FACULTY OF ENGINEERING & TECHNOLOGY

Effective from Academic Batch: 2022-23

Programme: Bachelor of Technology (Food Processing Technology)

Semester: V

Course Code: 202030522

Course Title: Industrial Safety and Health Management

Course Group: Open Elective Course - I

Course Objectives: This course would enable students to recognize and evaluate industrial safety and occupational health hazards in the workplace. Students will be able to analyse the effects of workplace exposures, accidents, illness, fatalities, risks and the methods to prevent accident using safety and health management.

Teaching & Examination Scheme:

Contact hours per week			Course Credits	Examination Marks (Maximum / Passing)				
				Theory		J/V/P*		Total
Lecture	Tutorial	Practical		Internal	External	Internal	External	
3	0	0	3	50 / 18	50/17	NA	NA	100 / 35

* **J**: Jury; **V**: Viva; **P**: Practical

Detailed Syllabus:

Sr.	Contents	Hours
1	**Introduction to Safety Standards:** Importance of Safety, objectives of safety management, Role and Responsibility of government, National Safety Council, Safety Standards, Safety Audit, Factory Act	4
2	**Safety Management System:** Policy regarding safety in organization, safety climate, safety organization structure, safety culture and performance management, roles and responsibilities of various persons for managing safety in industry, policy documentations, safety budget, investment in safety, Introduction, need and importance of safety training and education, safety plan, analysis of safety data.	7
3	**Accident and Incident Investigation:** Definitions, Accident, Process of accident, Causes of accidents, Accident prevention and control techniques, Plant safety inspections, Job safety Analysis and investigation of accidents, First aid, Financial costs-direct and indirect, social costs of accidents, Compilation procedure for financial costs, Cost data, quality and its limitations-Budgeting.	4

4	**Hazard identification, Risk Assessment and Control:** Check list procedure, Preliminary hazard analysis, What if analysis, Failure mode effect analysis, Hazard and operability (HAZOP) studies, Hazard analysis techniques: Fault tree analysis, Event tree analysis, General outline of DOW index, Risk estimation and Management, Major hazard control, On-site and Off-site emergency preparedness. Identification of hazard, Categorization methods for elimination of hazard, Mechanical hazards; machine guarding, safety with hand tools/ portable power tools, Pressure vessel hazards and their control, Safety in material handling: hazards and safe Practices, safety with storage of materials, Electrical hazards: classification, safe work practices, Chemical hazards: laboratory safety, bulk handling of chemicals, Fire and explosion hazards, Fire detection, Prevention ,control, and extinguishments, Industrial layout, Industrial waste management. Safety during construction: accidents of different stages of construction, accidents during receiving, unloading, shifting and storage, safety guidelines for storage, safety facilities at sites, coordination interface between civil and erection works, hazardous material and atmosphere.	**14**
5	**Industrial Hygiene:** Definition of Industrial Hygiene, Phases 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.	**4**
6	**Occupational Health Management** Concept of health and occupational health, Spectrum of health, Occupational and work related diseases, Levels of prevention, History of occupational health, Characteristics of occupational diseases, Essentials of occupational health service, personal protective equipments (respiratory and non-respiratory), Various Occupational health hazards : Adverse health effects of noise vibration, cold, heat stress, improper illumination, thermal radiation, ionizing and non-lionizing radiations. Permissible threshold exposure limits - short term and long term effects of exposures Preventive and control measures.	**9**
	Total	**42**

Reference Books:

1	Anupama Prashar & Bansal, “Industrial Safety and Environment”, S.K. Kataria & sons, New Delhi, 2005.
2	Industrial Accident Prevention, H.W. Heinrich, Dan Petersen, and Nestor Roos, McGraw-Hill Book Company, New York / New Delhi
3	Techniques of Safety Management (ISBN: 978-18-8-558139-6), Dan Petersen, McGraw-Hill Book Co. Ltd., New York, N.Y. USA
4	Industrial Safety and Environment, A.K.Gupta, Laxmi Publications, New Delhi

5	Industrial Safety, Health and Environment Management Systems, R.K.Jain and Sunil S.Rao, Khanna publishers , New Delhi (2006)
6	Safety- Health and working conditions: Training Manual, National Safety Council, Mumbai, 2000.
7	"Major safety control: A practical Manual" National safety council, India, 1993.
8	H Lingard and S M Rowlinson, Occupational Health and Safety in Construction Project Management, Routledge, Oxford, 2004.
9	A Griffith and T Howarth, Construction Health and Safety Management, Routledge, London, 2014
10	Guiding Principles for chemical accident Prevention, preparedness and response: Manual prepared by organization for economic co-operation and development, 1992

Supplementary learning Material:	
1	https://youtu.be/USGuag1Jids
2	https://youtu.be/VhuZ6M7a8N8
3	https://youtu.be/n7oUOUCIblg
4	https://nptel.ac.in/courses/110/105/110105094/

Pedagogy:

- Direct classroom teaching
- Audio Visual presentations/demonstrations
- Assignments/Quiz
- Continuous assessment
- Interactive methods

Internal Evaluation:

The internal evaluation comprised of written exam (40% weightage) along with combination of various components such as Certification courses, Assignments, Mini Project, Simulation, Model making, Case study, Group activity, Seminar, Poster Presentation, Unit test, Quiz, Class Participation, Attendance, Achievements etc. where individual component weightage should not exceed 20%.

Suggested Specification table with Marks (Theory) (Revised Bloom's Taxonomy):

Distribution of Theory Marks in %						**R**: Remembering; **U**: Understanding; **A**: Applying; **N**: Analyzing; **E**: Evaluating; **C**: Creating
R	**U**	**A**	**N**	**E**	**C**	
10%	40%	50%	0%	0%	0%	

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.

Course Outcomes (CO):

Sr.	**Course Outcome Statements**	**%weightage**
CO-1	Understand safety standards and management systems.	15
CO-2	Apply the knowledge of accident theories to prevent accidents.	15

CO-3	Understand the methods of hazard and risk identification and preventive Measures.	25
CO-4	Evaluate industrial safety programs and hygiene, and Select appropriate control methodologies based on the hierarchy of controls.	25
CO-5	Analyse the occupational health management.	20

Curriculum Revision:	
Version:	2
Drafted on (Month-Year):	June 2022
Last Reviewed on (Month-Year):	
Next Review on (Month-Year):	June 2025