CH 16101 **ENGINEERING CHEMISTRY – I** **3 0 0 3**

(Common to all branches)

COURSE OBJECTIVES

- To know the need of polymers for industrial application.
- To understand the interrelation of heat and work within the confines of the laws of thermodynamics.
- To understand the basic concepts of instrumentation, data acquisition, data processing and the principles of analytical techniques and their applications.
- To predict the number of stable phases that may exist in equilibrium for a particular system.
- To acquaint the students with the basics of Nano materials, their properties and applications.

UNIT I POLYMERS **9**

Introduction: Classification of polymers – Natural and Synthetic- Functionality – Degree of polymerization: Types of polymerization and Mechanism of Addition (Free Radical, cationic and anionic); condensation and copolymerization. Effect of polymer structure and properties of polymers strength, plastic deformation, physical state and chemical resistance. Plastics-Thermoplastics and Thermosetting plastics -Preparation, properties and uses of Nylon 6:6, Teflon, epoxy resin and polycarbonate (Lexan)-Compounding of Plastics-Constituents and functions -Fabrication methods of Plastics.

UNIT II CHEMICAL THERMODYNAMICS **9**

Terminology of thermodynamics-First law- Second law: Entropy- Entropy change for an ideal gas, reversible and irreversible process; Entropy of Phase transistion: Clausius inequality. Free energy and work function: Helmholtz and Gibbs free energy functions(problems); Criteria of spontaneity: Gibbs Helmholtz Equation(problems); ClausiusClapeyron equation ; Maxwell Relations- Vant Hoff Isotherm and Isochore (problems).

UNIT III WATER TECHNOLOGY AND SPECTROSCOPIC TECHNIQUES **9**

Water quality standards-Hardness of water-Types-expression-units-$CaCO_3$equivalence-problems and disadvantages- Water quality parameters and their determination methods-Titremetry,ElectroUV and AAS-Spectroscopy -Types- Electromagnetic spectrum – Absorption of radiation – Beer-Lambert's law – UV-Visible spectroscopy and IR spectroscopy – principles and instrumentation (block diagram only Electronic, Vibrational and rotational trasitions. Estimation of iron by colorimetry – flame photometry principles and instrumentation (block diagram only) - estimation of sodium by flame photometry –

UNIT IV PHASE RULE AND ALLOYS 9

Phase rule: Introduction, and explanation of terms with examples, One Component System: Water System- Reduced phase rule- Two Component Systems- Lead- Silver system, Zinc – Magnesium system. Alloys: Introduction – Definition – properties of Alloys- significance of alloying. Functions and effect of alloying elements- Ferrous alloys- Nichrome and Stainless Steel- Heat treatment of steel: Non Ferrous alloys; Brass and Bronze.

UNIT V NANOCHEMISTRY 9

Basics-distinction between molecules, nanoparticles and bulk materials; size-dependent properties. Nanoscale materials- particles: cluster, rods, tubes(CNT) and wires. Synthesis: precipitation, thermolysis, hydrothermal, solvothermal, electrode deposition, chemical vapour deposition, laser ablation; Properties and applications in electronics and communication, Energy sciences and risk discussion and future perspectives.

TOTAL : 45 PERIODS

COURSE OUTCOMES

- To select a polymeric material for a specific engineering application.
- To know the basic concepts of internal energy, enthalpy, entropy, free energy and chemical potential.
- To gain practical experience with chemical process equipment as well as to analyze and interpret data.
- To classify the states in a equilibrium in a heterogeneous system. To become familiar with the types, the heat treatment and properties of alloys .
- To identify the particle size, and the application of Nanomaterials in various fields .

TEXT BOOKS

1. P.C.Jain and Monica Jain, "Engineering Chemistry", 15th ed., DhanpatRaiPub.Co, New Delhi, (2012).
2. S.S.Dara, "A Text book of Engineering Chemistry", S.Chand&Co.Ltd ., New Delhi, (2009).

REFERENCE BOOKS

1. B. Sivasankar, "Engineering Chemistry", Tata McGraw-Hill Pub. Co. Ltd., New Delhi (2008).
2. R.Sivakumar and N.Sivakuamr, "Engineering Chemistry", Tata McGraw-Hill publishing company limited, New Delhi, (2009)

3. B.K. Sharma, "Engineering Chemistry", Krishna Prakasam Media (P) Ltd., Meerut (2001).
4. Bahl B.S.,Tuli G.D. and ArunBahl., Essential of Physical Chemistry, S.Chand& Co. Ltd., New Delhi. (2010).
5. Geofrey A ozin, Andre Arsonault and Ludovicacademariti. "A chemical approach to nanomaterials", Chemistry for Royal society Revised edition London, (2009).

Mapping of Course Outcomes with Programme Outcomes (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak														
COs	**Programmes Outcomes (POs)**													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	-	-	-	-	-	1	2	-	2	-	-	1	-	-
CO2	-	-	2	-	-	1	-	-	-	-	1	1	-	-
CO3	2	-	2	2	-	1	-	-	-	-	1	2	-	-
CO4	2	-	2	-	-	1	2	-	-	-	1	1	-	-
CO5	-	1	-	-	-	1	2	-	2	-	1	-	-	-

EC 16201 **ELECTRIC CIRCUIT ANALYSIS** **3 0 0 3**

COURSE OBJECTIVES

To enable students

- introduce electric circuits and its analysis
- impart knowledge on solving circuits using network theorems
- introduce the phenomenon of resonance in coupled circuits.
- educate on obtaining the transient response of circuits.
- know the concepts of duality

UNIT I BASIC CIRCUITS ANALYSIS **9**

Ohm's Law – Kirchhoff's laws – DC and AC Circuits – Resistors in series and parallel circuits – Mesh current and node voltage method of analysis for D.C and A.C. circuits – Phasor Diagram – Power, Power Factor and Energy.

