POST GRADUATE DIPLOMA IN INDUSTRIAL SAFETY, HEALTH AND ENVIRONMENT (PGDISHE)

DEPARTMENT OF ENVIRONMENTAL SCIENCE, M.D.S.UNIVERSITY, AJMER

A) Preamble:

Industrialization is basically considered for the comfortable living of human beings. We are getting different types of goods and luxuries due to industrial products though, these are positive aspects of industrialization, along with the development in science and technology the calamities related to industries and environmental pollution problems are increasing day by day. Bhopal Gas Tragedy, Chernobyl Accident, Three Mile Island Nuclear Accident, etc. are some of the examples of safety violation. The above mentioned incidences are to enough to understand the severity of Industrial calamities. To avoid such circumstances various laws and orders implementation is necessary but not the fact is that not only laws but proper training and education about safety rules and their implementation are prior requirements for any industry. In this ever increasing era of industrialization, accidents are becoming a part of process and therefore, there is need of qualified and experienced manpower that can handle the complex industrial situations and avoid the calamities. Nowadays, there is high demand for such safety professionals from different industries. In many nations, it has been made mandatory to appoint well trained and qualified professional for the Industry.
Every year around 50 students of Environmental Science from various Universities of Rajasthan complete M. Sc. degree and join Environmental Consultancy or Industry as an Environmental Professional. With their M. Sc. Environmental Science, if they get add-on course as a Post Graduate Diploma in Industrial Safety, which is compulsory under Factories Act, 1948 for a person joining industry as Environment and Safety Officer, these students will get immediate entry in the industry and good salary package after completion of their P.G. Considering the present scenario in mind, Dept of Environmental Science, propose to start P.G. Diploma in Industrial Safety, Health and Environment (PGDISHE). The course is designed for the students and employees from industries who will be exposed to comprehensive and rigorous training covering all areas of Safety, Health and Environmental management.

B) Objectives:
To develop highly qualified professional manpower the basic requirement lies on systematic quality based coaching and training in Advanced Science and Technologies. Therefore, the course is designed to train and provide expert human resource to safety management and expected to bring direct benefits to industry and society. The course is based on following objectives:

i. To develop an expert manpower to handle the complex industrial environment.
ii. To give knowledge about occupational health, industrial hygiene, accidental prevention techniques to the students.
iii. To make the student aware about safety auditing and management systems, pollution prevention techniques etc.
iv. To train the students about risk assessment and management.

C) Academic Duration of Course:
The duration of the course is 1 year and the lectures will be delivered four days a week, two hours for each paper per week, from 3 pm to 5 pm. or as decided by the Department. These timings will be suitable for students and working employees from industry. Minimum 75% attendance is required.

Workload: Two hours per day for four days in a week i. e. 2 x 4 = 8 per week.

D) Course structure:

Candidates will be required to undergo learning in theory, project development and workshop subjects during the academic year. Candidates also will be exposed to industrial exposure through Industrial visits to get familiar with industrial health, safety and environmental management.

E) Scheme:
There will be four theory papers and a compulsory project. Each paper will be of100 marks and three hours duration and project will be of 150 marks and In-plant training will be of three weeks and of fifty marks:-

Paper - I (ISHE 1) Occupational Health and Hazards
Paper – II (ISHE 2) Safety at Workplace
Paper - III (ISHE 3) Accident Prevention Techniques
Paper – IV (ISHE 4) Safety Management System and Law
Paper -V Industrial visit and project report

The marks of each paper I to IV are divided as
Seminar I - 10
Seminar II - 10
Internal assessment test I -10
Internal assessment test II - 10
Performance - 10
Annual exam – 50
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Total marks of each paper = 100 X 4 papers = 400
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Paper V -Industrial visits and project report
Project report = 150
In- Plant Training = 50
200

Total marks = 600
The minimum pass marks required in aggregate are 50% marks subject to a minimum of 40% for each paper subject to this provision the minimum requirement for an I division 60% and II Division 50 %.

