



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering

Subject Code: 3151510

Semester – V

Subject Name: Industrial Safety and Health Engineering

Type of course: Open Elective -I

Prerequisite: Nil

Rationale:

To provide a detailed understanding of Industrial safety and its impacts in worker's health. Now a days it is also necessary to provide an adequate background for applying the concept of safety in working environments. The following topics are discussed in this subject: Safety systems, Fire protection and suppression systems, Managing safety, Safety in material handling, Safety in process, Hazard analysis, Safety legislation, Environment Impact Assessment.

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	0	0	3	70	30	0	0	100

Content:

Sr. No.	Content	Total Hrs
1	Safety systems: Definitions and basic concepts, safety information system, definition of accidents, analysis of causes of accident. Fire protection systems: Chemistry of fire, automated firefighting system, water sprinkler, fire hydrant and detection systems. Fire suppression systems: CO2 system, foam system, DCP system, halon system, portable extinguisher.	08
2	Managing safety: Safety inspection, procedure, periodicity, checklist, and report forms. Planning for safety and productivity, safety sampling, safety audit and safety survey. Work permit and lock out system, accident analysis, safety education, communication and safety performance analysis. Personal protective equipment.	08
3	Safety in material handling: Selection of material handling equipment, procedure for testing and checking of equipments, Usage of ropes, chains, slings, hooks, clamps for material handling. Design of conveyor systems, belt, chain and elevator and lifts, industrial hoists, mobile crane, forklift. Operation, maintenance and checking procedures in equipments	08
4	Safety in process: Safety in foundry, forging and welding operations. Safety in hot working and cold working processes. Safety in use of power press, electroplating and boiler and furnace operations	05
5	Hazard analysis and legislations: Electrical, physical and chemical hazard analysis, detailed hazard analysis. Cost effectiveness in hazard eliminations, hazop and fault tree analysis. Provisions for safety in	08



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	factory act, explosive act, workmen compensation act, boiler act and pollution control act. Electrical safety, electricity act and rules	
6	Environment Impact Assessment: Introduction, EIA capability and limitations, legal provisions on EIA, methods of EIA, checklists, matrices and networks. Cost benefit analysis in EIA, analysis of alternatives, adverse impact on environment, ISO14001:2004 EMS standards	08
	Total Hours	45

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	15	25	25	15	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. Derek James, "Fire Prevention Handbook", Buttes Worths and Co., Oxford, 1991
2. Heinrich H W, "Industrial Accident Prevention", National Safety Council, McGraw Hill Inc, 1998.
3. John Ridley, "Safety at Work", Butter Work Publisher, Oxford, 1997.
4. Larry W Canter "Environmental Impact Assessment", McGraw Hill Inc, New Delhi 1996.
5. National Safety Council "Accident Prevention Manual for Industrial Operations", Chicago, 1995.
6. Shukla S K and Srivasava P R "Concepts in Environmental Impact Analysis" McGraw Hill Inc., New Delhi, 1990.
7. Syed ImtiazHaider, "Environment Management System-ISO 14001:2004 Standards", CRC Press, 2011.

Course Outcomes: Students will be able to:

Sr. No.	CO statement	Marks % weightage
CO-1	Explain the industrial safety and its impacts on employer's health.	30
CO-2	Construct safety rules for industry.	20
CO-3	Analyze hazardous condition and legislation.	30
CO-4	Examine environment impact of the industry.	20

Term Work:

The term work shall be based on the topics mentioned above.