UNIT II NETWORK REDUCTION AND NETWORK THEOREMS FOR DC AND AC CIRCUITS **9**

Network reduction: voltage and current division, source transformation – star delta conversion -Thevenin and Norton Theorem – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem.

UNIT III RESONANCE AND COUPLED CIRCUITS **9**

Series and parallel resonance – their frequency response – Quality factor and Bandwidth - Self and mutual inductance – Coefficient of coupling – Tuned circuits – Single tuned circuits – Double tuned circuits

UNIT IV TRANSIENT RESPONSE FOR DC CIRCUITS **9**

Transient response of RL, RC, RLCcircuits using Laplace transform for DC input and A.C. with sinusoidal input – Characterization of two port networks in terms of Z, Y, h and ABCD parameters.

UNIT V CONCEPTS OF DUALITY **9**

Concept of duality, Dual network, Graphs of a network, Trees, twig, link and branches, Incidence matrix, Tieset matrix and cutset matrix of a graph, Inverse networks and equalizers - Applications.

TOTAL PERIODS 45

COURSE OUTCOMES

Upon the completion of the course, students will be able

- Analyze electrical circuits
- Apply circuit theorems
- Analyze AC and DC Circuits
- Design resonance circuits
- Understand the concepts of Duality

TEXT BOOKS

1. Sudhakar A and Shyam Mohan SP, "Circuits and Network Analysis and Synthesis", Tata McGraw Hill, 2007.
2. Joseph A. Edminister, MahmoodNahri, "Electric circuits", Schaum's series, Tata McGraw-Hill,New Delhi, 2001.

REFERENCES

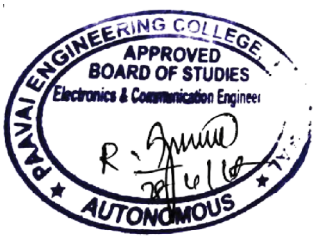
1. M Russell, Mersereau and Joel R. Jackson, "Circuit Analysis- A System Approach", Pearson Education, 2007.
2. Chakrabati A, "Circuits Theory (Analysis and synthesis)", DhanpathRai& Sons, New Delhi, 1999.
3. Charles K. Alexander, Mathew N.O. Sadiku, "Fundamentals of Electric Circuits", Second Edition, McGraw Hill, 2003.
4. Robert L. Boylestad, "Experiments in Circuit Analysis to Accompany Introductory Circuit Analysis", Prentice Hall, 2000.

WEB LINKS

1. http://www.electronics-tutorials.ws/
2. www.electrical 4u.com
3. http://nptel.ac.in/courses/Webcourse-contents/IIT-KANPUR/esc102/index.html
4. http://www.tina.com/1200_problems_and_examples
5. www.circuits-magic.com

Mapping of Course Outcomes with Programme Outcomes
(1/2/3 indicates strength of correlation) 3-strong, 2-Medium, 1-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	1	1	-	2	2	1
CO2	3	3	3	3	3	-	-	-	1	1	-	2	2	1
CO3	3	3	3	3	3	-	-	-	1	1	-	2	2	1
CO4	3	3	3	3	3	-	-	-	1	1	-	2	2	1
CO5	3	3	3	3	3	-	-	-	1	1	-	2	2	1



CH16206 **BIOCHEMISTRY LABORATORY** **0 0 4 2**

COURSE OBJECTIVES:

To enable the students to

- Estimation and quantification of biomolecules.
- Separation of macromolecules.
- Estimation and interpretation of biochemical parameter.
- Understand the basics knowledge of Biochemical parameter and their interpretation in Blood sample.

LIST OF EXPERIMENTS:

1. General guidelines for working and functional component of biochemistry lab
2. Preparation of solutions: 1) percentage solutions, 2) molar solutions, 3) normal solutions
3. Standardization of pH meter, preparation of buffers, emulsions.
4. Spectroscopy: Determination of absorption maxima (λmax) of a given solution
5. General tests for carbohydrates, proteins and lipids.
6. Identification of Blood Collection Tubes and Phlebotomy equipments
7. Preparation of serum and plasma from blood.
8. Estimation of Haemoglobin 1. Estimation of blood glucose.
9. Estimation of creatinine.
10. Estimation of urea.
11. Estimation of Uric acid
12. Estimation of cholesterol 14. Assay of SGOT/SGPT.
13. ELISA test
14. Separation of proteins by SDS electrophoresis(Demo)
15. Separation of amino acids by thin layer chromatography (Demo).

TOTAL: 60 PERIODS

COURSE OUTCOMES:

Upon completion of the course, students will be able to:

- Understand the Biochemistry laboratory functional components
- Understand the basics principle of preparation of buffers.
- Have a sound knowledge of qualitative test of different biomolecules.
- Understand the basics knowledge of Biochemical parameter and their interpretation in Blood sample.

CO-PO Mapping:

Course Outcomes (CO's)	Mapping of course objectives with PO's and PSO's (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak													
	Programme Outcomes (PO's)												Programme Specific Outcomes (PSO's)	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO 1	2	2	2	2	2				1			1	2	3
CO 2	2	2	2	2	2				1			1	2	3
CO 3	2	2	2	2	2				1			1	2	3
CO 4	2	2	2	2	2				1			1	2	3