



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Minor/Hons. Program

Level: UG

Branch: Minor/Hons. Industrial Process Safety

Subject Code: BE050AA011

Subject Name: Industrial Hygiene and Occupational Hazards

w.e.f Academic Year	2026-27
Semester	5
Category of the course	Core Course

Prerequisite	A good understanding regarding basics of chemicals and their properties, human anatomy.
Rationale	The main objective of this subject is to study hygiene to be maintained in Industry and use of PPEs as a mode of protection against harmful chemicals. It also includes ventilation, illuminations and sound that are to be maintained under standards. The subject focuses on occupational health, regular medical examination and ways to conduct them and how to use first aid kit in case of accident.

Course Outcomes:

Sr.No.	CO statement	Marks % weightage
CO-1	To understand the different approaches for the industrial hygiene	15%
CO-2	To know about the personal protective equipment and its application in different scenario	25%
CO-3	To analyze the methods for proper ventilation and illumination	25%
CO-4	To apply the knowledge about occupational health	15%
CO-5	To apply the concepts of a first aid kit	20%

Teaching and Examination Scheme:

Teaching / Learning Scheme (in Hours per semester)					Total Credits = TH/30	Assessment Pattern and Marks					Total Marks
L	T	P	PBL*	TH		Theory		Tutorial / Practical			
						ESE (E)	PA (M)	PA (I)	PBL (I)	ESE (V)	
45	30	00	45	120	04	70	0	0	30	50	150



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Minor/Hons. Program

Level: UG

Branch: Minor/Hons. Industrial Process Safety

Subject Code: BE050AA011

Subject Name: Industrial Hygiene and Occupational Hazards

Content:

Sr.No.	Content	Total Hrs
1	Industrial Hygiene: Definition of Industrial Hygiene, Industrial Hygiene: Control Methods, Substitution, Changing the process, isolation, wet method, local exhaust ventilation, personal hygiene, housekeeping and maintenance, waste disposal, special control measures. Route of entry to human system, recognition, evaluation and control of basic hazards, concepts of dose response relationship, bio-chemical action of toxic substances.	9
2	Personal Protective Equipment: Need for personal protection equipment, selection, applicable standards, supply, use, care & maintenance, respiratory and non-respiratory personal protective equipment.	8
3	Ventilation and Illumination: Purpose of ventilation, Thermal environment and its measurement. Indices of heat stress. Natural ventilation. Mechanical ventilation. Air conditioning. Control of heat exposures at source, dilution and local ventilation. Recommended values for air changes required for various areas as per Factories Act, 1948 and National Standards. Purpose of lighting. Benefits of good illumination. Phenomenon of lighting and safety. Lighting and the work. Sources and types of artificial lighting. Principles of good illumination. Recommended optimum standards of illumination. Maintenance. Noise and Vibration: Noise and ill-effect of noise on human health- Auditory & non-auditory, Noise Induced Hearing Loss (NIHL). Measurement and evaluation of noise. Control of Noise Hazards- Noise absorption techniques, Silencers. Permissible level of exposure to noise in Industry.	10
4	Occupational Health: Definition, Common Occupational Diseases, Occupations involving risk of contracting these disease - mode of causation of the diseases and its effects - diagnostic methods. Biological monitoring - Method of prevention Compensation for occupational diseases. Evaluation of injuries Occupational Health Management Services at the work place. List of notifiable diseases, Occupational Health Surveillance-Pre employment, Periodical, Post employment Medical examination, Occupational exposure & Risk based health surveillance Occupational Health Hazards & Occupational Diseases, Measurement and evaluation of noise Adverse health effects of noise, vibration, cold, heat stress, improper illumination, thermal radiation, ionizing and non-ionizing radiations. Permissible threshold exposure limits - short term and long term effects of exposures - Preventive and control measures, Occupational risk and hazards to firefighters.	10
5	First Aid: Definition, Purpose, Principles of First aid, First Aider-Role & Responsibilities and Qualities. Fundamentals of First-Aid- for thermal burns & chemical burns, Fractures, Fainting, Shock, insects and animal bites, Suffocation, Toxic Ingestion - Bleeding Wounds and Bandaging, Artificial	8



