GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Chemical Engineering (Semester 7)
Minor Degree : Industrial Process Safety
Subject Code : N117AA01 (w.e.f. AY 2026-27)
Subject Name : Industrial safety Practices- II

Type of course : Compulsory.

Prerequisite : A good understanding regarding basics of safety system, active and passive fire fighting system.

Rationale : The main objective of this subject is to study legal point of view in safety in different sector.

Teaching and Examination Scheme :

Teaching Scheme			Credits	Examination Marks				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE (E)	PA (M)	ESE (V)	PA (I)	
3	1	0	4	70	0	0	0	70

Content :

Sr. No.	Content	Total Hrs
1	Plant Sitting: Sitting Criteria for hazardous industries: Meteorological factors, Environmental guidelines, Reports to Authorities: Environmental Impact Assessment (EIA), Environmental Statement, Definition, Inventory, Preparation and Submission of Report to Competent Authorities, Separation distances and its relevance. Statutory requirements. National and International Standards.	6
2	Bulk Storages: General considerations: NFPA & OISD Standards, Design of storage layout. Dyke requirements. Incompatibility Criteria, Types and Safe Layout of Storages: Tank layout of LPG, Chlorine, Ammonia, EO and Oleum, Isolated storages, Mounded storages, Cryogenic storages.	9
3	Safety through Design: The Components involved in design process, Preliminary Hazard Analysis (PHA) and HAZOP exercise, Different tires of Protection and Redundancy, General considerations of design for Emergency Shutdown and Start-up, Operating conditions.	8
4	Pressure System Design: Pressure System Components, Fundamentals of pressure vessel design, Codes, Standards and Specifications, Over pressure protection, Pressure relief and blow down, Basic requirements of protection and their practical application for Flare Systems.	9
5	Charters of National & International Safety Organizations: Study of the Charters of ILO, EPA, OSHA, NFPA, NSC (Chicago), NSC (India)	3

6	Emission and Dispersion: Liquid discharge, Gas discharge, Vapour – liquid discharge, Fugitive emissions and measurement, Ambient air monitoring, Stack monitoring, Risk contours, Population density, Probit equation for probability assessment, Consequence analysis and inference of scenarios. Software modelling, Safety Audit and Safety Report: Their Preparation,.	10

Suggested Specification table with Marks (Theory) : (For BE only)

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**10**	**20**	**10**	**10**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books :

1. Loss Prevention in the Process Industries, Frank P Lees, Butterworth Heinemann.
2. Handbook of Industrial Safety by K.U. Mistry, SiddarthPrakashan, 108, Western Plaza, Near Bhulka Bhavan School, Adajan Road, Surat – 395 009. (Gujarat).
3. Methodologies for Risk & Safety Assessment in Chemical Process Industries, Raghvan K.V., Khan A.K., Commonwealth Science Council, London. Publications, New York.
4. Chemical Reactor Design for Process Plant, Howard F. Rase, Wiley Interscience
5. Publications, New York.

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Course Outcomes :

Sr. No.	CO statement	Marks % weightage
CO-1	To understand guidelines of EIA and methodology of EIA.	15%
CO-2	To have conceptual of bulk storage and handling of hazardous chemical compounds.	15%
CO-3	Able to implement the Hazop and safe design practices in Industry.	25%
CO-4	To apply basics of emission control methodologies.	25%
CO-5	To have basics of different rules and regulation for Chemical Industry.	20%

List of Practical/Tutorials :

1. To study plant layout and PFD.
2. To study dispersion model.
3. To study safety audit.
4. Design Dyke Wall For Storage Tank.
5. To Study and Perform Environmental Impact Assessment (EIA),
6. Design Storage Tank.
7. Design Pressure Vessel.

List of Open Source Software/learning website :

Reference to NPTEL can be made for a better understanding.

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