

**M. Tech. II Semester III**

**Subject Name:** Environmental Health & Safety

**Subject Code:** MTEN14302

**Type of course:** PE V

**Prerequisite:** The Student should have the basic knowledge of emergency steps to be taken in case of emergency.

**Rationale:** The subject offers basic introduction to national & international standards related to environmental safety with important assessment methods of improving safety & control of environmental pollution due to accidental hazards.

**Teaching and Examination Scheme:**

TEACHING SCHEME				Theory Marks			Practical Marks		Total
L	T	P	C	TEE	CA1	CA2	TEP	CA3	150
3	0	2	4	60	25	15	30	20	

**CA1:** Continuous Assessment (assignments/projects/open book tests/closed book tests) **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CA3:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

**Content:**

Sr. No.	Topics	Teaching Hrs.	Module Weightage
1.	<b>Introduction to Standards of Safety</b> Concept & Terminology of Safety, Problem of Industrial Accidents, Preventive measures for Accidents, factors affecting industrial safety, Factories Act and Rules, Environmental Pollution Act, Oil Industry Safety Directorate (OISD), Indian Electricity Acts and Rules, Mines Acts and Rules, Workmen Compensation Act, OSHA Standards, IS & BS Standards, API standards	6	15%
2.	<b>Physical &amp; Chemical Hazards</b> Noise and vibration, Instrumentation, Surveying procedure, Health effects, Control measures (stress, exposure and radiation effects), Recognition of hazards, TLV for air, gas and chemical contaminants.	6	15%
3.	<b>Safety Management</b> Indian & International Safety Standards, Cost effectiveness in hazard elimination – logical analysis – HAZOP, Probabilistic reliability considerations, Estimating probability in time, Safety management techniques: Safety inspection, safety action, safety survey disaster control.	7	16%
4.	<b>Prevention &amp; Protection</b> Safety measures for the protection of Industrial workers, Health Education, use of personal protective equipments, Fire protection services, etc., Prevention by Medical, Engineering Measure and	7	16%

**PE V: Program Elective V**

	legislation.		
5.	<b>Assessment of Hazards And Health Problems in Different Types of Industries</b> Construction, textile, food processing, Agriculture industries, Pharmaceutical Industries and waste water treatment plant, Survey of two industries for occupational hazards and safety management.	8	19%
6.	<b>Pollution Control in Industrial Accidents</b> Identification of different environmental pollution: Air, Noise & Water, their classification, effects of health & receiving bodies, safety measures to be take in different situations	8	19%

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

% Distribution of Marks					
R Level	U Level	A Level	N Level	E Level	C Level
25	15	25	15	10	10

**Legends: R:** Remembrance, **U:** Understanding; **A:** Application, **N:** Analyze, **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 Text Books:**

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1.	Industrial Safety	K. U. Mistry	Siddharth Prakashan	2008	1 <sup>st</sup>
2.	Environmental Sanitation	D. K. Thakur	Discovery Publishing House, ISBN-10 9350567008 ISBN-13 978-9350567005	2015	1 <sup>st</sup>
3.	Environmental Health and Safety Audits	Lawrence B. Cahill, Raymond W. Kane	Government Institutes Inc.,U.S. ISBN-10 9781605907086 ISBN-13 978-1605907086	2011	1 <sup>st</sup>
4.	Environmental Health and Hazard Risk Assessment Principles and Calculations	Louis Theodore, R. Ryan Dupont	CRC Publication, ISBN: 9781439868881,	2017	-

**Course Outcome:**

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % weightage
CO-1	To introduce general concept & details of Safety standards. (R & U-Cognitive Level)	10
CO-2	To develop basic understanding of Protection & Prevention. (U-Cognitive Level)	25
CO-3	To understand safety management. (U & N-Cognitive Level)	20
CO-4	To assess different Hazards & health problems in different industries. (A & N-Cognitive Level)	25
CO-5	To control industrial pollution during industrial accidents. (U & A-Cognitive Level)	20

**List of Open Source/learning website:**

- <https://nptel.ac.in/noc/courses/noc15/SEM1/noc15-oe02/>
  - Health, Safety & Environmental Management in Industries
- [https://onlinecourses.nptel.ac.in/noc19\\_oe02/preview](https://onlinecourses.nptel.ac.in/noc19_oe02/preview)
  - Environmental Management, Operational Safety, Evaluation & Control
- [https://onlinecourses.nptel.ac.in/noc20\\_mg43/preview](https://onlinecourses.nptel.ac.in/noc20_mg43/preview)
  - Industrial Safety Engineering: Hazard Identification, Planning & Curing
- <https://nptel.ac.in/courses/103/106/103106071/>
  - Safety Practices in different Industries

**List of Open Source Software:**

- Enviya, Safety Management Software