

CERTIFICATE COURSE IN INDUSTRIAL SAFETY

(1 Year)



**STATE BOARD OF TECHNICAL EDUCATION AND
TRAINING**

**SANKETHIKA VIDYA BHAVAN, MASAB TANK,
TELANGANA, HYDERABAD**

LIST OF EQUIPMENT (EQUIPMENTS FOR PRACTICALS)

S.No	Equipment	Qty. Required No's.
1	Noise Measuring Instrument	2 No's
2	Fire Protection Equipment - Fire extinguisher- different types-CO2, Foam, ABC, DCP	2 No's Each
3	Lux Meter	2 No's
4	Confined Space & Rescue Tripod / DAVIT SYSTEM	1 No's
5	Scaffolding System and Lifeline Ropes	1 No's
6	Fire Hydrant (with Sufficient Water Capacity) and Different types of Monitors and Nozzles	1 No's
7	Stretcher, Ropes and Knots	2 No's each
8	Gas Cylinder (Ammonia & Chlorine) and Kits	1 No each
9	Different types of PPE	2 No's each
10	First Aid Box	1 No.
11	SCBA (Self Contained Breathing Apparatus) set	1 No.

CERTIFICATE COURSE IN INDUSTRIAL SAFETY

COURSE TITLE : CERTIFICATE COURSE IN INDUSTRIAL SAFETY

COURSE CODE : IS

Periods per week : 5 days /s 30 Periods

Periods / Semester 1100

TIME SCHEDULE

Subject Code	Major Subjects	Period s	Practical Periods	Sessi onal	End exam mark s	Total marks
IS-101	Industrial Safety Management	100	--	-	100	100
IS-102	Safety in Engineering Industries	150	--		100	100
IS-103	Environmental Management	100	--		100	100
IS-104	Quality Control in Occupational Health and Safety	100	--		100	100
IS-105	Safety, Health and Environmental Legislation	150	--		100	100
IS-106	Industrial Hygiene and Occupational Health	150	--		100	100
IS-107	Chemical and Process Safety Management	100	--		100	100
IS-108	Safety in Construction Industry	100			100	100
IS-109	Industrial safety - Practical	--	100	40	60	100
IS-110	Project Work	--	150	40	60	100
	TOTAL	850	250	80	920	1000

INDUSTRIAL SAFETY MANAGEMENT

Subject Title : INDUSTRIAL SAFETY MANAGEMENT

Subject Code : IS-101

Periods/ weeks 30

Periods/ year 100

RATIONALE: To inculcate the Management Principles and Techniques for better practices of Safety, Health and Environment (SHE)

SCHEME

S.No.	Topic	No. of Periods	Short Questions	Long Answer Questions
1	Introduction to Management	10	1	1
2	Planning, Organizing and Directing for Safety	30	3	2
3	Safety, Health and Environment Management (SHE) Education & Training	15	1	1
4	Employee Participation in Safety & Accident prevention	20	1	2
5	Behavior Based Safety (BBS)	15	1	1
6	Management Information System	10	1	1
	Total	100	8	8

COURSE CONTENT

CHAPTER NO.	DETAILS
1	Introduction 1.1 Management Principles, Levels of Management- Lower, Middle and Top 1.2 Types of Management – Line and Staff; Line and Staff Functions for Safety, Health and Environment 1.3 Authority, Accountability and Responsibility of Management 1.4 Span of Management 1.5 Delegation and Decentralization of authority 1.6 Role of Management in Industrial Safety
2	Planning for Safety: • Planning: Definition, purpose, nature, scope and procedure. Range of planning, Variety of plans. • Strategic planning and tools of implementation • Management by Objectives and its role in Safety, Health and Environment • Management (Safety) Policy formulation and implementation • National policy on Safety, Health and Environment at Workplace Organizing for Safety: • Organizing: Definition, need, nature and principles • Organizing for safety, Health and Environment • Organizing structure, functions and responsibilities. • Safety Committee: Structure and Functions Directing for Safety: • Definition, process, principles and techniques. • Leadership: Leadership- Style, Role, functions and attributes of a good Leader. • Communication: Purpose, process, types and channels, Essential rules in Communication, Two ways communication, Barriers in Communication, Essentials of effective communication, Communication and group dynamics, Team building.
3	Safety, Health and Environment Management (SHE) Education & Training Elements of training cycle - Training need assessment - Techniques of Training, design and development of training programmes/modules - Training methods and strategies - Types of training - Evaluation and review of training programmes - Competence Building Technique (CBT) - Role of Multi-media, Communication, Applications of Computers
4	Employee Participation in Safety: Purpose, areas of participation, methods; Role of trade union in Safety, Health and Environment protection; Toolbox talks, Safety Kaizen, One-point Lessons, etc.;

	Safety promotion and Safety Awards (National, State Level and unit Level) and Suggestion Schemes, Safety competitions, Safety incentives Publicity schemes, Audio Visual publicity, Other promotional methods. Accident prevention: Principles of Accident Prevention / program plan; Theories of Accident Causation; Need of Accident Prevention; Causes of Accident; Accident Prevention Models – Heinrich Theory, Frank Bird Model, Domino Model; Systems Model, Human Factor Model, Swiss Theory of Accident Causation Incident, Accident, Injury, Dangerous occurrences, Unsafe Acts, Unsafe conditions Hazards, Error, Oversight, Mistakes etc.; Accident costs – Direct and Indirect; Role of supervisor in accident prevention; Role of Workmen in accident prevention; Role of Management in accident prevention; Role of Trade Union in accident prevention; Role of Factory Medical Officer in accident prevention; Role of Safety Officer in accident prevention
5	Behavior Based Safety (BBS) Human Behavior: Individual differences, Causes of behavior Changes. Behavior as function of self and situation, perception of danger and acceptance of risk, knowledge and responsibility vis-à-vis safety performance. Theories of Motivation and their application to Safety, role of supervisors and safety departments in motivation. Conflict & Frustration: Identification of situations leading to conflict and frustration and techniques of management.
6	Management Information System: Sources of information on Safety, Health and Environment protection, Compilation and collation of Information. Analysis & use of modern methods of programming, Storing and retrieval of MIS for Safety, Health and Environment. Computer utilization in Safety, Health and Environment (SHE) and SHE Software development.

