

22PCM313T					Safety, Health and Environment					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hours/Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	0	0	3	3	25	50	25	--	--	100

COURSE OBJECTIVES

- Exposure identify and assess hazards in any stage of process operation to quantify and manage
- Develop skills in hazard analysis and able to find out the root cause of an accident.
- Gain knowledge in devising safety policy and procedures to be adopted to implement total safety in a plant.
- Select, plan and implement health objectives, targets and performance standards
- Recognize and expertise measures of pollution control.

UNIT I: Introduction**9 Hr.**

Need for developing Environment, Health and Safety systems in work places. Status and relationship of Acts, Regulations and Codes of Practice. Role of trade union safety representatives. International initiatives. Ergonomics and work place. Concepts of safety: Hazard classification chemical, physical, mechanical, ergonomics, biological and noise hazards; Hazards from utilities like air, water and steam.

UNIT II: Occupational health and hygiene**11 Hr.**

Definition of the term occupational health and hygiene. Categories of health hazards. Exposure pathways and human responses to hazardous and toxic substances. Advantages and limitations of environmental monitoring and occupational exposure limits. Hierarchy of control measures for occupational health risks. Role of personal protective equipment and the selection criteria. Effects on humans, control methods and reduction strategies for noise, radiation and excessive stress. HAZOP, Job safety analysis; Fault tree analysis; Event tree analysis; Failure modes and effect analysis and relative ranking techniques; Safety audit; Plant inspection; Past accident analysis.

UNIT III: Workplace safety and safety systems**9 Hr.**

Features of the satisfactory design of work premises HVAC, ventilation; Safe installation and use of electrical supplies; Fire safety and first aid provision; Significance of human factors in the establishment and effectiveness of safe systems; Safe systems of work for manual handling operations; Control methods to eliminate or reduce the risks arising from the use of work equipment; Requirements for the safe use of display screen equipment; Procedures and precautionary measures necessary when handling hazardous substances; Contingency arrangements for events of serious and imminent danger.

UNIT IV Environmental Pollution and Control**10 Hr.**

Environmental Hazards, Aspects of air and water pollution, sources, classification characterization and effects of water pollutants, Primary Treatment- equalization, sedimentation, secondary treatment – Activated sludge process, tricking bed, Tertiary Treatment – chlorination, filtration and adsorption, Reverse osmosis. Sources, classification, characterization and effects of air pollutants Gravity Settling Chambers, Venturi scrubbers, Bag Filters, Electrostatic Precipitators. Solid waste management

Max. 39 Hr.

COURSE OUTCOMES

- CO1:** Identify accident prone areas and adopt methods for reducing accidents following safety precautions.
- CO2:** adopt safety policy in industry and list out the duties and implement safety targets.
- CO3:** Create a job safety analysis by applying the concepts of workplace injury prevention, risk management and environmental laws
- CO4:** Diagnose the cause of environmental pollution and take appropriate control measures to improve the health outcomes
- CO5:** Develop skills in analysing, sensitizing and managing the community about environmental health issues.
- CO6:** Select technologies for mitigating pollution

Text Books & References

1. Crowl, Daniel A., and Joseph F. Louvar. Chemical process safety: fundamentals with applications. Pearson Education, 2001.
2. Cheremisinoff, Nicholas P., and Madelyn L. Graffia. Environmental and Health and Safety Management: A Guide to Compliance. William Andrew, 1995.
3. C. S. Rao, Environmental Pollution and Control Engineering, 2nd ed., Wiley, India, 2006
4. S. P. Mahajan, Pollution Control in Processes Industries, TMH, 1985
5. Metcalf and Eddy, Wastewater engineering treatment and reuse, 4th ed., TMH, 2003
6. Gallant, Brian. The Facility Manager's Guide to Environmental Health and Safety. Government Institutes, 2007.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

Part A: 10 Questions each carrying 5 marks

Part B: 5 Questions each carrying 10 marks

Exam Duration: 3 Hr.

50 Marks

50 Marks