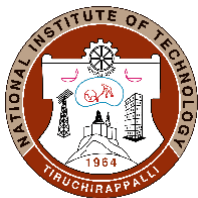




DEPARTMENT OF CHEMICAL ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech Chemical Engineering		
Course Title	Safety in Chemical Industries		
Course Code	CLPC 22	No. of Credits	3
Course Code of Pre-requisite subject(s)	CLPC16		
Session	July 2019	Section (if, applicable)	A/B
Name of Faculty	Dr.K.N.Sheeba	Department	Chemical Engineering
Official Email	sheeba@nitt.edu	Telephone No.	0431 2503113
Name of Course Coordinator(s) (if, applicable)	Dr. K.M.Meera Sheriffa Begum		
Official E-mail	meera@nitt.edu	Telephone No.	04312503109
Course Type (please tick appropriately)	<input checked="" type="checkbox"/> Core course <input type="checkbox"/> Elective course		
Syllabus (approved in BoS)			
<p>Introduction: Role of chemical engineer in process industries; Industrial Hazards – Fire hazards and its prevention, Radiation hazards and control of exposure to radiation, Mechanical hazards, Electrical hazards, Construction hazards. Psychology, hygiene & other industrial hazards: Industrial psychology, Industrial hygiene, Housekeeping, Industrial lighting and ventilation, Industrial noise, Occupational diseases and prevention methods, Personal protective equipments; Site selection and plant layout, Instrumentation and control for safe operation: Pressure, Temperature and Level controllers; Risk Management and Hazard Analysis – Steps in risk management, Risk analysis using HAZOP, FTA etc. Case studies pertaining to chemical industries: Bhopal gas tragedy, causes, affects & lessons learnt, other cases; Economics of safety – Financial costs to individual, family, organization and society. Legal framework for safety and environment: The Factories Act, The Environmental (Protection) Act, The Workmen's compensation Act, The Employee State Insurance Act.</p>			
REFERENCE BOOKS			
1. Sam Mannan, Frank P. Lees, "Lees' Loss Prevention in the Process Industries: Hazard Identification, Assessment and Control", 4th Edition, Butterworth-Heinemann, 2005. 2. H.H. Fawcett and W. S.Wood, "Safety and Accident Prevention in Chemical Operation", 2nd Ed, Wiley Interscience, 1982.			



3. Guide for Safety in the Chemical Laboratory Second edition 1977, Manufacturing Chemists Association. Van Nostrand Reinhold Company, New York.
4. Industrial Safety and Laws, 1993, by Indian School of Labour Education, Madras.
5. Daniel A. Crowl and Joseph F. Louvar, "Chemical Process Safety, Fundamentals with Applications", 2nd Edition, Prentice Hall, Inc. ISBN 0-13-018176-5.

COURSE OBJECTIVES

1. To provide a general idea about safety in chemical industries.
2. To imbibe in students a culture of safer practices.

MAPPING OF COs with POs

Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
1. Familiar with hazards in chemical industries and their mitigation	1,2,4,8,10,11,12
2. Familiar with safety aspects in plan site selection, design & layout and psychological approach to process safety	1,3,4,5,6,7,8,10,11,12
3. Familiar with occupational diseases and their prevention, process control for process safety	1,3,4,5,6,8,10,11,12
4. Familiar with case studies of industrial disasters and risk management methodologies	1,2,3,4,5,6,7,8,9,10,11,12
5. Familiar with legislations for safety in chemical industries & environmental protection, economics of providing safety	3,4,6,8,10,12

COURSE PLAN – PART II

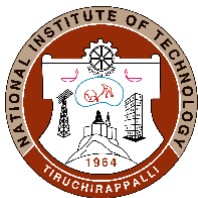
COURSE OVERVIEW

This course provides a foundation on industrial safety requirement for any process industry. Outcome of this course will enable a student to analyze and using incident videos and case studies and apply critical thinking skills to predict potential problems to avoid losses

COURSE TEACHING AND LEARNING ACTIVITIES

(Add more rows)

