NIRMA UNIVERSITY

Institute:	Institute of Technology
Name of Programme:	B.Tech. (Chemical Engineering)
Course Code:	2CH401CC25
Course Title:	Chemical Process Industries
Course Type:	Core
Year of introduction:	2025-2026

L	**T**	**Practical component**				**C**
		LPW	**PW**	**W**	**S**	
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Course Learning Outcomes (CLOs):

At the end of the course, the student will be able to –

1. explain various chemical manufacturing processes (BL2)
2. demonstrate the synthesis of chemical products and determine their properties (BL2)
3. identify the major engineering problems encountered during the manufacturing processes (BL3)
4. compare recent developments and modern techniques in process industries (BL4)

	Contents	**Teaching Hours (Total 30)**
Unit I	**Fertilizer Industries**	**05**
	Concept of unit operations and unit processes, Production of synthesis gas by steam reforming process and partial combustion process, ammonia production by Haber process, and urea manufacturing	
Unit II	**Inorganic Chemical Industries**	**06**
	Production of sulfur and sulfuric acid- sulfur production by FRASCH process, oxidation-reduction of H_2S and Finnish process, sulfuric acid production by DCDA process, chloro-alkali industry- Solvay process for the production of sodium carbonate, electrolytic process for the production of caustic and chlorine	
Unit III	**Natural Product Industries**	**09**
	Pulp and Paper Industry-kraft process and sulphite process, Carbohydrate and Fermentation Industries-production of starch and sugar, Oil and Soap Industries, Cement Industries	
Unit IV	**Petrochemicals**	**07**
	Introduction to global and Indian petrochemical industries, Production of C1 to C4 compounds- Methanol, formaldehyde, chloromethane, trichloroethylene, acetylene	
Unit V	**Polymer Industries**	**03**
	Polymerization fundamentals, Production of Polyethylene, PVC, Polypropylene	

Self-Study:

Self-study contents will be declared at the commencement of the semester. Around 10 % of the questions will be asked from the self-study contents.

Laboratory Works:

Laboratory work will be based on above syllabus with minimum 10 experiments to be incorporated.

Suggested Readings/ References:

1. George T. Austin, Shreve's Chemical Process Industries, Tata Mc-Graw Hill Publication
2. M. Gopala Rao and Marshell Sittig, Dryden's Outlines of Chemical Technology, East West Press.
3. Pandey G. N, Text book of Chemical Technology Vol 1, 2, Vikas Publishing.

Suggested List of Practical

Sr. No.	Practical	No of hours
1	To determine the acid value of a given oil sample	02
2	To prepare the caustic soda by chemical method	02
3	Determination of sodium carbonate content in washing soda	02
4	To determine the saponification value of a given oil sample	02
5	To study the preparation of soap	02
6	To prepare salicylic acid from methyl salicylate	02
7	To determine the Iodine value of the given oil sample	02
8	To prepare ammonia from ammonium salt	02
9	To prepare a detergent in the laboratory and carry out its cost analysis	02
10	To determine the aniline point and diesel index of given samples	02
11	Synthesis of biodiesel	02
12	Virtual lab experiment (https://biotech01.vlabs.ac.in/exp/saponification-value-fats-oils/simulation.html)	02