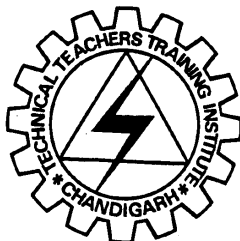


**REVISED CURRICULUM  
FOR  
DIPLOMA PROGRAMME  
IN  
CHEMICAL ENGINEERING  
  
FOR THE STATE OF HARYANA**



**Prepared by:**

**Curriculum Development Centre  
National Institute of Technical Teachers' Training  
and Research  
SECTOR 26, CHANDIGARH 160 019**

**December, 2003**

**1. SALIENT FEATURES OF THE DIPLOMA PROGRAMME IN CHEMICAL ENGINEERING**

- |    |                                  |   |  |
|----|----------------------------------|---|--|
| 1. | Name of the Programme            | : | Diploma Programme in Chemical Engineering          |
| 2. | Duration of the Programme        | : | Three Years  |
| 3. | Entry Qualifications             | : | Matriculation or equivalent as prescribed by AICTE |
| 4. | Admission Criteria               | : | Entrance Examination/Test                          |
| 5. | Intake                           | : | 30   |
| 6. | Pattern of the Programme         | : | Semester Pattern                                   |
| 7. | Ratio between Theory & Practical | : | 50 : 50  |

## 2. JOB OPPORTUNITIES

Employment opportunities for diploma holder in Chemical Engineering are visualized in following industries at various levels/positions:

- i) Chemical and Allied Industries like
  - (a) Fertilizer industry
  - (b) Petroleum refinery and petrochemical industry
  - (c) Oil and natural gas corporation
  - (d) Steel plant
  - (e) Cement plant
  - (f) Cosmetic industry
  - (g) Sugar industry
  - (h) Mineral industry
  - (i) Pulp and Paper industry
  - (j) Food Processing industry
  - (k) Consumer goods industry etc.
  - (l) Polymer industry
  - (m) Food industry
  - (n) Agro industry
  - (o) Leather industry
  - (p) Pharmaceutical industry
  - (q) Distilleries
  - (r) Paint and dye industry
  - (s) Rubber industry
  - (t) Soap & detergent industry
  - (u) Textile industry etc.

In various functional areas like erection and commissioning of plant, plant operation, production, maintenance and safety, quality control, inspection and testing, marketing and sales, consultancy services and areas concerning environmental protection.

- (ii) Research Organizations like CSIR laboratories, Defence laboratories, Atomic energy establishments etc.
- (iii) Boards and Corporations.
- (iv) Entrepreneurs to small/tiny units especially food, agro and chemical industries.

### 3. COURSE OBJECTIVES

Keeping in view the employment opportunities of diploma holders in Chemical Engineering, the course is aimed at developing following knowledge and skills in the students:

1. Basic understanding of concepts and principles related to applied sciences as a foundation for further studies.
2. Development of communication and interpersonal skills for effective functioning in the world of work.
3. Understanding of basic concepts and principles of mechanical, electrical and civil engineering so as to enable the students to apply the knowledge of these principles to the field of chemical engineering.
4. Ability to read and interpret drawings related to plant layout, process equipment and components.
5. Knowledge of various materials used in chemical processes, their properties and specifications.
6. Knowledge and associated skills of various unit operations, unit processes and process instrumentation in process industry.
7. Ability to calculate the quantity of raw materials, energy inputs, manpower requirement and output from the process.
8. Ability to control the process and quality of the products commensurating with laid specifications.
9. Understanding of basic principles of managing men, material and machines/equipment for optimum production.
10. Appreciation of the need of clean environment and its deterioration by various emissions from industry and preventive procedures and knowledge of safety regulations in process industry.
11. Development of generic skills of thinking and problem-solving, communication, attitudes and value system for effective functioning in a process industry.
12. Proficiency in the use of computers.
13. Basic manual and machining skills as an aid to function effectively in the process industry.
14. Knowledge of testing and quality control activities.
15. Detailed knowledge of petroleum and petroleum products along with processes involved in their production.
16. Detailed knowledge of fertilizers and technology involved in their production along with important fertilizer plants in India.
17. Development of good personality in order to have effective communication and business ethics.

#### 4. DERIVING CURRICULUM AREAS FROM COURSE OBJECTIVES

The following curriculum areas have been derived from course objectives.

Sr. No.	Curriculum Objectives	Curriculum Areas/Subjects
1.	Basic understanding of concepts and principles related to applied sciences as a foundation for further studies.	<ul style="list-style-type: none"> <li>- Applied Physics</li> <li>- Applied Chemistry</li> <li>- Applied Mathematics</li> </ul>
2.	Development of communication and interpersonal skills for effective functioning in the world of work.	<ul style="list-style-type: none"> <li>- Communication Skills</li> </ul>
3.	Understanding of basic concepts and principles of mechanical, electrical and civil engineering so as to enable the students to apply the knowledge of these principles to the field of chemical engineering.	<ul style="list-style-type: none"> <li>- General Engineering</li> </ul>
4.	Ability to read and interpret drawings related to plant layout, process equipment and components.	<ul style="list-style-type: none"> <li>- Engineering Drawing</li> <li>- Process Equipment Design &amp; Drawing</li> </ul>
5.	Knowledge of various materials used in chemical processes, their properties and specifications.	<ul style="list-style-type: none"> <li>- Chemical Process Industries</li> <li>- Engineering Materials</li> <li>- Applied Chemistry</li> </ul>
6.	Knowledge and associated skills of various unit operations, unit processes and process instrumentation in process industry.	<ul style="list-style-type: none"> <li>- Introduction to Chemical Engineering</li> <li>- Fluid Flow</li> <li>- Heat Transfer</li> <li>- Mechanical Operations</li> <li>- Mass Transfer</li> <li>- Process Instrumentation</li> <li>- Engineering Thermodynamics</li> <li>- Process Utilities</li> <li>- Reaction Engineering</li> </ul>
7.	Ability to calculate the quantity of raw materials, energy inputs, manpower requirement and output from the process.	<ul style="list-style-type: none"> <li>- Industrial Chemical Calculations</li> <li>- Introduction to Chemical Engineering</li> </ul>
8.	Ability to control the process and quality of the products commensurating with laid specifications.	<ul style="list-style-type: none"> <li>- Elective/Specializations</li> <li>- Chemical Process Industries</li> <li>- Process Instrumentation</li> <li>- Engineering, Materials</li> <li>- Engineering Thermodynamics</li> <li>- Reaction Engineering</li> </ul>

