

## Chemical Process Technology

1.1 Course Number: CH392

1.2 Contact Hours: 3-0-0 Credits: 9

1.3 Semester-offered: 3<sup>rd</sup> Year-Odd

1.4 Prerequisite: Basic concepts Mass Transfer, Heat Transfer & Chemical Reaction Engineering

1.5 Syllabus Committee Member: Dr Koushik Guha Biswas, Dr Shweta

### 2. Objective:

- To acquaint with the basic unit operation and processes in chemical process industries.
- To learn the manufacturing process of various products of chemical industries.

### 3. Course Content:

Unit-wise distribution of content and number of lectures

Unit	Topics	Sub-topic	Lectures
1	Introduction and Sulphur industries	Sulphur dioxide, Sulphuric acid, Oleum	3
2	Pulp and Paper	Cellulose derivatives: Pulp, paper and boards, Types of raw material for pulping, Various pulping methods, Recovery of chemicals from black liquor, Manufacture of paper, Quality improvement of paper.	3
3	Sugar and Starch	Raw and refined sugar, Byproducts of sugar industries, Starch and starch derivatives.	3
4	Oils and Fats	Types of oil, Different fatty acids, Extraction of oil from seeds, Oil purification, Hydrogenation of oil.	4
5	Soaps and Detergents	Types of soaps, Soap manufacture, recovery and purification.	3
6	Chlor-alkali Industries	Caustic Soda, Sodium Carbonate, Chlorine, Bleaching Powder.	3
7	Nitrogen Industries	Ammonia, Nitric acid, Ammonium sulphate, Ammonium nitrate, Urea, Calcium ammonium nitrate.	4
8	Phosphorus Industries and Mixed Fertilizers	Phosphorus, Phosphoric acid, Phosphatic fertilizers, SSP, TSP, NPK, KAP, DAP, Nitrophosphate, Bio fertilizers.	5
9	Ceramic Industries	Portland cement, Lime, clay products, Gypsum	3
10	Fermentation Industries	Fermentation Industries (Ethanol from Molasses, Alcohol from Biomass), Biofuels (Bioethanol & Biodiesel)	4

11	Polymer, petrochemicals and other industries	Manufacture of DDT and Maleic Anhydride, Viscose Rayon, Nylon, Acetic acid, Formic acid and Benzoic acid, Vinyl Chloride from Ethylene, Phenol from Benzene, Paint	5
		<b>Total</b>	<b>40</b>

#### 4. Readings

##### 4.1 Textbook:

1. Dryden's outlines of chemical technology for the 21st century, third edition by M Gopala Rao & Marsal Sittig, East-West Press Publications.
2. Chemical process Industries Shreve, Brink & Austin, Mc Graw Hill ,4th Ed., 1984

##### 4.2 Reference books:

1. Chemical Process Technology, J Moulijn, M Makkee and A Diepen, John Wiley & Sons, 2001
2. Riegel's Handbook of Industrial Chemistry, Edited by James A. Kent

#### 5 Outcome of the Course:

This subject deals with various chemical industries and their method of production of various products. The students after course completion will be able to understand the basic operation in any chemical industry which is manufacture of a new product starting from an ore or other chemical raw materials. Most of the chemical Engineering graduates will be working in various chemical industries so the subject will help them to have a comprehensive knowledge of different chemical industries existing and their mode of operation.