BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
INSTRUCTION DIVISION
FIRST SEMESTER 2018-2019

Course Handout (Part - II)

Date: 02/08/2018

In addition to Part I (General H andout for all courses appended to the Time Table), this portion gives further specific details rega rding the course.

Course No. : **CHE F214**
Course Title : **Engineering Chemistry**
Instructor In-charge : **PRADIPTA CHATTOPADHYAY**
Instructor(s) : **Pradipta Chattopadhyay, Shailee Gaur, T. Priya Shreedatta**

1. Course Description

Organic chemistry – Important functional groups, their reactions and named reactions, Physical chemistry – thermophysical and thermodynamic properties determination, phase rule, Adsorption equilibria, Electrochemistry, Chemical methods of analysis, Instrumental methods of analysis, Water and waste water chemistry and analysis, Corrosion, Engineering materials and inorganic chemicals, Metals and alloys, Polymers, Fuels and fuel analysis.

2. Scope and Objectives

Engineering Chemistry and its thorough knowledge in fundamental aspects would be required in understanding various developments in the field of water treatment, polymers, instrumental method of analysis, etc. The objective of the course is to study these areas in detail, understand the important working principles of equipments involved. The major learning outcome of this course would be to apply knowledge of Chemistry in applications pertaining to relevant areas in Chemical Engineering.

3. Prescribed Text Book

T1. Vairam S., Ramesh S., Engineering Chemistry, Wiley India, 2011.

4. Reference Books

R1. Palanna O. G, Engineering Chemistry, McGraw Hill India, 2017.

5. Course Plan:

Module No.	Chief topics to be covered	Ref. Chap./Sec.#(Book)	Learning Outcome
1. Water Treatment	Introduction, Sources of water, types of impurities present in water and its details, Determination of hardness of water, alkalinity, Treatment of water for domestic use, boilers and boilers troubles, softening of water, desalination of water	T1 Ch 19: 19.1-19.10	Identifying water quality parameters, Analysis of hardness and alkalinity, analyze water softening processes
2. Polymers	Introduction, degree of polymerization, classification of polymers, Types of polymerization, molecular mass of polymers, polymer applications	T1 Ch 13: 13.1-13.7	Understand the Chemistry of polymers, various characteristics and applications of polymers
3. Fuels and combustion	Determination of calorific value, Solid fuels, Liquid fuels, Gaseous fuels	T1 Ch 16: 16.1-16.6, 16.9, 16.11	Understanding of various kinds of fuels, their specific characteristics.
4.Electrochemistry	Review on electrochemistry, Types of electrodes & its applications, Batteries and Fuel cells	T1 Ch 7: 7.1-7.12, 7.15	Actual usage of electrochemistry concepts in electrodes for various applications, use of batteries, fuel cells and its applications
5. Corrosion	Introduction & types of corrosion	T1 Ch 18: 18.1-18.8	Corrosion and its related aspects in industries
6. Chemical methods of analysis	Volumetric and gravimetric analysis, Neutralization and redox titrations	T1 Ch 11: 11.1-11.5, 11.7-11.8	Understanding these methods and related concepts
7. Instrumental methods of analysis	UV-Vis spectroscopy, NMR spectroscopy, FTIR spectroscopy, Chromatography, Gas chromatography	T1 Ch 12: 12.1-12.7, 12.9	Understanding these methods for working of research equipments and related concepts
8. Metals and alloys, Engineering Materials	Metals and alloy uses, Engineering Material behavior	T1 Ch 14: 14.3, Ch 15: 15.1-15.5	To understand current importance of metals, materials and their behavior
9. Organic, Physical Chemistry concepts	Important reactions, Adsorption, Material properties, phase rule	Lecture material + T1 Ch 8: 8.1-8.4	To understand the important aspects of adsorption and other relevant material phenomenon

6. Evaluation Scheme:

Component	Duration	Weightage (300)	Date & Time	Remarks
Mid-Sem Test	90 min	90	10/10 2:00 - 3:30 PM	CB
Tutorial (Surprise Tests- 9 best out of 11)	20 mins for each	90	During tutorial session (10 marks each test, 6 before mid sem, 5 after mid sem)	CB/OB
Comprehensive Exam	3 hours	120	5/12 FN	CB

Closed Book Test: No reference material of any kind will be permitted inside the examination hall.

Open Book Exam: Use of any printed / written reference material (books and notebooks) will be permitted inside the exam hall. Computers of any kind will not be allowed inside the examination hall. Use of calculators will be allowed in all exams.

Chamber Consultation Hour: To be announced in the class.

Note:

It shall be the responsibility of the individual student to be regular in attending classes and also maintaining the study schedule as given in handout. **All notices would be put up on Nalanda. If the student is unable to appear for the Regular Test/Examination due to genuine exigencies, the student must refer to the procedure for applying for Make-up Test/Examination. No make up for any Tutorial test missed.**

(Pradipta Chattopadhyay)
Instructor In-Charge
CHE F214