9.	Understanding of basic principles of managing men, material and machines/ equipment for optimum production.	- Entrepreneurship Development and Management
10.	Appreciation of the need of clean environment and its deterioration by various emissions from industry and preventive procedures and knowledge of safety regulations in process industry.	- Environmental Engineering and Safety
11.	Development of generic skills of thinking and problem-solving, communication, attitudes and value system for effective functioning in a process industry.	- Industrial Visits - Project Work - Process Equipment Design and Drawing
12.	Proficiency in the use of computers.	- Computer Applications in Chemical Engineering - Basics of Information Technology
13.	Basic manual and machining skills as an aid to function effectively in the process industry.	- General Workshop Practice
14.	Knowledge of testing and quality control activities.	- Chemical Process Industries
15.	Detailed knowledge of petroleum and petroleum products along with processes involved in their production.	- Petrochemicals
16.	Detailed knowledge of fertilizers and technology involved in their production along with important fertilizer plants in India.	- Fertilizer Technology
17.	Development of good personality in order to have effective communication and business ethics.	- Student Centred activity

**5. ABSTRACT OF CURRICULUM AREAS/SUBJECTS****a) Basic Sciences and Humanities**

1. Communication Skills
2. Basics of Information Technology
3. Entrepreneurship Development and Management

**b) Applied Sciences**

4. Applied Mathematics
5. Applied Physics
6. Applied Chemistry

**c) Basic Courses in Engineering/Technology**

7. Engineering Drawing
8. General Workshop Practice
9. General Engineering

**d) Applied Courses in Engineering/Technology**

10. Introduction to Chemical Engineering
11. Engineering Materials
12. Fluid Flow
13. Mechanical Operations
14. Engineering Thermodynamics
15. Reaction Engineering
16. Industrial Chemical Calculations
17. Heat Transfer
18. Mass Transfer
19. Environmental Engineering and Safety
20. Process Instrumentation
21. Chemical Process Industries
22. Process Equipment Design and Drawing
23. Computer Applications in Chemical Engineering
24. Petrochemicals
25. Fertilizer Technology
26. Process utilities
27. Minor Project
28. Major Project

**e) Specialised Courses in Engineering/Technology)  
(Electives-I, any one of the following)**

29. Paint Technology
30. Sugar Technology
31. Food Technology

**(Electives-II, any one of the following)**

32. Polymer Technology
33. Paper Technology
34. Alternate Energy Sources

## 6. HORIZONTAL AND VERTICAL ORGANISATION OF THE SUBJECTS

Sr. No.	Subjects	Distribution in Hours in Various Semesters					
		I	II	III	IV	V	VI
1.	Communication Skills	5	5	-	-	-	-
2.	Applied Mathematics	5	5	-	-	-	-
3.	Applied Physics	6	-	-	-	-	-
4.	Applied Chemistry	4	4	-	-	-	-
5.	Basics of Information Technology	4	-	-	-	-	-
6.	Engineering Drawing	6	6	-	-	-	-
7.	General Workshop Practice	6	6	-	-	-	-
8.	Engineering Materials	-	3	-	-	-	-
9.	Introduction to Chemical Engineering	-	4	-	-	-	-
10.	Fluid Flow	-	-	6	-	-	-
11.	Mechanical Operations	-	-	6	-	-	-
12.	Industrial Chemical Calculations	-	-	5	-	-	-
13.	General Engineering	-	-	6	-	-	-
14.	Heat Transfer	-	-	7	7	-	-
15.	Industrial Process Equipments	-	-	4	-	-	-
16.	Mass Transfer	-	-	-	7	7	-
17.	Engineering Thermodynamics	-	-	-	4	-	-
18.	Reaction Engineering	-	-	-	6	-	-
19.	Process Instrumentation	-	-	-	6	-	-
20.	Chemical Process Industries	-	-	-	-	7	-
21.	Process Equipment Drawing	-	-	-	-	6	-
22.	Industrial Management	-	-	-	-	3	-
23.	Elective	-	-	-	-	4	4
24.	Computer Application in Chemical Industry	-	-	-	-	6	-
25.	Entrepreneurship Development and Management	-	-	-	-	-	3
26.	Process Utilities	-	-	-	-	-	3
27.	Fertilizer Technology	-	-	-	-	-	4
28.	Environment Engineering and Safety	-	-	-	-	-	5
29.	Agro Based Industries	-	-	-	-	-	4
30.	Petro Chemicals	-	-	-	-	-	4
31.	Project Work (Major/Minor)	-	-	-	3	-	8
32.	Student Centred Activities	4	7	6	7	7	5
	<b>Total</b>	<b>40</b>	<b>40</b>	<b>40</b>	<b>40</b>	<b>40</b>	<b>40</b>