SAFETY IN ENGINEERING INDUSTRIES

Subject Title : SAFETY IN ENGINEERING INDUSTRIES

Subject Code : IS- 102

Periods/ weeks 30

Periods/ year 150

RATIONALE: Acquire the Knowledge, Skill and Mechanism of functioning of Machine, Tools and Safe Use of the same

SCHEME

S.No	Topic	No. of Periods	Short Questions (5 marks each)	Long Answer Questions (12 Marks each)
1	Machine Operation and Guarding Safety in use of machines	30	1	1
2	Safety in the use of Hand tools & Power tools Destructive Testing, Non-Destructive Testing and Heat Treatment	30	1	1
3	Material Handling and Storage of materials	20	1	1
4	Plant design and Housekeeping Boiler Safety	25	2	2
5	Electrical Hazards at workplace, Static Electricity & Lightning Protection	25	2	2
6	Safety in Different Industries	20	1	1
	Total	150	8	8

COURSE CONTENTS

Chapter No.	DETAILS
1	Machine Operation and Guarding: Principles in Machine guarding - Ergonomics of machine guarding - Types of guard, their design and selection - Guarding of different types of machinery including special precautions for wood working, paper, rubber and printing machinery, machine tools etc. - Built in safety devices -
	Maintenance and repair of guards - Incidental safety devices and tools - Concept of Zero access Guarding Safety in use of machines: power presses (all types) - Shearing machine - Safety in use of Bending machine - Rolling machine - Drawing machine - Turning machine - Boring machine - Milling machine - Safety in use of Shaping machine - Safety in use of Planning machine - Safety in use of broaching machine - Safety in use of plating machine - Safety in use of Grinding machine - Safety in use of CNCs Machines - Robotics etc.
2	Safety in the use of Hand tools & Power tools: Main causes of accidents, prevention and control of accidents in the use of hand and power tools - Centralized and personal tool issues system - Purchase, Storage and supply of tools. - Inspection, maintenance and repair of tools. - Portable power tools and their selection, inspection, maintenance, repair and safe use - Non-sparking tools Destructive Testing, Non-Destructive Testing and Heat Treatment: Breaking load test, Tensile stress load testing, etc; NDT-Testing, Significance and Limitations; Types of NDT- Die Penetration, Radiography, Ultrasound, Magnetic Particle Methods, Eddy-Current Method, Thermography and heat Treatment – Safety aspects
3	Material Handling and Storage of materials: Manual: - Kinetics of manual handling - Maximum loads that could be carried - Lifting and carrying of objects of different shapes, size and weight - Safe use of accessories for manual handling. - Storage of materials: - Stacking and unstacking, Floor loading conditions, Layout condition for safety in storage - Ergonomics of manual handling and storage. Mechanical: Lifting machinery, Lifts and hoists -Safety aspects in design and construction, testing, use and care, signaling, inspection and maintenance ; Safety in design and construction, operation, inspection and maintenance of industrial trucks ; Safety in design and construction, operation, inspection and maintenance of lifting tackles and loose gears - testing, inspection and maintenance of lifting tackles ; Conveyors-Safety features, safe working load for all mechanical material handling equipment. The competent persons in relation to safety legislation – duties and responsibilities.
4	Plant design and Housekeeping: Plant layout, design and safe distance. - Need for planning and follow-up Safety and good housekeeping. Typical accidents due to poor housekeeping - Benefits of good housekeeping - Disposal of scrap and other trade wastes - Prevention of spillage - Marking of aisles space and other locations - Use of color as an aid for good housekeeping. Housekeeping contest. Cleaning methods - “5s” system - Safety checklist for buying new machinery for the plant - Role of standards and codes of practice for plant and equipment. Boiler Safety - Boiler Operations:

	Hazards in Boiler operations and safety measures for its operations - Thermic Fluid heaters Operations: Hazards in thermic fluid heaters operations and safety measures for its operations. - Hazards at Workplace - Welding, Gas cutting, Brazing, Soldering, Buffing and Polishing Hazards and their preventive measures
5	Electrical Hazards at workplace - Hazards of electrical energy - Safe limits of amperages, Voltages - Safe distance from lines - Capacity and protection of conductor. Joints and connections. Means of cutting off power - Overload and short circuit protection - No load protection - Earth fault protection - Earth insulation and continuity tests Earthing Standards. - Protection against surge and voltage fluctuation. - Types of Protection for electrical equipment in hazardous atmosphere - Electrical area classification. Criteria in their selection, installation, maintenance and use. Static Electricity: - Introduction, Electro-static charge; Electrostatic dissipators; Electrostatic hazards and their control (earthing and bonding) – Recommended earthing resistance. Lightning Protection - Definition, lightening splash, lightening strokes, lightening protection systems. Characterization of health effects of lightening stroke (electrical effects, side flashers, thermal effects, mechanical effects). Functions of lightning arrestors
6	SAFETY IN DIFFERENT INDUSTRIES • Automobile manufacturing activity like pattern making, melting, Molding, machining, forging, chipping, grinding, heat treatment, N.D. Test, Pollution control measures; • Manufacture of Basic Metals: Ferrous and Non-Ferrous; Metallurgy: Foundry, Steel plant; Hazards in the process of Melting (Furnaces) Casting, Forging, Working on hot rolling and cold rolling – operations and their control measures.; • Safety in Agro / Sugar Industry – Process and various hazards in agro/sugar industries and their control measures; • Safety in Textile Industry: Introduction to Textile process involving cotton, Jute and man made fiber. Significant hazards and preventive measures; • Safety in dock operations: Hazards in handling of Cargo – Onboard operations, on shore and along shore operations, Warehouse operations, Dangerous goods, Container operations, Lifting appliance, Loose Gears and Wire ropes. Responsibility of different agencies for Safety and health involved in dock work. • Safety in IT and Electronic Industry and Service Sector - Various hazards in IT, Electronics, related service sectors and their control measures ; Ergonomic / Musculoskeletal Disorder (MSD), electrical hazards, physical hazards, radiation hazard, fire hazards, Computer Vision Syndrome (CVS), Carpal Tunnel Syndrome (CTS), Repetitive Strain Injury (RSI), Various hazards in Malls, Cinema • Halls, Parking Lots and commercial Sectors, etc., – Preventive and control measures

ENVIORNMENTAL MANAGEMENT

Subject Title : ENVIORNMENTAL MANAGEMENT

Subject Code : IS - 103

Periods/ weeks 30

Periods/ year 100

RATIONALE: This subject deals with environment management system as well as environmental policy, laws, economics which are very much essential from the point of view of today's environmental problems.

