

Minor Programme for All Branches
Theme: Chemistry for Engineering Application

Course Code: CYOM1303/ CYOM1403/ CYOM1503/ CYOM1603	Organic & Physical Chemistry	Credits:04 (L:T:P:3:1:0)
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Prerequisites: -

Course Outcome

COs	Outcomes
CO1	Familiarising the students with some synthetically important organic chemistry reactions.
CO2	Acquainting the students with the chemistry and importance of heterocyclic compounds.
CO3	Developing an understanding of the constitution and importance of amino acids and dyes.
CO4	Introduction to the industrially relevant concepts of chemical kinetics.
CO5	Familiarising the students with the principles and applications of advanced electrochemistry.
CO6	Enabling the students to have a clear understanding of the concepts of phase equilibrium.

Module	Content	Lectures
1.	Organic Reaction Mechanisms: Organic molecules and structures, some reactions of synthetic importance.	4
2.	Heterocyclic Compounds: Heterocyclic compounds – synthesis and reaction of pyrrole, furan, thiophene and pyridine, heterocyclic drugs, vitamins, hormones etc.	4
3.	Amino Acids, Dyes: Amino acids–classification, synthesis and reactions of amino acids. Dyes – color and constitution, chromophores and auxochromes, quinone theory and electron theory of dyes, preparation, color and application of few dyes.	5
4.	Introduction to Chemical Kinetics: Energy of activation; theories of reaction rates–collision theory, transition state theory; heterogeneous reaction–zero order reaction; catalysis–theory and applications; inhibitors; promoters; enzyme catalysis, Langmuir-Hinshelwood mechanism, Eley-Rideal mechanism.	6
5.	Advanced Electrochemistry: Strong and weak electrolytes, Ostwald’s dilution law, Kohlrausch’s laws, conductivity, molar conductivity, drift velocity, ionic mobility; activity and activity coefficient of electrolyte, mean activity coefficient of electrolyte, ionic strength of electrolyte, Debye-Huckel limiting law.	6
6.	Electrochemical Cells: Galvanic cells, half-reactions and red-ox couple, electrodes of	6

	reversible cells, varieties of cell – with liquid junction and with salt bridge, notation of cell and presentation of cell reactions, electromotive force, cells at equilibrium, standard potentials – Standard Hydrogen Electrode (SHE), determination of pH, pH electrodes, electrochemical series, concept of fuel cells, batteries.	
7.	Phase Equilibrium: Clapeyron equation, Clausius – Clapeyron equation; phase rule – one component system (sulphur, carbon dioxide); two component system (completely miscible liquids) – vapour pressure diagrams, temperature-composition diagrams, azeotropes, partially miscible liquids.	6

Books:

1. Atkin's Physical Chemistry. Peter Atkins and Julio de Paula. 7th Ed. (Indian Edition), Oxford University Press.
2. Organic Chemistry. I. L. Finar. Vol. I and II. ELBS, London.
3. Morrison and Boyd, "A Text Book of Organic Chemistry", 5th and 6th Edn., Prentice Hall of India.
4. Chemical Kinetics. K. J. Laidler. 4th Edn., Pearson Education.