

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: VI

Chemical Engineering

Subject Name: **Pollution Control & Safety Management**

Subject Code: **160504**

| Teaching Scheme | | | | Evaluation Scheme | | |
|-----------------|----------|-----------|-------|------------------------------------|---------------------------------|------------------|
| Theory | Tutorial | Practical | Total | University Exam (Theory) (E) | Mid Sem Exam (Theory) (M) | Practical (I) |
| 3 | 0 | 0 | 3 | 70 | 30 | 50 |

| Sr. No | Course Content | Total Hrs. |
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| a. | Environmental Protection: Concept of environment and ecology, various natural cycles in environment and ecology, effect of human activities on environment and ecology. Various types of environmental pollution in general and in chemical and allied industry in particular, sources and causes of environmental pollution, effect of pollution on environment, environmental impact assessment and EIS, methodologies for environmental pollution prevention (including process technology up gradation, development, Invention etc.), control, abatement and treatment and waste disposal. Rules, regulations, laws etc. regarding environmental protection, pollution prevention and control, waste disposal etc. Role of government, semi/quasi govt. and voluntary organizations. Current trends and topics | 18 |
| b. | Introduction to Industrial laws, Industries Factory act, Energy audit, Environment Audit, Trade union, Labour laws and acts. Industrial Electricity rules, Industrial Dispute Acts, Workmen compensation Act, ESIC Act, Payment and Wages act, Minimum Wages act, Payment of Bonus act, Recent trends and practices in Safe industrial practices | 9 |
| c. | Safety Management: Current practices and topics in safety management, rules, regulations, laws etc. for safety management in industry. 1. General Introduction Historical Background, Growth of Safety Science, Aims of Safety Science, Safety and the Organization. 2. Basic Concepts of Safety Science. Hazard, Risk, Nature of the accident process, Use of Engineering Fundamentals in safety science. 3. Techniques of Hazard Identification Hazard and Operability Studies (HAZOP), Safety Audits, Hazard Analysis. | 8 |

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| | 4. Fault and Event Tree Analysis for Risk Prediction 5. Source Models Models of Accidental Release of Toxic/Flammable liquids and vapors, Models of flow of liquids and vapors through pipes. 6. Dispersion Models: Mathematical Models for prediction of Dispersion patterns for toxic/flammable materials released into atmosphere, various types of "plume" and "puff" models of dispersion. | 9 |
| | 7. Nature of fires and explosion Calculation of Blast damage due to over-pressure, prevention of fires and explosions. 8. Control of Major Chemical Hazards, Emergency Control and disaster planning. 9. Introduction to various personal protective equipments 10. Instruments for safety : Pressure safety valve, Rupture disc , Interlocks etc.. | 10 |

Text Books:

1. Frank P Lees, "Loss Prevention in Process Industries" Volume 1, 2 & 3
2. Industrial Organization and Economics by T.R. Banga & S.C. Sharma

Reference Books:

1. Environment Engg. by Metcalf and Eddy
2. Environmental Pollution Control Engineering By C.S.Rao