

**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**  
**INSTRUCTION DIVISION**  
**FIRST SEMESTER 2016-17**  
**Course Handout (Part II)**

**Date:** 02/08/2016

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

**Course No.** : CHE F214  
**Course Title** : ENGINEERING CHEMISTRY  
**Instructor-in-charge** : Dr. SMITA RAGHUVANSHI  
**Other Instructors (tutorial)** : -

**Scope and Objective of the Course:**

The aim of the course is to provide detailed knowledge of various aspects of Chemistry as applied to Chemical Engineering. The main focus is on the various theoretical concepts which is needed in Chemical Engineering. The emphasis would also be on the hands on with emphasis on the application aspects of Chemistry in the Chemical Engineering discipline.

**Text Book:**

**T1** S. Vairam, P. Kalyani and Suba Ramesh, Engineering Chemistry, Wiley India, 2011.

**Reference Books:**

**R1** Textbook of Engineering Chemistry, C Parameswara Murthy, C V Agarwal and Andra Naidu, B S Publications, Hyderabad.

**R2** Calculations in Chemistry, Donald J Dahm and Eric A Nelson, Norton Publications, Newyork.

Few journal articles on latest applications on concept taught in the class & e books will be referred portion wise. All the related links would be informed from time to time

**Course Plan:**

<b>Lect. No.</b>	<b>Learning Objectives</b>	<b>Topics to be covered</b>	<b>Ref. Chap./Sec.#(Book)</b>
1	Overview of the course	Introduction, Six types of chemical reactions, Handout discussion, Start of water chemistry	Class notes
2-8	To study the various aspects of Water, water analysis and Waste water chemistry	Sources of water, Impurities in water, Hardness of water and its determination, Analysis of water including BOD, COD, TOC, Techniques for water softening, Water for Industries, Methods of boiler water treatment, Internal treatment of boiler water, Water for high pressure boilers, Waste water sewage treatment	Ch-19 (TB) and Ch 3 (R1)
9-15	To understand the various aspects of Electrochemistry	Electrolytes, Electrochemical cells, Electrode potential, Nernst equation,	Ch-7 (TB)

		Galvanic cells, Glass electrode, Batteries, Lithium ion batteries,	
16-19	To understand the various aspects of Chemical methods of analysis	Volumetric and gravimetric analysis, Neutralization and redox titrations	Ch. 11, T1
20-24	To understand the various aspects of Corrosion	Types of corrosion, Rate of corrosion, Corrosion control methods, Protective coatings, Electroplating process.	Ch. 18, T1
25-29	To understand the various aspects of Instrumental methods of analysis	Infrared spectroscopy, spectroscopy, UV-Visible spectroscopy, mass spectroscopy, Gas Chromatography,	Ch. 12, T1
30-31	Colloidal chemistry	Classification of colloids, Types of colloidal dispersion, Method of preparation of colloidal systems, Properties of colloids, Emulsion, Gels	Class notes and R1
32- 35	To understand the various aspects of Fuel analysis & fuels	Classification of fuels, Calorific value, Combustion, Solid fuels, Bio-fuels, Liquid and gaseous fuels	Ch. 16, T1
36- 37	To study the various characteristics of Polymers	Classification of polymers, Types of polymerization, molecular weight of polymers,	Ch. 14, T1
38 – 39	To study the term Green Chemistry	Objectives, Feed stocks involved, Solvents, Designing alternative reaction methodology	Ch 21, T1
40	Recap	Revision of the contents taught	-

#### Evaluation Scheme:

Component	Duration	Total marks (300)	Date & Time	Remarks
Mid-Sem Test	90 min	90 marks	<TEST_1>	CB/OB
Surprise Test (Lecture hours: 3 best out of 5)	15 – 20 mins	30 marks (10 marks each)	During lecture hours	CB
Tutorial test (class hours: 5 best out of 7)	15 – 20 mins	45 marks (9 marks each)	During tutorial hours	CB/OB
Assignments- 1	-	15 marks	-	-
Comprehensive Exam	3 hours	120 marks	<TEST_C>	CB/OB

**Chamber Consultation Hour:** To be announced in the class.

**Notice:** Notice will be displayed on Nalanda and Chemical Engineering Notice Board .

**Make up Policy:** Make up exam for Mid-sem and Comprehensive exam will be granted for exceptional circumstances and only if the concerned student provides sufficient documentary proof behind the absence. No makeup will be granted for Surprise Tests or Assignments or Class hour test .

Instructor-in-charge  
CHE F214