SCHEME

S.No	Topic	No. of Periods	Short Questions (5 marks each)	Long Answer Questions (12 Marks each)
1	Environmental Management System	10	1	1
2	Concept of Common Effluent Treatment Plant (CETP)	10	1	2
3	Environmental Important Regulations	15	1	2
4	Environmental Monitoring	15	1	1
5	Waste management & Global Warming	28	2	1
6	Energy Conservation & Sustainability Reporting	22	2	1
	Total	100	8	8

COURSE CONTENTS

CHAPTER	CONTENTS
1	Environmental Management System • EMS Audit – ISO 14001 – 2015 • Aspects and impact of environment management • Environmental Policy, Environment Management Programmes • Administrative Procedure for Environmental Clearances • Environmental Impact Assessment (EIA) - Process and Methodologies • Air pollution and control measures • Water pollution and control measures • Soil Pollution and Control measures • Plastic pollution and control measures • Eco system, Concept and Structure, components of Eco system;
2	Concept of Common Effluent Treatment Plant (CETP) • Floating aquatic plant system and its design and operation • Sludge characteristics and disposal methods – design and operation of sludge drying bed • Design and operation of treatment plant – trouble shooting and trouble-free operation
3	Environmental Important Regulations • The Water Prevention and Control of Pollution Act, 1974 & Rules framed under the Act; Water (Prevention and Control of Pollution) cess. Act, 1977 & Rules; Role of State Pollution Control Board • The Air (Prevention and Control of Pollution) Act, 1981 and Rules framed under the Act; Role of State Pollution Control Board • Environment (Protection) Act and Rules (as amended) • Water cess Act and Rules • Public Liability Act and Rules • under Water and Air Act
4	Environmental Monitoring • Environment related terms / definitions, Principles and practice for monitoring of air pollution, water pollution, solid waste management • Cleaner technologies • Ambient Air quality, Environmental Noise Pollution, Stack Monitoring, Effluent Monitoring, Effluent Treatment Plant-key process, Air Pollution Control Devices, Scrubber system, Parameters of Effluent monitored
5	Waste management • Statutory Provisions for Bio-Medical Wastes - Treatment, Transportation and Disposal of hazardous waste

	• E-Waste Management - Treatment, Transportation and Disposal of hazardous waste • Battery Waste management - Treatment, Transportation and Disposal of hazardous waste • Hazardous Waste management: Hazardous Waste, PCB Requirements and transportation of hazardous wastes. Manifest, TREM Card, Solid Waste management. ETP and STP; Management of Hazardous waste by industries • Six R- Concept: Rethink, Refuse, Reduce, Recycle, Reuse and Reprocessing/ Co-processing of waste Global Warming • Carbon emission, Atmospheric gases, Greenhouse gases, Kyoto protocol, Acid rains, Effects on Human beings, Wildlife and natures • Mitigation measures of Global warming • Deforestation, Tree plantation, Biodiversity, Carbon Credit, Ozone depleting substances and its impact on the environment • Restrictions for development in Coastal Zone as per CRZ regulations (Coastal Regulation Zone (CRZ) Rules)
6	Energy Conservation • Key elements of energy management system ISO 50001 • Use of clean technologies, energy conservation measures, water conservation, Recycling, harvesting, Power Saving Measures, Paper saving measures, Raw material saving, depletion of natural resources, Renewable energy, Life cycle Assessment (LCA), Product stewardship, Green supply chain, Eco friendly environment good practices and innovations etc. Sustainability Reporting • Elements of sustainability Reports, Purpose and advantages of Sustainability Reporting • Global Reporting initiative (GRI) G 4 guidelines • Monitoring and analysis of industrial effluents, • Green Building Concept (GBC)

QUALITY CONTROL IN OCCUPATIONAL HEALTH AND SAFETY

Subject Title: QUALITY CONTROL IN OCCUPATIONAL HEALTH AND SAFETY

Subject Code : IS-104

Periods/ weeks : 20 Periods/ year:100

RATIONALE: To equip the student with skills and techniques for prevention and control of risks and hazards and mitigation of the same in efficient manner.

SCHEME

S.No	Topic	No. of Periods	Short Questions (5 marks each)	Long Answer Questions (12 Marks each)
1	Safety Appraisal & Control Techniques; Permit to work systems	24	1	1
2	Accident / Incident / Near-miss/ Dangerous Occurrence reporting and Investigation	15	1	1
3	Hazard Identification Techniques; Hazard Identification and Risk Assessment and Control	20	2	2
4	Measurement & Evaluation of Performance	6	1	1
5	Major Accident Hazards (MAH) control system; Emergency Preparedness and Response Plans	25	2	2
6	Occupational Health and Safety Audits	10	1	1
	Total	100	8	8

COURSE CONTENT

Chapter No.	TOPICS
1	Safety Appraisal & Control Techniques: Plant safety rules and procedure - Safe Operating Systems - Safety Check List - Safety Tag System - Plant Safety Inspection - Safety Sampling - Safety Surveys and safety tours - Safety Inventory System - Product Safety - Total Loss Control & Prevention Permit to work systems: Types of Work permit – Hot Work, Cold Work, Working at height, Electric Isolation, Confined Space entry, Excavation, Working on Fragile roof; Contents of work permits, Process for execution and closure of work permit; Lock Out and Tag Out (LOTO) System
2	Accident / Incident / Near-miss/ Dangerous Occurrence reporting and Investigation: Accident/Incident Investigation reporting and investigation purpose and process - Accident Report forms - Accidents reportable under various statutes like Factories Act, 1948, the BOCW Act 1996, the ESI Act 1948 etc - Agencies investigating accident - Identifying the key factors and the immediate and basic causes - Accident investigation report, Corrective Action and Preventive Action (CAPA)
3	Hazard Identification Techniques - Reactive approach, Incident Recall Technique (after-the-event approach) - Proactive approaches: Deductive technique, Inductive technique, Critical Incident Review Technique What-if, Fishbone, Why-Why, Root Cause Analysis (RCA), Fault Tree Analysis, Event Tree Analysis, Cause consequence analysis (CCA), Managerial Oversight Review Technique (MORT), Failure Mode and Effect Analysis (FMEA), Job Safety Analysis (JSA). Hazard Identification and Risk Assessment and Control - Hazard Identification and Risk Assessment (HIRA) - Hierarchy of Hazard control - Hazard Analysis (HAZAN) - Introduction to concept of Maximum Credible Accident Analysis (MCAA) - Introduction to concept of QRA (Quantitative Risk Assessment)

