Course Number and Name

BCH 201 ENGINEERING CHEMISTRY-II

Credits and Contact Hours

3 & 45

Course Coordinator's Name

Dr. Krishnaswamy

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).

Course Description

It imparts 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
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 - nitriding . 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 ofCoal –- 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 : Refractories – classification – acidic, basic and neutral refractories – properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling) Manufacture of Refractories :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, oilyness) Solid lubricants – graphite and molybdenum sulphide.