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1.	Week 1	Introduction, Role of chemical engineers in process industry , Types of Industrial Hazards	Chalk and Talk
2.	Week 1	Fire hazards, Radiation Hazards	Chalk and Talk
3.	Week 1	Mechanical Hazards	Chalk and Talk
4.	Week 2	Electrical hazards	Chalk and Talk
5.	Week 2	Construction Hazards	Chalk and Talk
6.	Week 2	Industrial Psychology	Chalk and Talk
7.	Week 3	Industrial hygiene	Chalk and Talk
8.	Week 3	Industrial lighting, ventilation & Industrial Noise	Chalk and Talk
9.	Week 3	Occupational Diseases and Prevention	Chalk and Talk
10.	Week 4	Personal Protective Equipments	PPT



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11.	Week 4	Site selection and plant layout	Chalk and Talk
12.	Week 4	Assignment evaluation – Batch - A	PPT
13.	Week 5	Assignment evaluation – Batch - A	PPT
14.	Week 5	Assignment evaluation – Batch - A	PPT
15.	Week 5	Assignment evaluation – Batch - A	PPT
		Assessment I	PPT
16.	Week 6	Instruments and control for safe operation	PPT
17.	Week 6	Types of controllers and their need	PPT
18.	Week 6	Risk management	PPT
19.	Week 7	Risk Analysis - I	Chalk and Talk
20.	Week 7	Risk Analysis - II	Chalk and Talk
21.	Week 7	Bhopal tragedy – History, Causes	PPT
22.	Week 8	Lessons learnt and Economic of safety	Chalk and Talk
23.	Week 8	Cost to individuals, family, organization and society	Chalk and Talk
24.	Week 8	Assignment evaluation – Batch B	PPT
25.	Week 9	Assignment evaluation – Batch B	PPT
26.	Week 9	Assignment evaluation – Batch B	PPT
27.	Week 9	Assignment evaluation – Batch B	PPT
		Assessment II	
28.	Week 10	The Factories Act	Chalk and Talk
29.	Week 10	The Factories Act	PPT
30.	Week 10	The Environmental (Protection) Act	PPT
31.	Week 11	The Environmental (Protection) Act	Chalk and talk
32.	Week 11	The Workmen’s compensation Act	Chalk and Talk
33.	Week 11	The Workmen’s compensation Act	PPT
34.	Week 12	The Employee State Insurance Act	PPT
35.	Week 12	The Employee State Insurance Act	PPT
36.	Week 12	Review and Discussion	Chalk and Talk
		Compensation Assessment	
		Final Assessment	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assessment I	End of 5 th week	1 hour	20%
2	Assessment II	End of 9 th week	1 hour	20%
3	Assessment III – (Assignment Presentation)	In between the course as mentioned in the course plan	50 minutes in the class	20 % (Average)
4	CPA (Compensation Assessment)*	After 12 th week	1 hour	20%
5	Final Assessment*	At the end of Course	3 hours	40%

***mandatory; refer to guidelines on page 4**



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COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

- 1) Feedback is planned to be collected thrice; At class committee meetings, during the assessment period and one at the end of course as soon as classes are over.
- 2) The academic performance of the students will be assessed based on **Two** assessments by written test (each 20 marks), Assignment Presentation (20 marks) during the course and **One** final assessment (40 marks) at the end of course.
Suitable mapping of COs with POs will be made and attainment will be calculated.

COURSE POLICY (including compensation assessment to be specified)

MODE OF CORRESPONDENCE (email/ phone etc): The Course Coordinator is available for consultation the Department. Queries may also be emailed to the Course Coordinator directly at sheeba@nitt.edu

COMPENSATION ASSESSMENT

All the assessments are compulsory. If a student fails to attend any one assessment due to genuine reasons, he/she will be permitted to appear for CPA. CPA may not be considered as an improvement test

Grading and passing minimum are as prescribed by the regulations of the institute.

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- At least 75% attendance in each course is mandatory.
- A maximum of 10% shall be allowed under On Duty (OD) category.
- Students with less than 65% of attendance shall be prevented from writing the final assessment and shall be awarded 'V' grade.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.
- The above policy against academic dishonesty shall be applicable for all the programmes.

ADDITIONAL INFORMATION, IF ANY
FOR APPROVAL

Course Faculty CC- Chairperson HOD 31/7/2019
(Dr. K. N. Sheeba) *(A. ARUNAGIRI)*