

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BRANCH NAME: Environmental Science & Technology**

**SUBJECT NAME: Safety Health & Environment**

**SUBJECT CODE: 2173508**

**B.E. Semester: VII**

**Type of course:** Environmental Science & Technology

**Prerequisite:** A good fundamental backup of knowledge of Environment & Safety issues in Industries.

**Rationale:** The main objective of this subject is to make students aware about the interrelationship among various Environment, safety & health related hazard controlling and preventive methods and their right usage at right place in right quantity. It also makes them learn about various management tools and estimation techniques. It works as a ground for some advance EHS management systems and green & safe businesses.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE (E)	PA (M)		PA (V)		PA (I)		
				PA	ALA	ESE	OEP			
3	0	0	3	70	20	10	0	0	0	100

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment; OEP-Open Ended problem; AL-Active learning;

**Learning Objectives:** The learning objective of this subject is:

1. To create proper understanding of Environment Health & Safety.
2. To provide information about occupational health related problems.
3. To create proper understanding of PPE and consequences of fire hazard.
4. To provide information about disease related to environmental degradation and different methods of Accident prevention.

**Content:**

Sr. No.	Topic	Teaching Hours	Module Weighted (%)
1.	GENERAL INTRODUCTION: The importance of health and safety, what accidents and work-related ill-health are, and why they occur. <ul style="list-style-type: none"><li>• Why the welfare of people at work is important.</li><li>• The approximate annual number of reported work related deaths, and injuries, which occur to people at, work in India, and the approximate costs involved.</li></ul>	5	15

	<ul style="list-style-type: none"> <li>The meaning of: Hazard, Risk, Safe, Accident, Dangerous occurrence.</li> </ul>		
2.	<p>OCCUPATIONAL HEALTH: The causes of work related ill health and the steps to control and prevent it.</p> <ul style="list-style-type: none"> <li>The appropriate measures to control the hazards associated with work related ill health including:- (a) Noise (b) Repetitive strain injury(RSI) (c) Display screen equipment (DSE) (d) Viral and bacterial infections e.g. legionnaires disease, hepatitis B. (e) Stress.</li> </ul>	12	25
3.	<p>PERSONAL PROTECTIVE EQUIPMENT: Outcomes :</p> <ul style="list-style-type: none"> <li>The different types of PPE and the hazards against which they provide protection.</li> </ul> <p>FIRE Outcomes:</p> <ul style="list-style-type: none"> <li>The dangers associated with fire.</li> <li>The “fire triangle” and the three conditions required for fire to start and continue to burn.</li> <li>The need for provision of adequate methods of raising the alarm, and routes of escape in the event of fire.</li> </ul>	12	30
4.	<p>PRINCIPLES OF ACCIDENTS PREVENTION :</p> <p>Definition :</p> <ul style="list-style-type: none"> <li>Incident, accident, injury, dangerous occurrences, unsafe acts, unsafe conditions, hazards, error, oversight, mistakes, etc.</li> </ul> <p>Accident Prevention :</p> <ul style="list-style-type: none"> <li>Theories / Models of accident occurrences.</li> <li>Principles of accident prevention.</li> <li>Accident and Financial implications.</li> <li>Hazard identification and analysis.</li> <li>Fault tree analysis.</li> <li>Event tree analysis.</li> <li>Failure modes and effects analysis.</li> <li>HAZOP studies</li> <li>Job safety analysis - examples</li> <li>Plant safety inspection - objectives and types check procedure inspection report.</li> </ul> <p>Environmental Issues Related to safety &amp; Health Environmental Risks and the Disease Burden. Improving the Household Environment. Water Quality and Health</p>	12	30

**Suggested Specification table with Marks (Theory):**

Unit No	Unit Title	Distribution of Theory Marks			
		R Level	U Level	A Level	Total
1	General Introduction	10	3	2	15
2	Occupational Health	5	10	10	25
3	PPE & Fire Outcomes	10	10	10	30
4	Accident Prevention and Environmental Health & Safety issues	5	10	15	30

**Legends: R : Remembrance ; U = Understanding; A = Application 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) R.K.Jain and Sunil S.Rao , Industrial Safety , Health and Environment Management Systems, Khanna publishers , New Delhi (2006).
- 2) Frank P Lees – Loss of prevention in Process Industries, Vol. 1 and 2, Butterworth-Heinemann Ltd., London (1991).
- 3) Slote.L, Handbook of Occupational Safety and Health, John Willey and Sons, Newyork
- 4) Mt Calf & Eddy, Waste Water Engineering

**Note: Apart from above references one can use some other books and material if required.**

**Note: Passing Marks for PA (M) will be 12 out of 30.**

**Passing Marks for ESE Practical (V) will be 15 out of 30.**

**Reference Books:**

- 1) R.K.Jain and Sunil S.Rao , Industrial Safety , Health and Environment Management Systems, Khanna publishers , New Delhi (2006).
- 2) Frank P Lees – Loss of prevention in Process Industries , Vol. 1 and 2, Butterworth-Heinemann Ltd., London (1991).
- 3) Slote.L, Handbook of Occupational Safety and Health, John Willey and Sons, Newyork
- 4) Mt Calf & Eddy, Waste Water Engineering,.

**Note: Apart from above references one can use some other books and material if required.**

**Course Outcome:** After learning this course the students would have:

- 1) Proper understanding of Environment Health & Safety.
- 2) Knowledge about occupational health related problems.
- 3) Proper understanding of PPE and fire hazard.
- 4) Knowledge of different methods of Accident prevention & Environmental degradation.

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.

**ACTIVE LEARNING ASSIGNMENTS:** Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.