation plans in high rise buildings, Making of Evacuation Plans, types of Evacuation, Procedure of Evacuation.

UNIT-VI Alarm signaling in high-rise building – Smoke movement in building – Residential high-rise building-High-rise building with complex occupancy. Basic fire-fighting strategy. Study of model code of practice for high-rise building in metropolitan cities (Building Bye Laws).

References:

1. Aero plane knowledge for Rescue Personnel by F. Engineering Division.
2. Fire Protection and Maintenance of Aircraft by N.F.P.A.
3. The Fire Hazards of Fuelling Aircraft in the Open by D.S.I.R., H.M.S.O. London.
4. I.C.A.O. Standard
5. Marine fire manual
6. High-Rise building fires and fire safety – N.F.P.A.
7. High-Rise Fire & Life Safety by B. Hagan
8. N.F.P.A.
9. National Building Code of India.

List of Experiments(Pl. expand it)

1. Study of Airport Fire Hazard and Categorization of Airports.
2. Study of Protection of Hangers.
3. Study of General Requirements of CFT.
4. Study of Emergency Landing, Belly Landing, Aircraft Engine.
5. Study of Fundamentals of Fire & Safety Building Design.
6. Life Safety plan in High Rise Buildings.
7. Study of working principle of Pilot Ejection Seat

Course Contents

Category	Title	Code	Credits – 6C			Theory Papers
DC -13	Nuclear Safety and Radioactive Materials	FT - 605	L	T	P	Max. Marks – 100 Min. Marks - 35 Duration – 3 hrs.
			3	1	2	

NUCLEAR SAFETY AND RADIOACTIVE MATERIALS

UNIT – I Radio Active Material – Basic Theory. Principles & Techniques of radiation dissymmetry. Techniques of area and air monitoring. Techniques of personnel radiation protection.

UNIT – II Sources and characteristics of radioactive waste and their types and their method of disposal.

UNIT – III Handling and prevention of radiation emergencies and Storage requirements of radioactive materials

UNIT – IV Fire fighting and rescue operations in the presence of radiation hazard.
Pre plan of Radiation Incident.

UNIT – V Radiation Safety in Nuclear Power Stations

References:

1. Radioactive Materials, B.M. Rao, Himalaya Publishing House (2001) (in press)
2. Principles of Radiation Dosimetry, G.W. Whyte, John Wiley and Sons, New York (1969)
3. Radiation Hygiene Handbook, Henson Blat. 2 (Ed.) McGraw Hill, New York (1959)
4. Radioactive Wastes, their Treatment and disposal, J.C. Collins, E.F.N. Spon Ltd., London
5. Effects of Nuclear Weapons, S. Glasstone, U.S. Government Printing Office, Washington
6. Environmental Radioactivity, M. Eisembud, McGraw Hill Book Co., New York (1963)
7. Industrial Hygiene and Toxicology, F.A. Patty (Ed.), Vols. I and II Interscience, New York (1962)
8. Industrial Safety, F.A. Patty (Ed.), Prentice Hall, New York (1960).
9. Living with Radiation Problems of the Nuclear age for the Layman parts-I and II
10. Fire Service Problems, Published by the United States Atomic Energy Commission.
11. Source Book of Atomic Energy S. Glasstone, 3rd Ed., Affiliated East-West Press, New Delhi.

List of Experiments(Pl. expand it)

Study of Storage of Radioactive Material
Study of PPE for Handling RAM
Study of measuring effects of RAM
Working principle of Dose meter
Rescue technique in RAM expose

Course Contents

Category of Course	Course Title	Course Code	Credits – 2C		
NECC-6	Field Training rescue in Chemical Hazards	FT - 606	L	T	P
			0	0	2

FIELD TRAINING RESCUE IN CHEMICAL HAZARDS

V SEMESTER & VI SEMESTER

Rescue Drill

- Unit – I Rescue from Chemical hazards.
- Unit – II Rescue from Toxic & Poisonous gas leak.
- Unit – III Rescue from high rise buildings & sewage