Course Number and Name

BCH 201 & Engineering Chemistry-II

Credits and Contact Hours

3 & 45

Course Coordinator's Name

Dr.Rajenderan

Text Books and References

Text Books:

1. P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., New Delhi (2002).
2. S.S.Dara "A text book of Engineering Chemistry" S.Chand &Co.Ltd., New Delhi (2006).
3. P. J. Lucia, M. Subhashini, "Engineering Chemistry, Volume 1", Crystal Publications, Chennai, (2007).

References:

1. B.Sivasankar "Engineering Chemistry" Tata McGraw-Hill Pub. Co.Ltd, New Delhi,(2008)
2. B.K.Sharma "Engineering Chemistry" Krishna Prakasan Media (P) Ltd., Meerut (2001).
3. http://ocw.mit.edu/courses/find-by-topic
4. http://nptel.ac.in/course.php?disciplineId=122
5. https://en.wikipedia.org/wiki/Spectroscopy

Course Description

To impart a sound knowledge on the principles of chemistry involving application oriented topics required for all engineering branches.

Prerequisites	Co-requisites
Engineering Chemistry-I	Nil
required, elective, or selected elective (as per Table 5-1)	
Required	

Course Outcomes (COs)

CO1: Students will understand the concepts and further industrial applications of Surface chemistry

CO2: To impart knowledge about the Industrial importance of Phase rule and alloys

CO3: To make the students to be conversant with Analytical techniques of chemistry and their importance

CO4: To have an idea and knowledge about the Chemistry of Fuels and

CO5: Understanding of engineering materials
CO6: All about bonding and molecular structures

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	H	H	L		H		H				M	
CO2		H			H		H					
CO3	H		L		H		H				M	
CO4			L		H		H					
CO5			L		H		H					
CO6			L		H		H		H		M	

List of Topics Covered

UNIT I SURFACE CHEMISTRY 9

Introduction **:** Adsorption , absorption , desorption , adsorbent, adsorbate and sorption – (definition only) Differences between adsorption and absorption Adsorption of gases on solids – factors affecting adsorption of gases on solids – Adsorption isotherms –Frendlich adsorption isotherm and Langmuir adsorption isotherm Role of adsorbents in catalysis, Ion-exchange adsorption and pollution abatement.

UNIT II PHASE RULE AND ALLOYS 9

Introduction **:**Statement of Phase Rule and explanation of terms involved – one component system – water system – Construction of phase diagram by thermal analysis - Condensed phase rule [Definition only] Two Component System : Simple eutectic systems (lead-silver system only) – eutectic temperature – eutectic composition – Pattinsons Process of desilverisation of Lead Alloys: Importance, ferrous alloys –nichrome and stainless steel – 18/8 stainless steel - heat treatment of steel – annealing – hardening – tempering normalizing – carburizing - nit riding . Non- ferrous alloys: Brass and Bronze

UNIT III ANALYTICAL TECHNIQUES 9

Introduction: Type of Spectroscopy - Atomic spectroscopy – molecular spectroscopy - Explanation IR spectroscopy – principles – instrumentation (block diagram only) – applications - finger print region UV-visible spectroscopy –– principle – instrumentation (block diagram only) – Beer-**Lambert's law**- – estimation of iron by colorimetry– Atomic absorption spectroscopy- principle - instrumentation (block diagram only) - estimation of Nickel by Atomic absorption spectroscopy Flame photometry– principles – instrumentation (block diagram only) - estimation of sodium ion by Flame photometry

UNIT IV FUELS **9**

Introduction **:** Calorific value – types of Calorific value - gross calorific value – net calorific value Analysis of Coal –- Proximate and ultimate analysis – hydrogenation of coal - Metallurgical coke – manufacture by Otto-Hoffmann method Petroleum processing and fractions – cracking – catalytic cracking – types – fixed bed catalytic cracking method- Octane number and Cetane number (definition only) Synthetic petrol – Bergius processes – Gaseous fuels- water gas, producer gas, CNG and LPG (definition and composition only) Flue gas analysis – importance - Orsat apparatus

UNIT V ENGINEERING MATERIALS **9**

Introduction: Refractory's – classification – acidic, basic and neutral refractory's – properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling) Manufacture of Refractory's: alumina bricks and Magnesite bricks, Abrasives – natural and synthetic abrasives Natural type : Siliceous - quartz ; Non –siliceous – diamond Synthetic Abrasives : silicon carbide and boron carbide. Lubricants: Liquid lubricants - Properties – viscosity index, flash and fire points, cloud and pour points, oiliness, Solid lubricants – graphite and molybdenum sulphide