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Minor/Hons. Program

Level: UG

Branch: Minor/Hons. Industrial Process Safety

Subject Code: BE050AA011

Subject Name: Industrial Hygiene and Occupational Hazards

Respiratory, Cardiopulmonary Resuscitation (CPR), Techniques. Victim transportation, Rescue Techniques. First Aid Box and its contents, Victim transportation, Rescue Techniques. First Aid Box and its contents

Distribution of Theory Marks

RLevel	ULevel	ALevel	NLevel	ELevel	CLevel
10	15	20	10	15	0

Legends:R:Remembrance;U:Understanding;A:Application,N:AnalyzeandE:EvaluateC: Create and above Levels(Revised Bloom's Taxonomy)

Reference Books:

1. Techniques of Safety Management By Dan Petersen (ISBN:978-18-8-558139-6),McGraw- Hill Book Co. Ltd., New York, N.Y.(USA)
2. Industrial Safety and Environment By A.K.Gupta Laxmi Publications, New Delhi
3. Accident Prevention Manual for Industrial Operations (ISBN:97808-7-912024-5), National Safety Council 1121, Spring Lake Drive, Itasca, Illinois 60143 (USA)
4. Industrial Safety and Environment (ISBN: 978-81-3-1804544), A.K. Gupta Laxmi Publications, New Delhi.
5. "Health & Safety At Work" Booklets Department of Employment and Productivity, U.K Encyclopedia of Occupational Health and Safety, ILO

List of Practical/Tutorials:

1. Sampling and Estimation of Gases in Work Environment: Oxides of Nitrogen, Sulfur I Ammonia & Chlorine
2. Sampling and Analysis of Mercury
3. Demonstration of Personal Protective Equipment (PPE)
4. Measurement of illumination level at working place with the help of digital Lux meter
5. Noise Level Measurement
 - a. Measurement of Sound pressure level in dBA and dB linear
 - b. Frequency analysis of noise
6. Measurement of Ventilation
7. Measurement of thermal Dry Bulb Temperature Wet Bulb Temperature Determination of relative humidity and effective corrective effective. 1) Aspirator Hygrometer. 2) Kata-Thermometer 3) Globe-Thermometer
8. Demonstration of CPR technique (Cardiopulmonary Resuscitation)



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Minor/Hons. Program

Level: UG

Branch: Minor/Hons. Industrial Process Safety

Subject Code: BE050AA011

Subject Name: Industrial Hygiene and Occupational Hazards

Major Equipments:

- Aspirator Hygrometer, Kata Thermometer, Lux meter, Atomic absorption spectroscopy, PPE with respirator and without respirator.

List of Open Source Software / learning website:

- Reference to NIOSH, and NPTEL can be made for a better understanding regarding regulations and standards in occupational health management and industrial hygiene.

List of suggested activities for Problem Based Learning:

Sr. No.	Description	No. of Hours	Total Hrs.
1	Technical Video based learning related to the subject	Duration of video: 5h Report preparation: 5h	10
2	Assignment writing Numerical based assignment is preferable.	5 assignments of 4h each.	20
3	Videos on Industrial safety/Disaster Management aspects based on subject	Duration of video: 5h Report preparation: 5h	10
4	Poster/chart PowerPoint preparation on technical topics	Duration:6 h	6
5	Self-learning on-line course	Minimum duration of the course should be 10h.	10
6	Discussion on research paper based on relevant subject	5 research paper: 20h	20
7	Group Discussion on emerging/trending technical topics based on subject	Duration: 1 h each	1
8	Annotated Video Explanation of Concept / Problem	10h (Preparation * Recording + Submission)	10
9	Online Technical Quizzes/Simulations	Multiple quizzes summing up to 10 h	10
Max. Hours to be allotted			45