Post Graduate Diploma in Industrial Safety (PGDIS)

Eligibility – Graduation/Diploma in Engineering Duration -1 Year

Subjects:

Sr	Subject Name	Subject Code	Theory	Practical
1	Safety Management System & Law	PGDIS -01	80	20
2	Accident Prevention Techniques	PGDIS-02	80	20
3	Safety at Workplace	PGDIS-03	80	20
4	Fire Engineering Science	PGDIS-04	80	20
5	Health, Safety & Environment	PGDIS-05	80	20
6	First Aid & Disaster Management	PGDIS-06	80	20
7	Practical & Viva	PGDIS-07	80	20

Detailed Syllabus

1	Safety Management System & Law	PGDIS -01	38 Hrs

Unit I **(08 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 **(10 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, spe cialist 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 **(06 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, Hazards identification risk assessments.

Unit IV **(06 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 Labor Organization). Aim and purpose of ILO, Foundation of ILO.

Unit V **(08 Hours)**

Factories Act-1948, Workman's Compensation Act-1943, Employees State Insurance Act-1948. Mines Act, Air (Prevention and control) Pollution Act-1981, Water (Prevention and Control) Pollution Act- 1974, Boiler Vessels Act. Child Labor and Women Employee Act. The factories rules, History, Provisions under the factories Act-1948 and rules made there under with amendments, Functions of safety management. ILO Convention and Recommendations in the furtherance of safety, Health and Welfare, Environment Protection Act.

2	Accident Prevention Techniques	PGDIS-02	22 Hrs

Unit I **(08 Hours)**

Definition: Incident, accident, injury, dangerous occurrences, unsafe acts, unsafe conditions, hazards, error, oversight, mistakes, etc. Accident Prevention : Theories / Models of accident occurrences, Principles of accident prevention, Accident and Financial implications, Hazard identification and analysis: fault tree analysis, Event tree analysis, failure modes and effects analysis, Hazop studies, Job safety analysis – examples, Plant safety inspection - objectives and types check procedure inspection report.

Unit II **(06 Hours)**

The effect of accident, unsafe act, unsafe condition, unpredictable performance, Human factors contributing to accidents - causes for unsafe acts. Safety and psychology -Theories of motivation and their application to safety. Consequences of accident, accident prevention programmers, Role of safety. Accidents related with maintenance of machines & advantages of Maintenance of machines, work permit system- significance of Documentation.

Unit III **(05 Hours)**

Body Structure and Functions, Position of causality, The Unconscious casualty, Fracture, Fracture types, and Dislocation, Injuries in muscles and joints, Bleeding, Burns, Scalds and accidents caused by electricity, Respiratory problems, Rescue and Transport of Casualty. Cardiac massage, poisoning, wounds.

Unit IV **(03 Hours)**

Personal Protective Equipments: Need, selection, supply, use, care and maintenance, Personal protective devices for head, ear, face, eye, foot, knee and body protection, Respiratory personal protective devices.

3	Safety at Workplace	PGDIS-03	23 Hrs

Unit-I **(12 Hours)**

Safety in the use of: 1) Grinding 2) CNC's (Computer Numeric Control) 3) Shearing 4) Bending 5) Milling 6) Boring 7) Shaping Safe use of hand tools: Safe use of various types of hand tools used for metal cutting, torsion tools, shock tools, non sparking tools, portable power tools. Ergonomics of machine guarding, Guarding of different types of machinery including special precautions for paper, rubber and printing machinery, wood working. Working in different areas: Working in confined spaces, Working Underground, Working at heights - use of stairways, clamps, working platforms, ladders of different types, Boatswain's chair and safety harness working on roofs, Lifting machinery lifts and hoists. Operation, inspection and maintenance of industrial trucks, loose gears conveyors, Safe working load for mechanical material handling equipments.

Unit-I **(06 Hours)**

Plant layout, design and safe distance, Ventilation and heat stress, Significance of ventilation, Natural ventilation, Mechanical ventilation Air conditioning. National Building code part VIII and Building service, Thermal comfort, Indices of heat stress, Physiology of heat regulation. Safety and good housekeeping, Disposal of scrap and other trade wastes Spillage prevention, Use of color as an aid of housekeeping, Cleaning methods, Inspection and Checklists, Advantages of good housekeeping.

Unit-III **(02 Hours)**

Purpose of lighting, Uses of good illumination, recommended optimum standards of illumination, Design of lighting installation, Standards for lighting and color.

Unit-IV **(03 Hours)**

Vibration- effects, Measurement & control, Activities related to vibrations, its impact on human health, Sources. Industrial Noise- sources & its control, effects of noise on man, Measurement and evaluation of noise, Silencers, Practical aspects of control of noise

4	Fire Engineering Science	PGDIS-04	17 Hrs

Unit I **(05 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 **(04 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 **(03 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 **(05 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	PGDIS-05	30 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 (Chlorofluorocarbon).

Unit II **(06 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 **(06 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 **(08 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 & Disaster Management	PGDIS-06	33 Hrs

Unit –I **(05 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 **(03 Hours)**

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

Unit III **(05 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 **(05 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 **(15 Hours)**

Definition of GIS(Geographic Information System), Concept of Space and Time, Spatial data. Map Projection and Datum. Domains of Spatial information system, Components of GIS (/Hardware, Software, Data, People and Process) GIS Functionalities for end user / system (Data Acquisition, Data Input, Data Management, Data Analysis, Data Modeling and Data Output) Web based GIS Technology, Remote Sensing Introduction to Remote Sensing, Fundamentals of Remote Sensing, Electromagnetic Radiation, Electromagnetic Spectrum, Energy interaction with Atmosphere, Energy interaction with Earth Surface, Platform and Sensors. Characteristics of Image, Image Interpretation and Analysis – Visual Image Interpretation & Digital Image Processing, Microwave Remote Sensing, Remote Sensing Application in Disaster Management, Scenario of Indian Remote Sensing Satellites in future. Advanced Technologies for Warning System, Definition of Early Warning System, Community Early Warning System, Core Components of People centered Early Warning System, Emergency Communication System, Wireless Communication, Bluetooth Wireless Technology, HAM Radio, GPS Application in Emergency Communication, Remote Sensing and GIS Application in Warning System, Cyclone Warning System and Tsunami Warning System Methods of collecting relevant information – libraries, internet, interviews questionnaires, survey, observation, Mass media, Meetings. Role of Information from disaster affected community Role of Information Technology in Disasters. Disaster management Information System. Role of Communication in Disasters, Types of communication in case of disasters – HAM radio, Satellite, Video Conferencing, Electronics devices

7	Practical & Viva	PGDIS-07	30 Hrs