

UCH507: CHEMICAL PROCESS INDUSTRIES

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4	0	0	4.0

Course Objective:

To study process technologies of various organic and inorganic process industries.

Introduction: Production trends, Material and energy balances, Symbols and flow sheets, Waste generation and recycling, Engineering problems, Materials of construction, Environmental and energy conservation measures.

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.

Sugar and Starch: Raw and refined sugar, Byproducts of sugar industries, Starch and starch derivatives.

Oils and Fats: Types of oil, Different fatty acids, Extraction of oil from seeds, Oil purification, Hydrogenation of oil.

Soaps and Detergents: Types of soaps, Soap manufacture, recovery and purification.

Chlor-alkali Industries: Brine electrolysis, Manufacture of caustic soda and chlorine in mercury cells, Diaphragm cells, Membrane cells, Hydrochloric acid.

Nitrogen Industries: Ammonia, Nitric acid, Ammonium sulphate, Ammonium nitrate, Urea, Calcium ammonium nitrate.

Phosphorus Industries: Phosphorus, Phosphoric acid, Phosphatic fertilizers.

Mixed Fertilizers: SSP, TSP, NPK, KAP, DAP, Nitrophosphate, Bio fertilizers.

Sulphur Industries: Sulphur dioxide, Sulphuric acid, Oleum.

Ceramic Industries: Portland cement, Lime, Gypsum.

Course Learning Outcomes (CLO)

Upon completion of this course, the students will be able to:

1. understand the processes involved in manufacturing of various inorganic and organic chemicals.
2. prepare the process flow diagrams.

3. analyze important process parameters and engineering problems during production.

Text Books:

1. *Dryden, C.E., Outlines of Chemical Technology (Edited and Revised by M. Gopal Rao and Sittig. M), East West Press Pvt. Ltd, New Delhi (1997).*
2. *Austin, G.T., Shreve's Chemical Process Industries, McGraw Hill (1984).*

Reference Books:

1. *Faith, W.L., Keyes, D.B. and Clark, R.L., Industrial Chemicals, Wiley (1980).*
2. *Kirk and Othmer, Encyclopaedia of Chemical Technology, Wiley (2004).*
3. *Groggins, P.H., Unit Processes in Organic Synthesis, Tata McGraw-Hill (2003).*

Evaluation Scheme:

S. No.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	50
3	Sessional (May includes seminar/ assignments/ quiz's etc)	20