1. SALIENT FEATURES OF THE DIPLOMA PROGRAMME IN CHEMICAL ENGINEERING (PULP AND PAPER)

1.	Name of the Programme	:	Diploma programme in Chemical Engineering (Pulp and Paper)
2.	Duration of the Programme	:	Three years
3.	Entry Qualifications	:	Matriculation or as prescribed by State Board of Technical Education, Haryana
4.	Intake	:	60 (or as prescribed by the Board)
5)	Pattern of the Programme	:	Semester Pattern
6)	Ratio between theory and Practice	:	50 : 50 (Approx.)

7) **Industrial Training**:

Four weeks of industrial training is included after IV semester during summer vacation. Internal assessment out of 50 marks and external assessment out of another 50 marks will be added in 5th semester. Total marks allotted to industrial training will be 100.

Distribution of Marks:

- Daily diary and reports of training - 50 Marks
- Viva Voce (External) - 50 Marks

8) **Ecology and Environment** :

As per Govt. of India directives, a subject on Environmental Education has been incorporated in the scheme.

9) **Entrepreneurship Development**:

A subject on Entrepreneurship Development and Management has been incorporated in the scheme.

10) **Student Centred Activities:**

A provision of 5-6 hrs per week in each semester has been made for organizing Student Centred Activities for overall personality development of students. Such activities will comprise of co-curricular activities such as expert lectures, games, hobby classes like photography, painting, singing etc. seminars, declamation contests, educational field visits, NCC, NSS and cultural activities etc.

2. EMPLOYMENT OPPORTUNITIES

Employment opportunities for diploma holder in Chemical Engineering (Pulp and Paper) are visualized in following industries at various levels/positions:

i) Chemical and Allied Industries like

(a) Pulp and Paper Industry
(b) Agro Industry
(c) Fertilizer Industry
(d) Industries based on Agricultural residue and recycle fibre
(e) Petroleum refinery and petrochemical industry
(f) Oil and natural gas corporation
(g) Steel plant
(h) Cement plant
(i) Cosmetic industry
(j) Sugar industry
(k) Mineral industry
(l) Food processing industry
(m) Consumer goods industry etc.
(n) Polymer industry
(o) Food industry
(p) Leather industry
(q) Pharmaceutical industry
(r) Distilleries
(s) Paint and dye industry
(t) Rubber industry
(u) Soap & detergent industry
(v) Textile industry
(w) Packaging industry

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 production.

ii) Research Organizations like CSIR laboratories, Defence laboratories, Atomic energy establishments, pollution control labs.

iii) Boards and Corporations.

iv) Entrepreneurs to small/tiny units especially food, agro and chemical industries.

v) Self employed in setting up a small unit of hand made paper.

3. COMPETENCY PROFILE

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

1. Basic understanding of concepts and principles related to applied sciences like physics, chemistry and mathematics.
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 paper and allied industries.
4. Ability to read and interpret drawings related to plant layout, process equipment and components and colour codes.
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 select the various raw materials and additives, understanding the properties and specifications for the manufacturing of pulp and paper.
9. Understanding of complete process of making paper starting from the raw material.
10. Appreciation of the need of clean and green environment and its deterioration by various emissions from industry and preventive procedures and knowledge of safety regulations in paper industry.
11. Development of generic skills of thinking and problem-solving, communication, attitudes and value system for effective functioning in a process industry.
12. Understanding of the basic principles of managing men, material and machines/ equipment for optimum production
13. Proficiency in the use of computers.
14. Basic manual and machining skills as an aid to function effectively in the process industry.
15. Knowledge of properties and conversion of paper.
16. Development of good personality in order to have effective communication and business ethics.

4. CURRICULUM AREAS AS DERIVED FROM COMPETENCY PROFILE

The following curriculum areas have been derived based on competency profile:.

