

GANPAT UNIVERSITY					
FACULTY OF DIPLOMA ENGINEERING					
Programme	Diploma in Chemical Engineering				
Semester	III	Version	1.0.0.0		
Effective from Academic Year	2026-27	Effective for the batch Admitted in	JULY 2025		
Course code	1CH3102	Course Name	Chemical Technology		

### I.TEACHING-LEARNING AND ASSESSMENT SCHEME

Course Type	Course Code	Learning Scheme						Assessment Scheme										
		Actual Contact Hrs./Week			SLH	NLH	Credits	Theory				Practical			Based on SL		Total Marks	
		CL	TL	LL				FA-TH	SA-TH	TOTAL		FA-PR	SA-PR	TOTAL		SLA		
		MAX	MAX	MAX	MAX	MIN	MAX	MIN	MAX	MAX	MAX	MIN	MAX	MIN				
SEC	1CH3102	3	-	2	3	8	4	40	60	100	40	30	20	50	20	20		8

<b>Abbreviation:</b>	CL- Classroom Learning	TL - Tutorial Learning	LL - Laboratory Learning
	SLH - Self Learning Hours	NLH - Notional Learning Hours	SLA - Self Learning Assessment
	FA - Formative Assessment (Term work +Mid Sem Exam +Attendance)		SA - Summative Assessment

### II. PRE-REQUISITES

Basic knowledge of chemistry

### III. INDUSTRY /EMPLOYER EXPECTED OUTCOMES

The outcome expected from this course is to help the chemical engineering students to attain the industry/employer identified competency about the production and flow sheets of day-to day utilised chemical products like acids, alkalies, oil, sugar, pharmaceuticals, dyes and cement with through various teaching learning experiences.

### IV. COURSE LEARNING OUTCOMES

At the end of the course, students will be able to achieve the following course learning outcomes:

**CO1:** Understand the manufacturing of acids and alkalis in industries.

**CO2:** Learn about the different products of carbohydrates, oil and fat industries.

**CO3:** Understand the manufacturing of pharmaceuticals products and dyes.

**CO4:** Know the composition, types and manufacturing of cements.

### V. THEORY LEARNING OUTCOMES AND ALIGNED COURSE CONTENT:

Name of Unit	Theory Learning outcomes (TLO's) aligned to CO's	Learning Content mapped with Theory Learning outcomes (TLO's) & CO's	Marks	Hours
<b>Unit 1 Alkalies and Acids</b>	<p><b>TLO1.1</b> Learn the industrial manufacturing process for sulphuric acid.</p> <p><b>TLO1.2</b> Understand the manufacturing process for hydrochloric acid.</p> <p><b>TLO1.3</b> Understand the manufacturing process of nitric acid.</p> <p><b>TLO1.4</b> Understand the manufacturing process for soda ash, caustic soda and chlorine.</p>	<p><b>1.1</b> Manufacture of sulphuric acid.</p> <p><b>1.2</b> Manufacture of hydrochloric acid.</p> <p><b>1.3</b> Manufacture of nitric acid.</p> <p><b>1.4</b> Manufacture of Soda ash, Caustic Soda and Chlorine</p>	16	12
<b>Unit 2 Carbohydrate Industries</b>	<p><b>TLO2.1</b> Understand the process of production of sugar</p> <p><b>TLO2.2</b> Know the process of production of starches</p> <p><b>TLO2.3</b> Understand the production process of ethanol from molasses by fermentation</p>	<p><b>2.1</b> Manufacture of sugar</p> <p><b>2.2</b> Manufacture of starches.</p> <p><b>2.3</b> Manufacture of Ethanol from molasses by fermentation</p>	10	08

