

COURSE TITLE	CHEMICAL PROCESS SAFETY
COURSE CODE	01CH1505
COURSE CREDITS	3

Objective:

- 1 To understand the importance of safety, to measure its effects and to prepare and protect employees, environment and industry from industrial hazards.

Course Outcomes: After completion of this course, student will be able to:

- 1 Understand all safety codes and standards of industry.
- 2 Identify causes of accident and will be able to provide engineering control methods.
- 3 Evaluate storage, handling and transportation of hazardous materials.
- 4 Create safety measure and methods.

Pre-requisite of course:Basics of Chemical Engineering Process.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	Introduction to Safety in Chemical process Industries Need for Development of Safety Consciousness in Chemical Industries , Hazard, Risk, Danger, Accident, Extreme operating conditions, toxic chemicals – safe handling;, Elements of Safety Program: Effective Realization; Economic and Social Benefits from Safety Program;, Effective Communication Training at various levels of Production and Operation., Accidents identification and prevention.	10
2	Potential Hazards in Chemical Process Industries Chemical and Physical job Safety Analysis: High pressure and Temperature Operation, Dangerous and Toxic Chemicals,, Effects of toxicants and its elimination. Toxic release and dispersion models., Radio Active materials; relief sizing, Safe Handling and Operation of materials and Machinery;, periodic inspection and replacement.	10
3	Hazard Identification & Risk Assessment Introduction to Hazard identification, Process Hazards Checklists,, Hazards Surveys, HAZOP study, Safety Reviews,, Event tree analysis: Fault tree analysis,, QRA and LOPA	8

Contents : Unit	Topics	Contact Hours
4	Case studies Fire, Accidents, Chemical release, Explosion, Petroleum,, Commercial, Natural disasters	8
Total Hours		36

Textbook :

- 1 Hazard Analysis Techniques for System Safety, 2nd ed. , Ericson C.A.,, Wiley, USA, , 2015

References:

- 1 Chemical-Process-safety-2nd-ed- , Chemical-Process-safety-2nd-ed- , Daniel A. Crowl, Joseph F. Louvar, , Prentice Hall International Series in the Physical and Chemical, Engineering Sciences, 2001

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
10.00	20.00	25.00	25.00	10.00	10.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- 4 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

- 1 <https://www.osha.gov/archive/Publications/osha3091.html>
- 2 <https://nptel.ac.in/courses/103107156>
- 3 <https://ohsonline.com/Articles/2011/08/01/Eight-Tips-for-Chemical-Safety.aspx>
- 4 <https://www.ilo.org/legacy/english/protection/safework/cis/products/safetytm/introduc.htm>