

INSTITUTE	DIPLOMA STUDIES
PROGRAM	DIPLOMA ENGINEERING (CHEMICAL ENGINEERING)
SEMESTER	3
COURSE TITLE	SAFETY & POLLUTION MEASURES
COURSE CODE	09CH2303
COURSE CREDITS	4

Objective:

- 1 To study about safety consideration and pollution measures is to get knowledge about safety consideration, risk and hazards management and pollution strategies in process engineering plant.

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

- 1 Basic knowledge of chemistry and environmental science
- 2 Understood about the Safety, Safety codes and standards.
- 3 Understood importance about Hazards and personal protective equipment used in industries.
- 4 Understood about pollution and pollutants and their effect on human health.

Pre-requisite of course: Knowledge of basic chemistry.

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
2	0	4	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	Safety, Safety codes and standards, PPE Definition of Safety, Importance of Safety in Chemical Industries, Development of safety organization, Indian standards (IS) and codes, International Standards like ISO 9001, ISO 14001, OHSAS18001,18002, Protection for head, ears, eyes, face, respiratory organs, hands, feet etc	4
2	Hazard Identification and control Techniques Definition of Hazards and types Hazards, Classification of Chemical Hazards, occupational health hazards and control, Prevention of diseases due to chemical effect, Hazard and Operability study (HAZOP), HAZAN and HAZOP, Fault Tree analysis (FTA) Even Tree analysis (ETA)	8

Contents : Unit	Topics	Contact Hours
3	Control of Chemical Hazards Ventilation and lighting, Safety factors: Heat and Temperature hazards, Thermal Hazards, Chemical burns and their effect, Colour codes and symbols for safety, Different types of symbols in chemical industries	2
4	Types of pollution and pollutants Definition of pollution and pollutant, Sources of Pollution, Effect of pollution on Human health, Air pollution, Water pollution, Land pollution.	2
5	Air Pollution Classification of Air Pollutants, Sources of Air Pollution Effect of Air pollution on human health, animals and material Ambient air sampling, particulate and gaseous sample collection methods	3
6	Water Pollution & Waste Water Treatment Introduction of Water Pollution, Classification & Sources of Water Pollution Characterization of water : BOD, COD, VM, Suspended Matter, Dissolved solids, pH	3
7	Land pollution Sources and Types of Soil pollution, Impact of soil pollution on soil quality, Effect of industrial pollutants on soil	3
8	Noise pollution Parameters for measurement of Noise, Sources of Noise Pollution, Measurement of noise pollution, Effects and control of Noise Pollution, effect on human`s health	3
Total Hours		28

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	Experiment 1 Demonstration of various personal protective devices.	2
2	Experiment 2 Identification colour & colour codes for pipe & gas cylinder for various chemicals	2
3	Experiment 3 Identification of first aid for different hazard or accidents.	2
4	Experiment 4 To Identification of health hazard & remedies for it	2
5	Experiment 5 Case study regarding safety and its regulation in process industries.	2
6	Experiment 6 Sampling of ambient air, Particulate and gaseous effluent	2
7	Experiment 7 Determination of COD of the given effluent sample.	2

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
8	Experiment 8 To estimate chloride content of given water sample	2
9	Experiment 9 Determination of hydrogen ion concentration (pH) of sample	2
10	Experiment 10 To determine BOD of given sample	2
11	Experiment 11 Determination total dissolved solids in given effluent sample.	2
12	Experiment 12 Prepare an Environmental Audit report of any process Industry.	2
13	Experiment 13 Preparation of Detail charts of various Pollutants and sources of pollution	2
14	Experiment 14 Study of Pollutants and Scheme of Pollution control in a chemical process plant	2
Total Hours		28

Textbook :

- 1 Fundamentals of Industrial Safety & Health, K.U.Mistry, Siddharth Prakashan, 2008
- 2 Text Book of Environmental Pollution and Control-1998, Dr. H. S. Bhatia, Galgotia Publication, 1998

References:

- 1 Essential of Environment (337), Essential of Environment (337), Course Learning Manual prepared by CEC, Directorate of Technical Education, 2000
- 2 Environmental Pollution control, Environmental Pollution control, S. S. Rao, Wiley Eastern Ltd, 2015

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
40.00	40.00	10.00	10.00	0.00	0.00

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. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

- 1 <https://archive.nptel.ac.in/courses/103/107/103107156/>