4	Measurement & Evaluation of Performance - Indian Standard IS-3786 and its salient features, Definition of terminology used: Accident, incident, Near miss – incident, dangerous occurrence, disabling (lost-time) injury, non-disabling injury, reportable lost-time injury, non-reportable lost-time injury, days of disablement (lost time), partial disablement, temporary partial disablement, permanent partial disablement, total disablement, temporary total disablement, permanent total disablement, man-hours worked/ exposure hours, scheduled charges for disabilities, statistical period, Restricted work case (RWC), first aid case etc.
	Safety Performance Indicators: Frequency Rate, Weighted Frequency Rate, Severity Rate (SR), Incidence Rate, Frequency- Severity Index (FSI), Safe T- score, Cost Factor, Cost severity rate, activity rate, Fatal Accident Frequency
	Rate (FAFR), Time charges in the Employee's Compensation Act, 1923; Leading and Lagging Indicators
	Classification of Industrial Accidents and Special Cases according to IS-3786: Classification of accidents as per IS-3786, Assessment of special cases: Inguinal hernia, back injury, Aggravation of pre-existing condition, Aggravation of a minor injury, cardio-vascular diseases, Miscellaneous, Other disabilities
	Accident / Incident Analysis: Methods of collating and Tabulating data, Record-keeping, Accident/ Incident/ Occupational illness trend analysis
5	Major Accident Hazards (MAH) control system: Major Accident Control, Definition of Major Accident hazards, Identification and Assessment of MAH Installations, Roles of Government, Management, Local Authorities and Public, ILO Code of Practice for Major Accident Control, Major Accident Control system at Local, State, National and International Levels Emergency Preparedness and Response Plans: Onsite Emergency Response Plan, Off-site emergency Response Plan, Mutual Accident Response Group (MARG); Disaster management Act & Rules
6	Occupational Health and Safety Audits: Occupational Health and Safety Audit IS-14489: 2018; Different types of audits; Internal, External audits Integrated Management System (IMS) – IS 18001:2007 / OSHAS 18001:2007 / ISO 45001

Safety, Health and Environmental Legislation

Subject Title : Safety, Health and Environmental Legislation

Subject Code : IS-105

Periods/ weeks : 20 Periods/ year:150

RATIONALE: To acquaint the student with National and International Acts, Rules, Conventions pertaining to Safety, Health and Environment.

SCHEME

S.No	Topic	No. of Periods	Short Questions (5 Marks each)	Long Questions (12 Marks each)
1	ILO Conventions and Recommendations	15	1	1
2	The Factories Act, 1948 (Amended) and Rules	30	2	2
3	Social Security- Legislations	30	1	1
4	SH&E related Important Legislation (PESO Related)	20	1	3
5	SH&E related Important Legislation (Others)	20	1	
6	Environment Protection Legislations:	35	2	1
	Total	150	8	8

COURSE CONTENTS

Chapter No.	Details		
1	ILO Convention and Recommendation concerning Occupational Health and Safety; Relevant Conventions and Recommendation of ILO in the furtherance of Safety, Health and Environment (SHE), SHE a human right issue, Trade Policy affecting OHS		
	Year	Convention	Recommendation
	1981	155-OHS	164 - OHS
	1985	161-OHS	171 - OHS
	1988	167-Safety & Health in Construction	175 - Safety & Health in Construction
	1990	170-Chemicals	177 - Chemicals
	1993	174-Prevention of major industrial accidents	181-Prevention of Major Industrial Accidents
2	The Factories Act, 1948 (Amended) and Rules: Provisions relating to Safety, Health and Welfare under the Act and The Telangana Factories Rules, 1950 Important Case laws under the Factories Act, 1948 Introduction to Occupational Safety, Health and Working Conditions Code 2020		
3	Social Security- Legislations: Employees Compensation Act and Rules - ESIC Act and Rules - Contract Labor (Abolition and Conditions of Service) Act and rules - Public Liability Insurance Act 1991 and Rules - Responsible Care (RC) - Social Accountability 8000; Introduction to the Code on Social Security 2020		
4	Safety, Health and Environment (SHE) related Legislations (PESO Related): Sections pertaining to SHE • Indian Explosives Act, 1984 and Rules • Petroleum Act 1934 and Petroleum Rules (as amended) • Gas Cylinder Rules • Calcium Carbide Rules, 1987 (as amended) • Static and Mobile (Unfired) Pressure vessel Rules, 1981 as amended in 2000 • Ammonium Nitrate Rules, 2012 (as amended)		

5	Safety, Health and Environment (SHE) related Legislations (others): Sections pertaining to SHE • Indian Boilers Act,1923 with allied Regulations,1961 • Indian Electricity Act, 2003 and Rules; Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2010 as amended. • The Insecticides Act and Rules. • Radiation Protection Rules • The Dock Workers (Safety, Health & welfare) Act 1996 and Rules and Regulations. • The Central Motor Vehicles Rules, 1989 as amended in 2000
6	Environment Protection Legislations: MSIHC Rules -, 1989 (as amended) - Noise Pollution (Regulation and Control) Rules (as amended) Batteries (Management and Handling) Rules - Hazardous Waste management Rules - E-waste (Management) Rules, 2016 (as amended) - Chemical accidents (Emergency Preparedness, Planning and Response) Rules, 1986

INDUSTRIAL HYGIENE AND OCCUPATIONAL HEALTH

Subject Title : INDUSTRIAL HYGIENE AND OCCUPATIONAL HEALTH

Subject Code : IS-106

Periods/ weeks :20 Periods/ year: 150

RATIONALE: Acquire knowledge of interaction of Man and Machine to maintain Hygiene and Health while working to prevent exposure to dangers.

