Diploma in Industrial Safety (DIS)

Eligibility – 12th (Science) Duration -1 Year

Subjects:

Sr	Subject Name	Subject Code	Theory	Practical
1	Safety Management	DIS -01	80	20
2	Construction Safety	DIS-02	80	20
3	Industrial Safety	DIS-03	80	20
4	Fire Engineering Science	DIS-04	80	20
5	Health, Safety & Environment	DIS-05	80	20
6	First Aid	DIS-06	80	20
7	Practical & Viva	DIS-07	80	20

Detailed Syllabus

1	Safety Management	DIS -01	41 Hrs

Unit I **(8 Hours)**

Key elements of a safety and Health Management System- Policy & commitment, Planning, Implementation and Operation, Measuring Performance, Auditing and Reviewing performance Initial Safety and health Management System Review, Safety and health Management System model, safety and Health policy- Developing a workplace Safety and Health Policy , Planning – safety and Health objectives and Targets, performance standards, Implementation and Operation – structure and responsibilities- management responsibilities, individual responsibilities, Safety Consultation.

Unit II **(15 Hours)**

Participation and Representation, Training , Awareness and competence, Communication- Information coming into the organization, Information Flow within the Organization, Information Flow from the Organization,: Document Control : Safety and Health Management System records: Operational Control – Workplace Precautions, Safety And Health training and Competence Training for Safety and Health:, Identify Training Needs – Organizational Needs, job-related Needs, Individual Needs : Identify Training Objectives and Methods, Deliver Training , Evaluation and feedback, specialist Advice and Services – access to Specialist advice and services, relationships within the Organization , relationships Outside the organization , external specialist safety and safety support.

Unit III **(08 Hours)**

Risk assessment and control- the legal Basis for risk Assessment, key stages of Risk assessment and control- use trained Risk assessors, preparation and Inventory, Identify the hazards, assess the risk , identify Appropriate Action , Risk assessment records and control . A simple Risk estimation example – Hazards, remedial measures, Motivation of employees, Insurance coverage of Industrial plant & personnel.

Unit IV **(10 Hours)**

Stages in plant life and unsafe condition in factories, maintenance & safety, basics safety programming, safety department, Rules and regulation of safety department, Responsibility of management for safety in plant, safe guarding the public, Responsibility of government, social organization and public authorities. Safety activities of the ILO (International Labour Organization)

2	Construction Safety	DIS-02	42 Hrs

Unit I **(10 Hours)**

Safety during project construction,. Training to project staff and operation staff, stages of project construction, safety during receiving, unloading, shifting and storage, safety guidelines for storage, general safety facilities at construction sites, interface between civil and errection works, definition on construction safety, soil classification system, general precaution, hazardous atmosphere and materials, emergency rescue equipment, exhaust gases

Unit II **(12 Hours)**

Hydraulic shoring for trenches, timber shoring for trenches. Safety in cutting and brazing, gas welding oxy acetylene equipment and use, gases- storage of cylinders, handling of cylinders, Inspecting equipment, Projective measures for electric arc welding, welding and cutting in tank vessels and drums, confined spaces, personal protection, health hazards. Safety in Concrete, Concrete forms and shoring, reinforcing steel, concrete placement, general requirements for vertical and tubular welded frame shoring, tube and coupler shoring, vertical slip forms, electrical safety in constructions, work on live equipment, over head and underground cables, safety in use of power tools, hand tools, pneumatic tools, electrically operated tools, cartridge, individual tools and precautions

Unit III **(10 Hours)**

Form works-Types, assembling and dismantling and their safety. Scaffolding, Types of scaffold, design and inspection of scaffold, terminology of scaffold, scaffold construction materials, scaffold erection procedure, safety precaution while erecting scaffold, dismantling of scaffold, material handling, investigation of scaffold accident, causes of hazard in scaffold, safety in scaffold, provision of scaffold for the building and other construction. Study of safety standards and ILO (International Labour Organization) recommendation. Case studies (Accidents in different construction sites.)

Unit IV **(10 Hours)**

Practical: Visit to construction site ,Erecting and dismantling scaffolding for single storied , Multi storied buildings ,Demonstration of Safety harness and ladders ,Showing how to use power tools and hand tools safely, Conducting Tool box meeting, Mock drill (Falling from height) ,Awareness about site evacuation plan ,Safe way to material handling ,How to wear personal protective equipments.

3	Industrial Safety	DIS-03	32 Hrs

Unit-I **(06 Hours)**

Basics of industrial safety, various types of industries, Understanding the types of safety systems and equipments, Safety policy and safety terminology

Unit-II **(06 Hours)**

The Work permit systems, Job safety analysis, Hazop study, Fault tree analysis

Unit-III **(10 Hours)**

Emergency planning, Safety inventory systems, Safety survey, Occupational health hazards, Safety organization and duties of a safety officer, roll of management in industrial safety, roll of supervisor in safety

Unit-IV **(10 Hours)**

Accident prevention methods, Safety committee, Accident investigation, Safety management systems, Laws related to safety (Factories ACT 1948 Explosive ACT, Electricity ACT etc.)

