Course Type	Course Code	Name of the Course	L	T	P	Credits
OE	CHO302	Industrial Safety and Hazards Management	3	0	0	9

Course Objective
To teach the students about process safety, health and hazards issues and make them aware of the prevalent regulatory provisions.
Learning Outcomes
The students will be able to appreciate and deal with the HSE issues in chemical process industries.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	**Statutory Regulations Safety and Hygiene:** Industrial safety, toxicology and Industrial hygiene, models for dose and response, threshold limiting values (TLVs), government laws and regulations, OSHA standards, MOEF (India) guidelines for handling and storage of hazardous chemicals, sludges, materials, MSDS	**07**	Knowledge about requirements of statutory regulations and standards of Safety, Toxicology and hygiene
2	**Toxic Release and Dispersion Models:** Estimation of realistic and worst-case release of vapor and liquid toxicant through hole in tank, pipe, and flange, dispersion of neutrally buoyant and dense gases	**06**	Basic estimation of leaks/releases and their repercussions.
3	**Fire and Explosion:** The fire triangle, flammability characteristics of chemicals and auto ignition, flammability diagram, explosion characteristics and blast diagram, dust, vapor, cloud and mist explosion, prevention of fire and explosion	**08**	Idea about fire, explosion, their characteristics and prevention techniques.
4	**Relief Devices:** Types and characteristics, relief systems and design consideration, relief sizing and vent area calculation	**07**	Design of relief system for high pressure, reactive, flammable systems.
5	**Hazard identification and Risk assessment:** Hazard survey and safety review, Event tree, fault tree and its minimum cut set	**06**	Basics of risk assessment techniques.
6	**Safety Procedure and Design:** Hierarchy, documentation, best practices, procedures for process safety design, safety aspects related to site, plant layout, process development and design stages	**08**	Understanding of safety design of processes

Textbooks:

1. Crown. D. A. (2011). Chemical Process Safety Fundamental with Application, 3rd ed., Prentice Hall International Series.
2. Fawcett, H. H., and Wood, W.S. (1966). Safety and Accident Prevention in Chemical Operations, John Wiley & Sons.

Reference books:

1. Mannan, S. (2012). Lees' Loss Prevention in the Process Industries: Hazard identification, Assessment and Control (3 Volumes), 4th Ed., Butterworth-Heinemann.
2. Haight, J.M. (2013). Handbook of Loss Prevention Engineering, Volume 1 & 2, John Wiley & Sons,