SCHEME

S.No	Topic	No. of Periods	Short Questions (5 Marks each)	Long Questions (12 Marks each)
1	Industrial Hygiene & Occupational Health	50	2	2
2	Personal Protective Equipment	30	1	1
3	First Aid & Introduction to Ergonomics	25	2	2
4	Ventilation and Heat Stress	15	1	1
5	Industrial Lighting & Illumination	15	1	1
6	Noise and Vibration	15	1	1
	Total	150	8	8

COURSE CONTENT

Chapter No.	Details
1	Industrial Hygiene: Definition of Industrial Hygiene, Industrial Hygiene: Control Methods, Substitution, Changing the process, Isolation, Wet method, Local exhaust ventilation, Personal Hygiene, Housekeeping and maintenance, waste disposal, Special control measures. Introduction to chemical hazards, dangerous properties of chemical, dust, gases, fumes, mist, vapors, smoke and aerosols. Route of entry to human system, recognition, evaluation and control of basic hazards, Concept of dose response relationship, bio-chemical action of toxic substances. Personal Sampler, High Volume Sampler, Midget Impinger Tubes, Rota Meter, Calibration of Rotameter. Concept of threshold limit values, TLV-TWA, PEL/OEL, STEL, IDLH, LC50, LD50 Air sampling strategies, personal exposure monitoring. Work environment monitoring biological sampling & analysis Occupational Health: Definition: As per WHO; Common Occupational Disease - Occupations involving risk of contracting these disease- Mode of causation of the diseases and its effects-Diagnostic methods. - Biological monitoring – Methods of prevention Compensation for Occupational diseases. - Evaluation of Injuries - Occupational Health Management Services at the workplace. - List of notifiable diseases Schedule III of Factories Act-1948 Occupational health Surveillance – Pre employment, Periodical, Post Employment Medical examination Role of factory medical officer / certifying surgeon Occupational exposure and risk-based health surveillance Occupational Health Hazards & Occupational Diseases Adverse health effects of Noise, Vibration, Cold, Heat stress, Improper illumination, Thermal radiation, Ionizing and non-Ionizing radiations - Permissible threshold exposure limits- Short term and long-term effects of exposures – Preventive and control measures - Common Occupational Diseases as per the schedule III of the Factories Act,1948 Common Occupational Diseases as per the schedule III of the Factories Act,1948
2	Personal Protective Equipment: 2.1.1 : Need for personal protective equipment, selection, applicable standards Supply, use, care & maintenance respiratory and non-respiratory personal Protective Equipment. 2.1.2 : Non-respiratory personal protective devices: Head protection, Ear protection, Face and Eye protection, Hand protection, Hand protection, Foot protection, Body protection. 2.1.3 : Respiratory personal protective devices: Classification of hazards, Classification of respiratory Personal protective devices, Selection of respiratory personal protective devices.

	2.1.4: Instructions and training in the use, maintenance and care of self-containing breathing apparatus. Training in the use of breathing apparatus (Open Circuits and Close Unit) - Testing procedure and standards
3	Define First Aid, Purpose, Principles of First aid, First Aider-Role & Responsibilities and Qualities Fundamentals of First Aid for thermal burns, Chemical burns, Fractures, Fainting, Shock, Insects and animal bites, Suffocation, Toxic Ingestion, Bleeding wounds and bandaging, Artificial respiratory, Cardiopulmonary Resuscitation (CPR), Techniques, Victim transportation, Rescue Techniques, first aid box and its contents. Introduction to Ergonomics: Definition, Aims and scope, Man-machine (Job), Environment system, Constituents of Ergonomics, Application of Ergonomics in Industry for Safety, Health and Environment. - Ergonomics of Automation / Assembly, Visual Fatigue, Ergonomics of Rehabilitation while Assigning alternate jobs. - Anthropometry and fundamental of biomechanics: Basic and applied aspects: Anthropometric measurements and their usefulness in Industry. - Permissible limits of load for manual lifting and carrying Concept of workstation and its design. Improving safety and productivity through workstation design Physiology and ergonomics at work: Assessment of workload based on Human physiological reactions. Assessment of work capacity Fatigue and Rest allowances Physiological Test for assessment of Occupational Health and Physical Fitness Aerobic work capacity (physical work capacity), Methods of the determination (use of bicycle, ergometer, treadmill, stepstool, ergometer) Factors affecting aerobic capacity and work performance
4	Ventilation and Heat Stress Purpose of Ventilation – Physiology of heat regulation; Thermal environment and its measurement; Indices of heat stress; Thermal limits for comfort, efficiency and freedom from health risk; Natural ventilation. Mechanical Ventilation. Air conditioning, Control of heat exposures at source, dilution and local ventilation. Recommended values for air changes required for various areas as per the Factories Act, 1948 and National Standards
5	Industrial Lighting & Illumination Purpose of Lighting Benefits of good illumination; Phenomenon of lighting and safety, Lighting and the work Sources and types of artificial lighting Principles of good illumination Recommended optimum standards of illumination. Stroboscopic effect, Design of lighting installation., Maintenance. IS Standards relating to lighting and color
6	Noise and Vibration Noise and ill-effect of noise on human health – Auditory and Non-Auditory Measurement and evaluation of noise Control of noise hazards – Noise absorption techniques, silencers, Permissible level of exposure to noise in industry, Ill effects of vibration, White Fingers (Reynold's phenomenon) and control measures of vibration

CHEMICAL AND PROCESS SAFETY MANAGEMENT

Subject Title : CHEMICAL AND PROCESS SAFETY MANAGEMENT

Subject Code : IS-107 Periods/

weeks :30 Periods/ year:100

RATIONALE: Study the nature and functions of chemicals, chemical process, receiving, storing and handling of chemicals and understand Safety, Health and Environment Systems to be followed for sustainable development.

SCHEME

S.No.	Topic	No. of Periods	Short Questions (5 Marks each)	Long Questions (12 Marks each)
1	Process Safety Management (PSM)	10	1	1
2	Enhancing safety in chemical industry; Unit Operations and Process hazards	15	2	1
3	Specific safety measures for chemical industries & Corrosion causes and Protection	25	2	2
4	Safe handling of Chemicals & Safety in Plant operation and maintenance	20	1	1
5	Fire & Explosion	15	1	2
6	Pressure Vessels	15	1	1
	Total	100	8	8