F) Expertise Available:
Implementation of this type of course is new to the university; therefore, very few experts from various departments of University are available to teach such course. But the experts from industrial sector, labour institute and engineering colleges can be invited for lecturers. Also, some experts from National and International Institutes related to industrial safety can be invited to deliver lectures and monitor the activities.

G) Space Required:
The course includes theory papers and industrial training. The theory part can be taught in the Department of Environmental Science, M.D.S. University, Ajmer. The remaining part of

industrial training can be completed in the industry as the project is based on industrial safety, health and management. The students have to complete it in the industry and therefore, laboratory space is not required for the project. The department has well equipped teaching classrooms and Laboratories for the practical. The course will be run only in Environmental Science Department.

H) Eligibility for Admission:

The students having science and engineering background will be eligible i.e. anygraduate from Science, Engineering and Technology.

I) Examination:

The students will be undergoing continuous assessment throughout the academic year through seminars, tests, tutorials etc. The evaluation will consist of internal assessment, external assessment and viva voce for the project. Passing will be as per university rules.

J) Intake capacity:

Maximum 20 students in which priority will be given to the university students (60%) and others (40%). Other fee will be applicable as per university rules/ norms

K) Justification:

This activity aims to start Post Graduate Diploma in Industrial Safety, Health and Environment in the Department of Environmental Science. The course aims at

i. M. Sc. Environmental Science students will get an add on diploma.
ii. It will produce well trained, qualified and expert manpower for the Industrial sector.
iii. Better placement opportunity for M. Sc. Environmental Science students.
iv. Course will be useful for in-service people from the industry.
v. More interaction between University and Industry.

Department of Environmental Science
M.D.S. University, Ajmer
Syllabus for P. G. Diploma in
INDUSTRIAL SAFETY, HEALTH AND ENVIRONMENT
(PGDISHE)

PAPER - I (ISHE 1) OCCUPATIONAL HEALTH AND HAZARDS

Unit - I Safety and Health Management:

i. Occupational Health Hazards, Promoting Safety, Safety and Health training, Stress and Safety. Safety Psychology, Safety information system
ii. Ergonomics - Introduction, Definition, Objectives, Advantages.
Ergonomics Hazards - Musculoskeletal Disorders and Cumulative Trauma Disorders.
iii. Importance of Industrial safety. Safety of Environment

Unit - II Radiation and Industrial Hazards:

i. Types and effects of radiation on human body, Measurement and detection of radiation intensity. Effects of radiation on human body, Measurement – disposal of radioactive waste, Control of radiation, Indian Standards.

ii. Different air pollutants in industries, Effect of different gases and particulate matter, acid fumes, smoke, fog on human health
iii. Industrial Hygiene & Health

Unit -III Electrical Hazards and Hazards in Construction Industry:

i. Safe limits of amperages, voltages, distance from lines, etc., Joints and connections, Overload and Short circuit protection, Earthing standards and earth fault protection, Protection against voltage fluctuations, Effects of shock on human body Hazards from Borrowed nutrals, Electrical equipment in hazardous atmosphere, Criteria in their selection, installation, maintenance and use, Control of hazards due to static electricity. Energy Conservation & Safety

ii. Introduction of Construction industry:- Scaffolding and Working plat form,
Welding and Cutting, Excavation Work, Concreting and Cementing work,
Transportation of men and material, Handling and Storage of compressed gas.Demolition, Indian Standards.

Unit - IV Fire and other Hazards:

i. General causes and classification of fire, Detection of fire, extinguishing methods, fire fighting installations with and without water.
ii. Machine guards and its types, automation. High pressure hazards, safety, emptying, inspecting, repairing, hydraulic and nondestructive testing, hazards and control in mines.