4	Fire Engineering Science	DIS-04	44 Hrs

Unit I **(10 Hours)**

History of fire service, Basic physics, Units, Guidelines for writing the units, Force, resultant force, Laws of force, Laws of motion, Mass and weight, work, power, energy, Law of conservation of energy, Mechanics – rest and motion, Distance and displacement, Speed and velocity, Acceleration, retardation, Acceleration due to gravity, Newton laws of motion, Machines and engines, Efficiency, Friction loss

Unit II **(12 Hours)**

Basic Chemistry and physics of fire, Atomic structure, Elements, compounds, Pure substance and mixture, Physical and chemical changes, Condition for the changes, Energy changes, Effects of heat on matter, Combustion, Temperature, Specific heat capacity, Catalyst, Neutralization, Sublimation, Heat of decomposing, Chemical reaction, Exothermic reaction and endothermic reaction, Transmission of heat, Flash and fire point, Ignition temperature, Flammables and combustible chemicals, Spontaneous combustion, Triangle of combustion, Tetrahedron fire, Spread of fire

Unit III **(10 Hours)**

Fixed fire fighting installations using water, Hydrant or fire water system, Classification of hydrant system, Sprinkling system, Major foam pourer system, Steam drenching system, Emulsification, Special fires and fire fighting, Air craft fire, Ships fire

Unit IV **(12 Hours)**

Classification of fire, General Causes of fire, Detection of fire, Extinguishing methods, First aid fire fighting equipments, Fire bucket, Fire beater, hose real hose, Portable extinguisher, depends on weight, depends on operating method, depends on content, Depends on position of nozzle, Construction, Operation, Maintenance, Refilling

5	Health, Safety & Environment	DIS-05	40 Hrs

Unit I **(10 Hours)**

Air pollutants – Pollution sources - automobile pollution-hazards of air pollution-concept of clean coal combustion technology, fly ash-control of combustion in combustion chambers- ultra violet radiation, infrared radiation, radiation from sun-hazards due to depletion of ozone – deforestation ozone holes-automobile exhausts-chemical factory stack emissions - CFC (Chloro fluoro carbon)

Unit II **(08 Hours)**

Water pollutants-health hazards-sampling and analysis of water-water treatment - different industrial effluents and their treatment and disposal -advanced wastewater treatment - effluent quality standards and laws - chemical industries, tannery, textile effluents-common treatment.

Unit III **(10 Hours)**

Hazardous waste management in India-waste identification, characterization and classification technological options for collection, treatment and disposal of hazardous waste selection charts for the treatment of different hazardous wastes-methods of collection and disposal of solid wastes-health hazards-toxic and radioactive wastes incineration and verification - hazards due to bio-process-dilution-standards and restrictions – recycling and reuse

Unit IV **(12 Hours)**

Sampling and analysis – dust monitor – gas analyzer, particle size analyzer – lux meter-pH meter – gas chromatograph – atomic absorption spectrometer, Gravitational settling chambers-cyclone separators-scrubbers electrostatic precipitator - bag filter – maintenance - control of gaseous emission by adsorption, absorption and combustion methods- Pollution Control Board-laws, Pollution control in process industries like cement, paper, petroleum-petroleum products textile tanneries-thermal power plants – dying and pigment industries – eco friendly energy

6	First Aid	DIS-06	48 Hrs

Unit –I **(08 Hours)**

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 management, Burns, Scalds and frost Bits signs and symptoms and management. Causes and types of fractures Sprain & Dislocation-Signs and symptoms, Snake Bite-Treatment.

Unit II **(08 Hours)**

Automatic Fire Detection cum Alarm System: Introduction of Types of Detectors- Smoke, Heat, Flame/Gas Detectors, Operating principles, Control Panel.

Unit III **(10 Hours)**

Introduction, Importance of Discipline, General Principles of discipline, essentials for discipline and outward Signs, Hazard and Risk: Causes, Identification, Evaluation & Control. HAZOP, Sources for Information on Hazard Evaluation. Risk and Risk Analysis.

Unit IV **(10 Hours)**

Accident : Industrial Accidents, Classification of Accidents, Need for the Analysis of Accidents, Accidents Reports, Methods Adopted for Reducing Accidents, Investigation of Accidents, Safety Slogans, Safety Precautions adopted in the Plant

Unit V **(12 Hours)**

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 offer, Washing facilities in Dry clothing, Storing, Sitting, First Aid Appliances, Canteen, Shelters for rest & lunch, Crèches, Welfare officers, Right & Obligation of workers, Lighting, Ventilation & Work related stress: Introduction to Lighting, Ventilation, Heat Stress, Cold Stress, Noise

7	**Practical & Viva**	**DIS-07**	**30 Hrs**