COURSE CONTENTS

Chapter no.	Details
1	Process Safety Management (PSM) - Purpose of PSM, its elements and Risk – based Process Safety Management (RBPSM) ; Process safety culture, Compliance with standards, Process safety competency, workforce involvement, stakeholder outreach, process knowledge management, Hazard Identification and Risk Assessment, Operating procedures, Safe Work practices, Asset integrity and reliability, Contractor Management, Training and Performance Assurance, Management of Change (MOC), Operational readiness. Conduct of operations, emergency management, incident investigation, measurement and metrics, Auditing, Management review and continuous improvement.
2	Enhancing safety in chemical industry - Introduction to concept - Criteria for siting and layout of chemical plants – Hazardous Area Classification, layers of Protection Analysis (LOPA), Instrumentation for safe and efficient operation of plants, Safety Integrity Level (SIL). MAJOR INDUSTRIAL DISASTERS (CASE STUDIES) – Flixborough disaster (1974), Seveso dioxin disaster (1976), Mexico LPG tank farm fire and explosion (1984), Bhopal Disaster (1984), Sandoz-Basel disaster (1986), etc. Unit Operations and Process hazards - Piping and Instrumentation Diagrams (P&ID) - Various unit operations and their associated hazards, control precautions and prevention - Sampling techniques for toxic and flammable chemicals, pharmaceuticals etc. - Precautions in the process and operations involving explosives flammable, toxic substances, dusts, gases, vapor cloud formations and combating
3	- Specific safety measures for certain chemical industries like fertilizer, insecticides/pesticides; chloro-alkali, explosives, paints, petrochemicals, petroleum refineries, pharmaceuticals etc. - Corrosion causes and Protection - Corrosion and erosion, location, causes inspection and prevention. Cathodic protection of underground tanks /pipelines. Sacrificial anode. Protective cladding and lining.
4	Safe handling of Chemicals - Safety in receiving, storage and handling of chemicals - Nitrogen blanketing of flammable liquid storage tanks - Use of Material Safety Data sheets (MSDS) and understanding the terminology used in MSDS - Chemical compatibility considerations - Transportation of hazardous materials, safety precautions for transporting hazardous /toxic/flammable / explosive / radioactive substances by all modes. - UN and other classification of chemicals. - Transfer of chemicals by pipelines within and outside installations (above ground, underground and submarines). - Pigging operation of pipelines including intelligent pigging. Safety in Plant operation and maintenance Safe procedures for plant start-up and shutdown - Pipeline color coding for identification of contents - Safety precautions for working on pipelines - Safety in preventive and emergency maintenance work - Pressure relief systems and breather valves, Flare system - Mechanism of mechanical failure that lead to a loss of containment prevention strategy

5	Fire & Explosion: • Industrial Fires. Dispersion Modelling • Chemistry of Fire – Classification of Fires • Common causes of industrial fires • Deflagration and Detonation • Unconfined vapor cloud explosion (UVCE) • Runaway reaction and control methods • Boiling-Liquid Expanding Vapor Explosion (BLEVE) • Dust Explosion – factors of pentagon, causes of dust explosions and controls. • Fire Protection: Design of building, Plant, exits, etc. for fire safety. Fire resistance of building materials, Fire doors and firewalls, Determination of fire load. Dow Fire and Explosion Index, Salient features of fire explosion and toxicity index. • Fire Detection and Alarm System: - Various types of fire detection and alarm system., special safety measures for control of fire and explosion in handling / processing of flammable gases, liquids, vapors, mists, solids, dusts and flying. Fire-fighting system: Different types of portable fire extinguishers, their installation, periodic inspection and operation. Replacement of Halon with safer substitutes. Fire hydrant system. Fire monitors, sprinkler systems and deluge system. Carbon-dioxide flooding system. Foam pourer system
6	PRESSURE VESSELS: • Pressure vessels (Unfired) codes of practices governing their safety • Assessment of reliability of pressure vessels and their testing. • Inspection techniques for plants, reaction vessels • Checklist for routine inspection • Checklist for specific maintenance • Pressure system hazards and controls: Principle of pressure system. Pressure, Hazards of steam, mechanism of steam explosion. Properties of liquid petroleum gas. Liquefaction of gases for bulk storage under pressure, pressure system, meaning of relevant fluids, key components and safety features of pressure system. Failure of pressure system. Hazards of overpressure and over temperature in pressure system

SAFETY IN CONSTRUCTION INDUSTRY

Subject Title : SAFETY IN CONSTRUCTION INDUSTRY

Subject Code : IS-108

Periods/ weeks :30 Periods/ year:100

RATIONALE: This subject deals with the scope of safety in construction operation as well as in the demolition operations. It also deals with importance of safety with regards to storage, stocking and handling of materials of construction.

SCHEME

S.No	Topic	No. of Periods	Short Questions (5 Marks each)	Long Questions (12 Marks each)
1	Hazards in Construction Sector and their Preventive measures	10	1	1
2	Types of Construction Activity	15	1	2
3	General Safety Measures & Special works	20	1	1
4	Safety in Demolition Operations and Special Precautions for Other works	25	2	1
5	Safety with regards to Storage, Stacking and Handling of Materials & Accident Prevention - Occupational hazards	20	2	2
6	Statutory Obligations	10	1	1
	Total	100	8	8

COURSE CONTENT

Chapter no.	Details
1	Hazards in Construction Sector and their Preventive measures • Basic Philosophy - Peculiarities and Parameters governing the Safety In construction such as site planning and design layout, Safe Access, Good Housekeeping • Safety in use of Construction Machinery and transport equipment's, Signs and Indication • Liaison for Safety with local authorities • Structural Soundness • Accidents and Hazards – their causes and effects • Good Safety practices / Initiatives in Construction Safety
2	Types of Construction Activity Working below ground level: Excavation, drilling and blasting. Pneumatic trenching, excavation equipment, shoring, strutting, tunneling, piling and safety in using and operating machinery and equipment relating to the above works. Foundations: Plant and machinery and structure Working at Height: Scaffolding, shuttering / form work, ladders, concrete, cofferdams and special operation connected with irrigation work. Safety in use and portion of related machinery and equipment safety on working on fragile roof; Precautions on tower cranes, temporary installation and structures.
3	General Safety Measures At Ground Level: Housekeeping, Electrical hazards, Handling and storage of construction material at site; Safety precautions in storage handling and stacking of material Underwater portions: Well sinking, Caissons, Underwater concreting, cofferdams and special operations connected with irrigation work. Safety in use of machinery and equipment related to underwater portions. Special works – Highrise buildings, bridges and tunnels, roads, railways, asphaltting, pneumatic caissons, electrical installations and lifts; Safety in

	prevention and protection at work site including the collapsing of the structures
4	Safety in Demolition Operation- Planning and Permit: - Precautions prior to Demolition – Protection of the Public – Precautions during demolition – Sequence of demolition operations from Safe angle; Safety while carrying out repairs, additions and alterations Project management in construction Safety: - Introduction, Manpower and material utilization, equipment and tools Safety in use and handling of explosives: Open cost machinery, quarrying Special precautions for works of engineering construction: like distilling / fractionating columns, chimney, silos-oil and gas installations, transmission/ communication lines, cooling towers, cable car installations, airfields
5	Safety with regards to Storage, Stacking and Handling of Materials of Construction - Hazards- Health ill effects while handling construction material and chemicals – Safety measures with respect materials such as cement, limes, aggregates, fly ash, timber, steel, glass, paints, varnishes, petroleum products, chemicals used in construction, plastics & PVC material etc. Accident Prevention - Occupational hazards – Occupational diseases relating to construction work – Safety in the use of personal protective equipment specific to construction industry – health and welfare measures – emergency medical measure for construction site – treatment of injuries and rehabilitations
6	Statutory Obligations – • The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996 ; The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules , 1998; The Building and Other Construction Worker’s Welfare Cess Act, 1996 Cess Rules, 1998. • National Building Code 2016 • Local building & Development by laws • Relevant Indian Standards