<b>Unit 3 Oil and Fats Industries</b>	<b>TLO3.1</b> Know the classification of oil & fats <b>TLO3.2</b> Understand the process of extraction of vegetable oil <b>TLO3.3</b> Understand the process of Hydrogenation of oil <b>TLO3.4</b> Understand the production process of soap and glycerin	<b>3.1</b> Classification of oil & fats <b>3.2</b> Extraction of vegetable oil <b>3.3</b> Hydrogenation of oil <b>3.4</b> Manufacture of soap and glycerin	<b>12</b>	<b>10</b>
<b>Unit 4 Pharmaceuticals and Dyes Industries</b>	<b>TLO4.1</b> Know the classification of drugs <b>TLO4.2</b> Understand the process of manufacture of penicillin and aspirin. <b>TLO4.3</b> Know the classification of dyes <b>TLO4.4</b> Understand the process of manufacture of H-acid and $\beta$ -naphthol	<b>4.1</b> Classification of drugs <b>4.2</b> Manufacture of penicillin and aspirin. <b>4.3</b> Classification of dyes <b>4.4</b> Manufacture of H-acid and $\beta$ -naphthol	<b>14</b>	<b>09</b>
<b>Unit 5 Cement Industries</b>	<b>TLO5.1</b> Know the cement and its composition <b>TLO5.2</b> Know the types of cement <b>TLO5.3</b> Know the classification of cement <b>TLO5.4</b> Understand the manufacturing of cement	<b>5.1</b> Introduction to cement <b>5.2</b> Types of cement <b>5.3</b> Classification of cement <b>5.4</b> Manufacturing of cement	<b>08</b>	<b>06</b>

#### VI. LABORATORY LEARNING OUTCOME AND ALIGNED PRACTICALS

<b>SR. NO</b>	<b>PRACTICAL/LABORATORY LEARNING OUTCOME(LLO)</b>	<b>PRACTICAL TITLES</b>	<b>RELEVANT Cos</b>
1	<b>LLO 1.1</b> Understand the process steps of preparation of soap	Preparation of soap	CO2
2	<b>LLO 2.1</b> Understand the process steps of preparation of detergent	Preparation of detergent.	CO2
3	<b>LLO 3.1</b> Understand the determination of saponification value of oil	To determine Saponification value of oil	CO2
4	<b>LLO 4.1</b> Understand the process steps of preparation of azo dye	Preparation of azo dye	CO3
5	<b>LLO 5.1</b> Understand the process steps of preparation of aspirin	Preparation of aspirin	CO3
6	<b>LLO 6.1</b> Understand the determination of moisture content in cement.	To determine the moisture content in cement.	CO4
7	<b>LLO 7.1</b> Understand the determination of the ash content in cement.	To determine the ash content in cement.	CO4
8	<b>LLO 8.1</b> Understand the process steps of preparation of detergent	Preparation of boric acid	CO1
9	<b>LLO 9.1</b> Understand the process steps of preparation of detergent	Preparation of calcium carbonate	CO1
10	<b>LLO10.1</b> Understand the process steps of preparation of detergent	Preparation of magnesium carbonate	CO1
11	<b>LLO 11.1</b> Understand the process steps of preparation of detergent	Identification test of ammonium chloride	CO1

## VII. SUGGESTED MICRO PROJECT / ASSIGNMENTS / ACTIVITIES FOR SELF LEARNING / SKILL DEVELOPMENT (SELF LEARNING)

### MICRO PROJECTS

- Write a brief report on sulphuric acid production plant
- Prepare a project report on comparative study of alkali industries
- Case study: analysis of any industrial acid leakage accident and preparation of report
- Prepare a sugar factory process flow sheet.
- Prepare a project report on ethanol from molasses
- Prepare a project report on vegetable oil extraction and hydrogenation
- Soap manufacturing industry: a brief report
- Aspirin manufacturing flow sheet
- Penicillin – industrial bioreactor Study
- Dye manufacturing: a case Study
- Cement plant process and its environmental impact study

### VIII. LIST OF REFERENCE BOOKS

Sr. No.	Title	Author	Publication
1	Chemical Technology	C. E. Dryden	East West Press. Pvt. Ltd
2	Shreve's Chemical Process Industries	G. T. Austin	McGraw Hill
3	A Text book of Chemical Technology	G. N. Pandey	Vikas Publishing