PAPER – II (ISHE 2) SAFETY AT WORKPLACE

Unit I - Safe use of machines and tools:
i. 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

ii. Ergonomics of machine guarding, Guarding of different types of machinery including special precautions for paper, rubber and printing machinery, wood working.

iii. 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. Safety against falling bodies

iv. Operation, inspection and maintenance of industrial trucks, loose gears conveyors, Safe working load for mechanical material handling equipment's.

Unit II - Plant design and Housekeeping:
i. Plant layout, design and safe distance, Ventilation and heat stress, Significance of ventilation, Natural ventilation, Mechanical ventilation Air conditioning

ii. National Building code part VIII and Building service, Thermal comfort,
Indices of heat stress, Physiology of heat regulation. Statutory provisions.

iii. Safety and good housekeeping, Disposal of scrap and other trade wastes
Spillage prevention, Use of colour as an aid of housekeeping, Cleaning methods, Inspection and Checklists, Advantages of good housekeeping

Unit III - Industrial Lighting:
Purpose of lighting, Uses of good illumination, recommended optimum standards of illumination, Design of lighting installation, Standards for lighting and color. Testing and Maintenance of ventilation systems.

Unit IV - Vibration and Noise:
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. Audiometry, hearing conservation programmes.

PAPER - III (ISHE 3) ACCIDENT PREVENTION TECHNIQUES

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

Unit - III First aid:
Need of First aid. Body structure and Functions, Position of causality, the unconscious casualty, fracture 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.Statutory provisions.

Unit IV - Personal Protective Equipment's
Personal Protective Equipment's: Need, selection, supply, use, care and
Maintenance, Personal protective devices for head, ear, face, eye, foot, knee and body protection, Respiratory personal protective devices.Training maintenance, precaution and care of PPE, Detection equipment.

PAPER – IV (ISHE 4) SAFETY MANAGEMENT SYSTEM AND LAW

Unit - I Legislative measures in industrial safety:
Factories Act, 1948, Workman's Compensation Act, 1923, 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 Labour and Women Employee Act. The factories rules, History, Provisions under the factories Act 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.Employees liability Act 1938.

Unit – II Occupational Safety, Health and Environment Management :
Bureau of Indian standards on safety and health 14489 - 1998 and 15001 – 2000
OSHA, Process Safety Management (PSM) as per OSHA, PSM principles,
OHSAS – 18001, EPA Standards, Performance measurements to determine effectiveness of PSM, Preservation of Natural resources, Environmental Impact Assessment (EIA).

Unit – III Safety Management:
Organising for safety, Health and Environment. Organisation: Structure, Function and responsibilities Safety Committee: Structure and function The competent person in relation to safety legislation - duties and responsibilities. Competence Building Technique (CBT), Concept for training, application of computer, multimedia, communication.

Relevance of WTO regarding safety, Health and environment.Employee participation in safety - Role of Trade union in safety,health and environment.Safety promotion and safety

awards, safety, competitions, audio visual publication. Safety Education & Training, Approaches to compliance & Violations.

Unit IV Directing safety:

Definition, process, principles and techniques. Leadership - role, function and attribution of a leader. Essential rules in communication with employees with conducting training, team building and group dynamics. Financial cost to individual worker and family, organization and society. Procedures for compilation, utility and limitations of cost data, budgeting for safety.

Reference Books :

1. The Factories Act with amendments 1987, Govt. of India Publications DGFASLI, Mumbai
2. Grimaldi and Simonds , Safety Management, AITBS Publishers , New Delhi (2001)
3. Industrial Safety –National Safety Council of India ISHET.
4. Dr. K. U. Mistry - Fundamentals of Industrial Safety & Health, Siddharth Prakashan, Ahmadabad.

Paper V: Industrial visits and project report

A- Compulsory project on Industrial safety is to be completed and a report is to be submitted to the department.

B- In-plant Training and Industrial Visits.

i. In-plant training of 3 weeks is compulsory and a Report to be submitted to the Department with due Certification of the industry where training is done.

ii. Minimum 3 Industrial Visits are compulsory.