PRACTICAL

Subject Title : Industrial safety -**PRACTICAL**

Subject Code : IS-109

Periods/ weeks :30 Periods/ year:100

CONTENT

Chapter no.	Details
1	Personal Protective Equipment - Inspection
2	Fire Extinguisher Drill and Fire Hydrant Drill, Emergency Evacuation Drill
3	Confined Space Entry and Rescue
4	Working at Heights – Rescue Drill
5	SCBA (Self Contained Breathing Apparatus) – Donning
6	Transportation of Victim, Rescue of Victim, Bandaging, CPR
7	Ammonia Cylinder Leak Arresting – Drill
8	Chlorine Cylinder Leak Arresting – Drill
9	Measurement of illumination level at working place with the help of digital Lux meter
10	Noise Level Measurement - Measurement of Sound Pressure level in dBA and dB liner

Implementation Strategy

The practical's is to be assessed by external and internal examiners equally for

- a) Practical's assessment – 60 marks (External marks)
- b) Oral based on Practical's – 40 Marks (Internal marks)

Subject Title: PROJECT WORK

Subject Code: IS-110

Periods/ year:150

The main aim of the preparation of project on Industrial safety is to judge the knowledge gained by the students during their tenure of the industrial safety programme. The transfer or learning that has taken place as well as their exposure to industrial environment and its safety, so that many faceted developments of the students can be achieved under various skills of domains such as Personal, Social, Professional and lifelong learning. The students will be benefited lot by this exercise of preparation of project on their safety experience 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 consist of the following

1. Title of the Project work
2. Contents
3. Acknowledgement
4. Preface, Objective and Methodology
5. Introduction
6. Safety, Health and Environmental Activities in the Company
7. Recommendations
8. References / Bibliography
9. Any Key learning in Industrial Safety after project

Implementation Strategy

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

- a) Project assessment – 60 marks (External marks)
- b) Oral based on Project Work – 40 Marks (Internal marks)

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)

SUGGESTED LEARNING RESOURCES

Sr. No	Title	Author	Publication
1	Industrial Accident Prevention	By H.W. Heinrich, Dan Petersen and Nestor Roes	McGraw-Hill Book Company, New York / New Delhi
2	Accident Prevention manual (Vol 1 & Vol2)		National Safety Council 1121. Spring Lake Drive, Itasca
3	Accident Prevention Manual for Industrial Operations		National Safety Council 1121. Spring Lake Drive, Itasca
4	Supervisors Safety Manual		National Safety Council 1121. Spring Lake Drive, Itasca
5	Loss Control Management	By Frank E Bird Jr & Robert G Loftus	Institute Press, Loganville, Georgia (USA)
6	Management Guide to Loss Control	By Frank E Bird	Institute Press, Loganville, Georgia (USA)
7	Techniques of Safety Management	By Dar Petersen	McGraw Hill Book Co. Ltd
8	Industrial Safety and Environment	By A. K . Gupta	Laxmi Publications, New Delhi
9	Industrial Safety Concepts and Practices	By K. T Kulakarni	Pune Vidyarthi Grihaprakashan
10	Fundamentals of Industrial Safety	By K. U Mistry	NKM Publishers, Ahmadabad
11	Methods for computation of Frequency and Severity Rates for industrial Injuries and Classification of Industrial Accidents	--	BIS 3786 – 1983 Indian Standards Institution, New Delhi
12	Safety Code for Scaffolds and Ladders (Part II) – Ladders		BIS 3696
13	Glossary of terms relating to wire ropes		IS 2363
14	Steel wire ropes for general engineering purposes		IS 2266
15	Wire ropes slings and sling legs		IS 2365
16	Steel Wire rope suspension ropes for lifts, elevators and hoists		IS 3973

17	Accident Prevention Manual for Industrial Operations		National Safety council
18	Rigging Manual		Construction Safety Association of Ontario
19	Forth light roofs	VR & BKS	Ind J of Tech Vol 3 No. 3 Pg 72-74 1965
20	Illumination Engineering Vol - 54 P 317-353 1959	HR Blackwoll	
21	Encyclopedia of Occupational health and Safety		ILO
22	Model code of Safety Regulation for Industrial Establishments		ILO
23	The Factories Act and State Factories Rules		Bare Act
24	Environment (protection) Act, 1986 Rules		Bare Act
25	The BOCW (Regulation of Employment and Conditions of Service) Act, 1996 and Central Rules, 1998 and State Rules		Bare Act
26	Indian electricity Act, 2003 and CEA Guidelines		Bare Act
27	Petroleum Act and Rules		Bare Act
28	Indian Boiler Act and Rules		Bare Act
29	National Standards IS 3103 – Code of Practice for Industrial Ventilation, National Building Code Part VIII – Building Services		Bare Act
30	Loss prevention in the Process Industries (Vol. 1,2 &3)	Frank P. Less	Butterworth – Heinemann Waltham Massachusetts (USA)
31	Chemical Process Quantitative Risk Analysis		Center for Chemical Process Safety, American Institute of Chemical Engineers

CRITERIA REQUIRED FOR INDUSTRIAL SAFETY COURSE PAPER SETTING

Subject Code	Subject Name	Educational Qualification Required	Experience Required
IS-101	Industrial Safety Management	Minimum Qualification Given below	In case of Diploma Having 18 Years; In case of B.Tech having 10 Years; In case of B.Sc.(Chem / Phy) having 15 years; Degree / Diploma in any branch of Engg. and having fifteen years of experience in Factory Inspectorate or Directorate of Industrial Safety and Health or fifteen years of experience in the DGFASLI or RLI or CLI or National Safety Council in the capacity of Assistant Director or above.
IS-102	Safety in Engineering Industries	Minimum Qualification Given below	In case of Diploma Having 18 Years; In case of B.Tech having 10 Years; In case of B.Sc.(Chem / Phy) having 15 years; Degree / Diploma in any branch of Engg.

