SECOND SEMESTER 2015-16

Course Handout (Part II)

Date:11/1/2016

In addition to part -I (General Handout for all courses appended to the time table) this portion provides further details regarding the course.

Course No. **: CHE F419**

Course Title **: Chemical Process Technology**

Instructor-in-charge **: SMITA RAGHUVANSHI**

Scope and Objective of the Course:

The aim of the course is to study Chemical manufacturing processes and their applications to specific Chemical Industries. The main focus is on the raw materials, flow sheet, synthesis and detailed analysis of the processes. It bridges the gap between the chemical sciences and the chemical industry. It enables the students to integrate the fundamental knowledge learnt in other courses so far . It hels them to apply this knowledge and understanding in the industrial processes.

Text Book:

1. Moulijn A J., Makkee, M., Diepen, A V., "Chemical Process Technology, 2nd Edition" Wiley, 2013.

Reference Books:

1. Rao M G., Sittig M., "Dryden's Outlines of Chemical Technology for the 21st Century", East West Press, 3rd Ed., 1997.
2. Austin G T., Shreve R.N., "Shreve`s Chemical Process Industries", McGraw Hill, 5th Ed., 1984.
3. Research Papers from Refereed Journals / Resources.
4. Dynamic addition of reference material will be shared.

Course Plan:

Lect. No.	Learning Objectives	Topics to be covered	Ref. Chap./Sec.#(Book)
1	Overview of the course	Introduction to the course, Chemical Industries, Status of old and new technolgies	Ch 1, T1
2	To know the present status of chemical industries in India	Chemical Industries – Facts and figures	Ch.I, T1
3 – 4	To understand the species allocation and separation task selection	Unit operations and Unit Process concepts, General Principles applied in studying an Industry	Ch.I A-D, R1
5 – 7	To undertand the various processes in the oil refinery	Oil refinery-an overview, Physical and Thermal Processes, Catalytic Processes, Treatment of refinery gas streams	Ch 1- T1
8 - 10	To understand the chronological development in the sulfuric acid production (Inorganic bulk chemicals)	Chamber Process, Contact Process, Modern Sulphuric Acid Production Plant, Catalyst Deactivation	Ch II A - R1, Ch 7 - T1
11 - 14	To understand the chronological development in the Nitric acid production (Inorganic bulk chemicals)	Ammonia Oxidation Processes: Mono Pressure and Mixed Pressure Processes	Ch II E - R1, Ch 7 - T1
15 - 18	To understand the steam cracking process	Cracking recations, Kinetics involved, Industrial Process, Product Processing	Ch 4 - T1
19 - 21	To understand the synthesis gas production	Syn gas from natural gas, coal gasification, purification and adjustment of synthesis gas	Ch 5 - T1
22 - 24	To understand the production of bulk chemicals and synthetic fuels derived from syn gas	Ammonia production, methanol production, Fischer - Tropsch process	Ch 6 - T1
25 - 28	To understand the chronological development in the Nitrogen based fertilizer production, NPK fertilizer	Urea Production Processes; Ammonium Nitrate Production Processes; Phosphate and Potash based fertilizers production processes; Phosphoric acid manufacturing processes	Ch II E - R1, R2 Ch II F - R1, R2
29 -30	To understand the processes for conversion	Biofuels, Different types of fuels	Ch 7 - T1

	of biomass		
30 - 31	To undesrtand the concept of heterogeneous catalysis	Case study, Review of reactors used in the process	Ch 10 - T1
32 - 33	To understand the pulp and paper production processes	Kraft Process, sulfite Process, Mechanical Pulping; Paper making, Production of lignin chemicals	Ch III F, R1
34 - 35	To understand the cement manufacturing processes	Dry and wet cement manufacturing processes	Ch II K, T1
36 - 38	To understand the biotechnology processes	Conversion process, fermentation technologies, enzyme technology	Ch 13 - T1
39	Concept of Process Intensification	Introduction, Microreactors, Structured catalytic reactors	Ch 14 - T1
40	To understand the Process Development	Introduction, Pilot plants/mini plants, scale up concepts	Ch 15 - T1

Evaluation Scheme:

Component	Duration	Weightage 300M	Date & Time	Remarks
Mid sem test	90 min	90	18/3 2:00 - 3:30 PM	CB / OB
Written surprise quiz (Best 4 out of 5)	15 min	40	-	CB / OB
Discussion based quiz (Best 2 out of 3)	30 min	20	-	CB / OB
Assignments (1 before midsem & 1 after midsem)	-	30	-	OB
Comprehensive exam	3 hours	120	9/5 FN	CB / OB

- Students have to follow the class timings.
- Chamber consultation hour will be announced in the class.
- Notices will be displayed on the Chemical Engineering Department notice board & Nalanda.
- Make-up will be granted for **genuine cases only.** Certificate from authenticated doctor from the Medical Center must accompany make-up application (*only prescription or vouchers for medicines will not be sufficient*). **Prior permission of IC is compulsory.**
- No make up for surprise quiz and discussion based components.