### IX. LINK OF LEARNING WEB RESOURCE

1	<a href="https://nptel.ac.in/courses/103103218">https://nptel.ac.in/courses/103103218</a>
2	<a href="https://nptel.ac.in/courses/103103220">https://nptel.ac.in/courses/103103220</a>
3	<a href="https://youtu.be/sd72w6GS4Jg?si=yOlveJTj79zA6pEj">https://youtu.be/sd72w6GS4Jg?si=yOlveJTj79zA6pEj</a>
4	<a href="https://youtu.be/oloFBWraddw?si=4x_3NOWR1LBF9ZDY">https://youtu.be/oloFBWraddw?si=4x_3NOWR1LBF9ZDY</a>
5	<a href="https://youtu.be/x0wCxttMN7U?si=Sd6yaEmSVKCCUbCq">https://youtu.be/x0wCxttMN7U?si=Sd6yaEmSVKCCUbCq</a>
6	<a href="https://youtu.be/P0QxfXWuhYI?si=mPULsP-qqqQ-4_uR">https://youtu.be/P0QxfXWuhYI?si=mPULsP-qqqQ-4_uR</a>
7	<a href="https://youtu.be/FZgNVKSOFbY?si=SDY0_xJIOeHsX9wX">https://youtu.be/FZgNVKSOFbY?si=SDY0_xJIOeHsX9wX</a>
8	<a href="https://youtu.be/cRkzWx6mj-I?si=zwrvbu7hdG4C0RAN">https://youtu.be/cRkzWx6mj-I?si=zwrvbu7hdG4C0RAN</a>
9	<a href="https://youtube.com/watch?v=nKhzYYPQksM">https://youtube.com/watch?v=nKhzYYPQksM</a>
10	<a href="https://www.youtube.com/watch?v=JmWfoVRj-Js">https://www.youtube.com/watch?v=JmWfoVRj-Js</a>
11	<a href="https://www.youtube.com/watch?v=0dD95ymHJ3g">https://www.youtube.com/watch?v=0dD95ymHJ3g</a>
12	<a href="https://www.youtube.com/watch?v=xdUCZinY3os">https://www.youtube.com/watch?v=xdUCZinY3os</a>
13	<a href="https://youtu.be/EWbelBomrYk?si=ZFopOdxMHMm6Yohp">https://youtu.be/EWbelBomrYk?si=ZFopOdxMHMm6Yohp</a>
14	<a href="https://youtu.be/qKJMLTe6fKs?si=jOnz3WDVBt8D5fuZ">https://youtu.be/qKJMLTe6fKs?si=jOnz3WDVBt8D5fuZ</a>

X. SUGGESTED WEIGHTAGE TO LEARNING EFFORTS & ASSESSMENT PURPOSE							
Unit	Unit Title	Align ed COs	Learning Hours	R- Level	U- Level	A- Level	Total Marks
1	Alkalies and Acids	CO1	12	5	6	5	16
2	Carbohydrate Industries	CO2	08	3	4	3	10
3	Oil and Fats Industries	CO2	10	3	5	4	12
4	Pharmaceuticals and Dyes Industries	CO3	09	4	6	4	14
5	Cement Industries	CO4	06	2	4	2	08
Grand Total			45	17	25	18	60

XI. COs AND POs AND PSOs MAPPING										
Course outcome (COs)	Programme Outcomes (POs)							Programme Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
<b>CO1</b>	3	2	1	1	2	1	1	3	1	2
<b>CO2</b>	3	3	1	1	2	1	1	3	1	2
<b>CO3</b>	3	2	2	2	1	1	1	3	1	2
<b>CO4</b>	3	2	2	1	2	1	1	3	2	3
<i>Legends: - 3- High      2-Moderate/Medium      1-Slight/Low      0-None</i>										