Bishop Heber College (Autonomous)

(Nationally Reaccredited at the 'A' Grade by NAAC with a CGPA of 3.58 out of 4)

(Recognized by UGC as "College with Potential for Excellence")

Post Graduate Diploma
in
Industrial Safety

SYLLABUS

2015 - 2016 onwards

DEPARTMENT OF ENVIRONMENTAL SCIENCES

Bishop Heber College (Autonomous)

Tiruchirappalli – 620 017

PG DIPLOMA IN INDUSTRIAL SAFETY

SCHEME OF EXAMINATIONS
(For students admitted in 2015-2016 onwards)

Code no	Subject	Duration of exam	CA Marks	CE MARKS	Total Marks
First Semester					
15PGDIS01	Industrial Safety & Management	3 hrs	40	60	100
15PGDIS02	Safety in Industries	3 hrs	40	60	100
15PGDIS03	Legislation on environment, health & safety	3 hrs	40	60	100
Second Semester					
15PGDIS04	Accident and loss prevention techniques	3 hrs	40	60	100
15PGDIS05	Industrial Hygiene & Occupational Health	3 hrs	40	60	100
15PGDIS06	Industrial Visit Report	3 hrs	100	-	100
15PGDIS07	Project Report	-	80	120	200
Total					800

Rules and Regulations

1. Eligibility: Any under graduate degree
2. Duration of course : 1 year
3. Other rules and regulations for admission, examinations are according to regulations of Bishop Heber College.

First Semester **15PGDIS01**

INDUSTRIAL SAFETY & MANAGEMENT

UNIT I

Definition of Occupational Health as per WHO/ILO. Occupational Health and Environmental Safety Management – Principles practices. Common Occupational diseases: Occupational Health Management Services at the work place. Pre-employment, periodic medical examination of workers, medical surveillance for control of occupational diseases and health records.

UNIT II

Occupational Health and Environment Safety Management System, ILO and EPA Standards. Industrial Hygiene: Definition, Control Methods, Substitution, Changing the process, Local Exhaust Ventilation, Isolation, Wet method, Personal hygiene, housekeeping and maintenance, waste disposal, special control measures.

UNIT III

Element of training cycle, Assessment of needs. Techniques of training, design and development of training programs. Training methods and strategies types of training. Evaluation and review of training programs. Occupational Health Hazards, Promoting Safety, Safety and Health training, Stress and Safety, Exposure Limit.

UNIT IV

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. Importance of Industrial safety, role of safety department, Safety committee and Function.

UNIT V

International Labor Organization (ILO) Convention and Recommendation concerning Occupational Health & Safety. Conventions and Recommendation of ILO in the furtherance of Safety, Health and Environment (SHE). SHE a human right issue. Trade Policy affecting OHS.

REFERENCES

1. R. K. Jain and Sunil S. Rao , Industrial Safety , Health and Environment Management Systems, Khanna publishers, New Delhi (2006)

2. Slote. L, Handbook of Occupational Safety and Health, John Willey and Sons, New York .

3. Jeanne Mager Stellman, Encyclopedia of Occupational Health and Safety (ILO) Ms. Irma Jourdan publication.

First Semester **15PGDIS02**

SAFETY IN INDUSTRIES

UNIT-I

Personal protective devices Plant Layout for Safety-Location and Design-distance between hazardous units-Lighting-Ventilation-Color coding-Flowcharts-Pilot plant applications, and Machine Guarding and its types-Housekeeping.

UNIT-II

Factors contributing towards fire-Chemistry of fire-common causes of industrial fires-Types of fires-Fire extinguishers-types and handling. Fire detection and alarm systems-water spray systems-BLEVE-Confined and UVCE.

UNIT-III

Personal protective equipments-need, selection, applicable standards, supply, use, care and maintenance. Respiratory personal protective devices for various hazards-instruction and training in use of breathing apparatus. Non-respiratory personal protective devices for head, ear, face, eye, foot, knee and body protection.

UNIT-IV

Major accident Hazards-consequences of major hazard accidents-role of management and public. On-site and off-site Emergency planning-structure of disaster management system-constitution disaster management group-control of emergencies.

UNIT-V

Maintenance of machines and equipments-types and its advantages. Accidents related with maintenance. Work permit systems-significance of documentation-type of work requires permit-clearance procedures-permission to test, etc.

REFERENCE

1. Frank P Lees-Loss prevention in Process Industries, Vol. 1 & 2, Butterworth Heinemann Ltd., London (1991).

First Semester **15PGDIS03**

LEGISLATION ON ENVIRONMENT, HEALTH AND SAFETY

UNIT I

Overview of Indian legislation pertaining to SHE, The Factories Act, 1948 (Amended) and Rules: Provisions under the Act and Rules made there-under with Amendments Case Laws under the Factories Act. Social Security – Legislations: Workmen's Compensation Act and Rules, ESI Act and Rules. Contract Labour (Abolition and Regulation) Act, Public Liability Insurance Act, Social Accountability 8000 SA-8000

UNIT II

Indian Boilers Act, 1923 with allied Regulations, 1961, Indian Electricity Act, 2003 and Rules, Indian Explosives Act, 1984 and Rules. Petroleum Act and Rules. Gas Cylinders Rules. Calcium Carbide Rules. The Insecticides Act and Rules. Radiation Protection Rules. Hazardous Material Transportation Rules. Static and Mobile (Unfired) Pressure Vessel Rules, 1981 as amended in 2000.

UNIT III

The Dock Workers (Safety, Health & Welfare) Act, 1996 and Rules and Regulations. The Building and other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996; The Building and other Construction Worker's Welfare Cess Act, 1996 Cess Rules,1998.