			and having fifteen years of experience in Factory Inspectorate or Directorate of Industrial Safety and Health or fifteen years of experience in the DGFASLI or RLI or CLI or National Safety Council in the capacity of Assistant Director or above.
IS-103	Environmental Management	Minimum Qualification Given below	In case of B.Tech having 10 Years; In case of B.Sc.(Chem / Phy) having 15 years; Degree / Diploma in any branch of Engg. and having fifteen years of experience in Factory Inspectorate or Directorate of Industrial Safety and Health or fifteen years of experience in the DGFASLI or RLI or CLI or National Safety Council in the capacity of Assistant Director or above.
IS-104	Quality Control in Occupational Health and Safety	Minimum Qualification Given below	In case of Diploma Having 18 Years;

			In case of B.Tech having 10 Years; In case of B.Sc.(Chem / Phy) having 15 years; Degree / Diploma in any branch of Engg. and having fifteen years of experience in Factory Inspectorate or Directorate of Industrial Safety and Health or fifteen years of experience in the DGFASLI or RLI or CLI or National Safety Council in the capacity of Assistant Director or above.
IS-105	Safety, Health and Environmental Legislation	Minimum Qualification Given below	In case of Diploma Having 18 Years; In case of B.Tech having 10 Years; In case of B.Sc.(Chem / Phy) having 15 years; Degree / Diploma in any branch of Engg. and having fifteen years of experience in Factory Inspectorate or Directorate of Industrial Safety and Health or fifteen years of experience in the DGFASLI or RLI or CLI or National Safety

			Council in the capacity of Assistant Director or above.
IS-106	Industrial Hygiene and Occupational Health	M.B.B.S Degree with AIFH Course Plus 20 + years of experience as Factory medical Officer Or Retired as Factory medical Officer / Certifying Surgeon Or Degree / Diploma in any branch of Engg. Or B.Sc (chemistry) and having fifteen years of experience in Factory Inspectorate or Directorate of Industrial Safety and Health or fifteen years of experience in the DGFASLI or RLI or CLI or National Safety Council in the capacity of Assistant Director or above in Industrial Hygiene / Occupational Health Department.	
IS-107	Chemical and Process Safety Management	Minimum Qualification Given below	In case of Diploma Having 18 Years; In case of B.Tech having 10 Years; In case of B.Sc.(Chem / Phy) having 15 years; Degree / Diploma in any branch of Engg. and having fifteen years of experience in Factory Inspectorate or Directorate of Industrial Safety and Health or fifteen years of experience in the DGFASLI or RLI or CLI or National Safety Council in the capacity

			of Assistant Director or above.
IS-108	Construction Safety	Minimum Qualification Given below	In case of Diploma Having 18 Years; In case of B.Tech having 10 Years; In case of B.Sc.(Chem / Phy) having 15 years; Degree / Diploma in any branch of Engg. and having fifteen years of experience in Factory Inspectorate or Directorate of Industrial Safety and Health or fifteen years of experience in the DGFASLI or RLI or CLI or National Safety Council in the capacity of Assistant Director or above.

Minimum Qualification

Degree in branch of Chemical/Mechanical/Electrical/ Production Engineering + (Plus) Industrial Safety Course***from any State Board of Technical Education / AICTE/ Recognized University

Or

Diploma in branch of Chemical/Mechanical/Electrical/ Production Engineering +(Plus) Industrial Safety Course*** from any State Board of Technical Education / AICTE / Recognized University

Or

B.Sc. (Physics / Chemistry) +(Plus) Industrial Safety Course*** from any State Board of Technical Education / AICTE/ Recognized University

Or

Degree / Diploma in any branch of Engg. and having fifteen years of experience in Factory Inspectorate or Directorate of Industrial Safety and Health or fifteen years of experience in the DGFASLI or RLI or CLI or National Safety Council in the capacity of Assistant Director or above.

*** the course shall be of one-year full time regular, certificate to be issued by State Board of Technical Education & Training of any state government / AICTE / Recognized University

**CRITERIA REQUIRED FOR INDUSTRIAL SAFETY COURSE EXAMINATION
PAPERS EVALUATION**

Key Need to be taken from the Paper Setters. Need to ensure the evaluator, must evaluate the examination papers with the above said Key only.		
Subject Code	Subject Name	Educational Qualification Required
IS-101	Industrial Safety Management	Minimum Qualification Given below
IS-102	Safety in Engineering Industries	Minimum Qualification Given below
IS-103	Environmental Management	Minimum Qualification Given below
IS-104	Quality Control in Occupational Health and Safety	Minimum Qualification Given below
IS-105	Safety, Health and Environmental Legislation	Minimum Qualification Given below
IS-106	Industrial Hygiene and Occupational Health	M.B.B.S Degree with AIFH Course Plus 20 + years of experience as Factory medical Officer Or Retired as Factory medical Officer / Certifying Surgeon Or Degree / Diploma in any branch of Engg. Or B.Sc (chemistry) and having fifteen years of experience in Factory Inspectorate or Directorate of Industrial Safety and Health or fifteen years of experience in the DGFASLI or RLI or CLI or National Safety Council in the capacity of Assistant Director or above in Industrial Hygiene / Occupational Health Department.
IS-107	Chemical and Process Safety Management	Minimum Qualification Given below
IS-108	Construction Safety	Minimum Qualification Given below

Minimum Qualification

Degree in branch of Chemical/Mechanical/Electrical/ Production Engineering with 10 Years' experience**+(Plus) Industrial Safety Course***from any State Board of Technical Education / AICTE/ Recognized University

Or

Diploma in branch of Chemical/Mechanical/Electrical/ Production Engineering with 20 Years' experience* +(Plus) Industrial Safety Course*** from any State Board of Technical Education / AICTE / Recognized University

Or

B.Sc. (Physics / Chemistry) with 12 Years' experience* +(Plus) Industrial Safety Course*** from any State Board of Technical Education / AICTE/ Recognized University

Or

Degree / Diploma in any branch of Engg. and having fifteen years of experience in Factory Inspectorate or Directorate of Industrial Safety and Health or fifteen years of experience in the DGFASLI or RLI or CLI or National Safety Council in the capacity of Assistant Director or above.

** (experience in manufacturing/maintenance/design/project or safety department in the supervisory or above capacity in factories); and it will be considered as after completion of Industrial Safety Course

*** the course shall be of one-year full time regular, certificate to be issued by State Board of Technical Education & Training of any state government / AICTE / Recognized University