Subject Code: 01CH0608

Subject Name: Chemical Technology

B.Tech. Year – III (Semester VI)

Objective: To understand the governing mechanisms and driving forces of various advanced separation processes and to perform process and design calculations for advanced separation processes.

Credits Earned: 4 Credits

Course Outcomes: After completion of this course, student will be able to:

1. Expose to the concept of unit operations and unit processes
2. Improve their ability to read and abstract the process flow diagrams.
3. Equip themselves familiar with different feed preparation, separation and purification steps involved in manufacture of organic and inorganic chemicals.
4. Analyse the salient features of the process.

Pre-requisite of course: Engineering Chemistry, Mechanical operation.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA (I)	CSE (C)	Viva (V)	Term work (TW)	
3	2	0	4	50	30	20	25	25	150

Contents:

Unit	Topics	Contact Hours
1	**Chemical Processing Fundamentals & Water Treatment** An overview of Indian Chemical Industries, Basic Chemical data, Batch & Continuous processes, Flow Charts, Water Treatment Processes: Demineralization, Deionization, Desalination, Reverse Osmosis.	10
2	**Inorganic Chemical Industrial Processes:** Raw material data, Manufacturing process description and major engineering problems in the manufacture of: Sulphuric Acid by DCDA process, Soda ash by Solvay process and Dual process. Introduction to Ceramic industries, Raw materials for cement, types of cement, properties of cement, Manufacturing of Cement. Types of glass, Raw materials and manufacture of glass	10
3	**Organic Chemical Industrial Processes**: Raw material data, properties, Manufacturing process description and major engineering problems in the manufacture of: Sugar, Penicillin, Erythromycin, Streptomycin, Industrial alcohol.	10
4	**Natural Product Industrial processes:** Raw material data, Manufacturing process description and major engineering problems in the manufacture of: Soap, Detergents, Pulp by Kraft process, Paper products, Pigments	10
	Total Hours	40

References:

1. "Shreve's Chemical Process Industries", George T. Austin, McGraw Hill Publication, 5th edition
2. "DRYDENS outlines of chemical technology for the 21st century", M Gopalarao & Marshal Sitting, pub East-West Press, 3rd edition
3. "General chemical technology", Shukla and Pandey.

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
15%	45%	20%	15%	5%	-

List of Experiments:

1. To prepare hydrated lime from given calcium carbonate powder.
2. To prepare Caustic soda by chemical method.
3. To prepare soap in the laboratory and carry out its cost analysis.
4. To determine saponification value of Oil Sample.
5. To determine the acid value of the given sample of Oil.
6. To prepare m-Nitrobenzene from Nitrobenzene.
7. To Prepare Ammonia from Ammonium salt with a strong base.
8. To study operations of Water Softener.

Instructional Method:

a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

d. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory

Online Web Resources:

1. http://nptel.ac.in/courses/103107081/
2. http://nptel.ac.in/courses/103106109/
3. https://ocw.mit.edu/courses/audio-video-courses/#chemical-engineering