UNIT IV

Water (Prevention & Control of Pollution) Act 1974 and Rules. Air (Prevention & Control of Pollution) Act 1981 and 1982 and Rules. Environment Protection Act 1986 (Amended) and Rules. Noise Pollution Act, 1998, Bio-Medical Waste management.

UNIT V

Hazardous Waste Management Rules.

Chemical accident (Emergency preparedness, planning and response) Rule 1986.

REFERENCES

1. Pollution control legislation – TNPCB (Vol- I & II)

Second Semester **15PGDIS04**

ACCIDENT AND LOSS PREVENTION TECHNIQUES

UNIT-I

Safety Organization in loss prevention-role, objectives, types, functions and advantages. Safety Education and Training-Safety Promotion and Publicity schemes.

UNIT-II

Human factors contributing to Accidents-causes for unsafe acts-Safety and psychology-Theories of Motivation and their application to safety.

UNIT-III

Hazards Identification and analysis-Fault tree analysis-Event tree analysis-Failure modes and effects analysis, HAZOP studies, Job Safety Analysis-examples.

UNIT-IV

Plant Safety inspection-objectives and types-check list procedure-inspection report. Safety Audit-elements and standards-advantages.

UNIT-V

Accident investigation-Classification of accidents-purpose and steps of investigation-accident reports-remedial measures and rehabilitation of workers. First Aid-Principles-General rules-Training-electric shocks, respiratory problems, cardiac massage, fainting, poisoning, wounds, burns, bleedings, insect bites, etc.,

REFERENCE

1. R.K.Jain & Sunil S Rao- Industrial Safety, Health and Environment Management System, Khannan Publisheres. New Delhi (2006).

2. Frank P Lees-Loss prevention in Process Industries, Vol. 1 & 2, Butterworth Heinemann Ltd., London (1991).

Second Semester **15PGDIS05**

INDUSTRIAL HYGIENE & OCCUPATIONAL HEALTH

UNIT-I

Physical hazards : Noise, compensation aspects, noise exposure regulation, properties of sound, occupational damage, risk factors, sound measuring instruments, octave band analyzer, noise networks, noise surveys, noise control program, industrial audiometry, hearing conservation programs-vibration, types, effects, instruments, surveying procedure, permissible exposure limit.

Ionizing radiation, types, effects, monitoring instruments, control programs, OSHA standard- non-ionizing radiations, effects, types, radar hazards, microwaves and radio-waves, lasers, TLV- cold environments, hypothermia, wind chill index, control measures- hot environments, thermal comfort, heat stress indices, acclimatization, estimation and control.

UNIT-II

Chemical hazards : Introduction to chemical hazards – Dangerous properties of chemicals, dust, gases, fumes, mist, vapors, smoke and aerosols – Route of entry to human system, recognition, evaluation and control of basic hazards – Degree of hazards – Concepts of dose response relationship – Bio-chemical action of toxic substances – Concept of threshold limit values – Air sampling strategies. Personal exposure monitoring and Work environment monitoring of chemical hazards – Biological sampling & analysis – Industrial hygiene control methods: Substitution, changing the process, isolation, wet method, local exhaust ventilation, personal hygiene, housekeeping and maintenance, waste disposal, special control measures.

UNIT-III

Biological and Ergonomical Hazards: Classification of Biohazardous agents – bacterial agents, rickettsial and chlamydial agents, viral agents, fungal, parasitic agents, infectious diseases - Biohazard control program, employee health program-laboratory safety program-animal care and handling-biological safety cabinets - building design. Work Related Musculoskeletal Disorders –carpal tunnel syndrome CTS- Tendon pain disorders of the neck-back injuries.

UNIT-IV

Occupational health and toxicology : Concept and spectrum of health - functional units and activities of occupational health services, pre-employment and post-employment medical examinations - occupational related diseases, levels of prevention of diseases, notifiable occupational diseases such as silicosis, asbestosis, pneumoconiosis, siderosis, anthracosis, aluminosis and anthrax, lead-nickel, chromium and manganese toxicity, gas poisoning (such as CO, ammonia, coal and dust etc) their effects and prevention – cardio pulmonary resuscitation, audiometric tests, eye tests, vital function tests.

UNIT-V

First aid & antidotes: Fundamentals of first – AID burns, fractures, suffocation, toxic ingestion – bleeding wounds artificial respiratory, techniques – Bandaging, Antidotes. Industrial toxicology, local, systemic and chronic effects, temporary and cumulative effects, carcinogens entry into human systems. Work physiology: Physiology of respiration, cardiac cycle, muscle contraction, nerve conduction system, etc. Anthropometry and fundamental of Bio-mechanics – Assessment of workload based on Human Physiological reactions – energy cost of work – Assessment of work capacity fatigue and rest allowances – Physiological test for assessment of occupational health – Nutritional values of diets for exercise and work – Nutrition and physical fitness relationship – Environmental Physiology.

REFERENCES

1. Handbook of Occupational Health and Safety, NSC Chicago, 1982

2. Encyclopedia of Occupational Health and Safety, Vol. I & II, International Labour Organisation, Geneva, 1985.

3. McCornick, E.J. and Sanders, M.S., Human Factors in Engineering and Design, Tata McGraw-Hill, 1982.

Second Semester **15PGDIS06**

Industrial visit

Industrial visit/ In-plant training (minimum four industries) is compulsory for all students and they have to submit their report at the end of the course. Evaluation of reports will be done only by the internal examiners.

Distribution of marks: CA: 100 Marks

Second Semester **Code**

PROJECT REPORT

The students must do their project report in industries.

Distribution of marks

1.	CA marks	:	80 Marks
2.	CE marks		
	Viva	:	40 Marks
	Project Evaluation	:	80 Marks
	Total Marks	:	200 Marks