S. No.	Competency	Curriculum Areas/Subjects
1.	Basic understanding of concepts and principles related to applied sciences like physics, chemistry and mathematics.	- Applied Physics - Applied Chemistry - Applied Mathematics
2.	Development of communication and interpersonal skills for effective functioning in the world of work.	- Communication skills
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 paper and allied industries.	- Applied Mechanics - General Workshop Practice
4.	Ability to read and interpret drawings related to plant layout, process equipment and components and colour codes.	- Engineering Drawing
5.	Knowledge of various materials used in chemical processes, their properties and specifications.	- Engineering materials - Applied Chemistry
6.	Knowledge and associated skills of various unit operations, unit processes and process instrumentation in process industry.	- Process Plant Utilities - Fluid Flow - Mechanical operations - Heat Transfer - Mass Transfer - Chemical Engg. Thermodynamics and Reaction Engineering - Process Industries
7.	Ability to calculate the quantity of raw materials, energy inputs, manpower requirement and output from the process.	- Chemical Process Calculations
8.	Ability to select the various raw materials and additives, understanding the properties and specifications for the manufacturing of pulp & paper.	- Paper Properties and Conversion
9.	Understanding of complete process of making paper starting from the raw material.	- Pulping Process - Pulp Washing and Cleaning - Pulp Bleaching - Stock Preparation - Paper Making - Chemical Recovery

10.	Appreciation of the need of clean and green environment and its deterioration by various emissions from industry and preventive procedures and knowledge of safety regulations in paper industry.	- Environmental Education - Pollution Control in Chemical Process Industry
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
12.	Understanding of the basic principles of managing men, material and machines/ equipment for optimum production	- Entrepreneurship Development and Management
13.	Proficiency in the use of computers.	- Computer Applications in Chemical Engineering - Basics of Information Technology
14.	Basic manual and machining skills as an aid to function effectively in the process industry.	- General Workshop Practice
15.	Knowledge of properties and conversion of paper.	- Paper Properties and Conversion
16.	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. Employability Skills
4. Entrepreneurship Development and Management

b) Applied Sciences

5. Applied Mathematics
6. Applied Physics
7. Applied Chemistry

c) Basic Courses in Engineering/Technology

8. Engineering Drawing
9. General Workshop Practice
10. Applied Mechanics

d) Applied Courses in Engineering/Technology

11. Fluid Flow
12. Mechanical Operations
13. Chemical Process Calculations
14. Pulping Processes
15. Pulp Washing and Cleaning
16. Pulp Bleaching
17. Mass Transfer
18. Chemical Engineering Thermodynamics and Reaction Engineering
19. Heat Transfer
20. Process Industries
21. Stock Preparation
22. Paper Making
23. Computer Applications in Chemical Industry
24. Chemical Recovery
25. Process Plant Utilities
26. Process Instrumentation and Control
27. Pollution Control in Chemical Process Industry
28. Paper Properties and Conversion
29. Minor Project Work
30. Major Project Work

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	6	-	-	-	-
4.	Applied Chemistry	5	5	-	-	-	-
5.	Engineering Drawing	6	6	-	-	-	-
6.	General Workshop Practice	6	6	-	-	-	-
7.	Basics of Information Technology	4	-	-	-	-	-
8.	Applied Mechanics	-	5	-	-	-	-
9.	Fluid Flow	-	-	7	-	-	-
10.	Mechanical Operations	-	-	6	-	-	-
11.	Chemical Process Calculations	-	-	4	-	-	-
12.	Pulping Processes	-	-	7	-	-	-
13.	Pulp Washing and Cleaning	-	-	4	-	-	-
14.	Pulp Bleaching	-	-	6	-	-	-
15.	Mass Transfer	-	-	-	7	7	-
16.	Chemical Engineering Thermodynamics And Reaction Engineering	-	-	-	4	-	-
17.	Heat Transfer	-	-	-	7	-	-
18.	Process Industries	-	-	-	7	-	-
19.	Stock Preparation	-	-	-	3	6	-
20.	Paper Making	-	-	-	6	6	-
21.	Employability Skills	-	-	-	-	2	2
22.	Environmental Education	-	-	-	-	3	-
23.	Computer Applications in Chemical Industry	-	-	-	-	3	-
24.	Chemical Recovery	-	-	-	-	6	
25.	Entrepreneurship Development and Management	-	-	-	-	-	3
26.	Process Plant Utilities	-	-	-	-	-	4
27.	Process Instrumentation and Control	-	-	-	-	-	7
28.	Pollution Control in Chemical Process Industry	-	-	-	-	-	7
29.	Paper Properties and Conversion	-	-	-	-	-	6
30.	Minor Project Work	-	-	-	-	3	-
31.	Major Project Work	-	-	-	-	-	6
32.	Student Centred Activities	3	2	6	6	4	5
	Total	**40**	**40**	**40**	**40**	**40**	**40**