



Malaviya National Institute of Technology Jaipur
Department of Chemistry

Course Details

Chemistry for Engineers | 26CYT101 | 2 1 0 0

PREREQUISITE:

NIL

COURSE OBJECTIVE(S):

To enable the students to learn the basic and advanced knowledge of chemistry concerning the applications of the basics of chemistry in different fields and branches of engineering. To function very efficiently and know how to build connections over the exploration/use of a modern work environment to run or lead those as professionals.

COURSE OUTCOMES:

CO1 : Able to interpret the fundamental principles of spectroscopy for molecular analysis.

CO2 : Able to understand thermodynamic and kinetic aspects of chemical reactions.

CO3 : Identify, formulate and develop polymeric compounds used in various engineering materials for futuristic engineering applications.

CO4 : Relate the knowledge of operating principles of various types of electrochemical cells, to optimize the need for sustainable development.

SYLLABUS:

UNIT I (7 Lectures): Introduction to Spectroscopy, Lambert Beer's law, Jablonski Diagram, UV-Visible spectroscopy, CFT, Colour of complexes, Fluorescence, IR and Raman spectroscopy, NMR spectroscopy.

UNIT II (7 Lectures): Thermochemistry: Entropy and Free energy, Equilibrium and Spontaneity, Reaction Enthalpy, Heat of Formation, Calorimetry Kinetics and Catalysis: Rate and Order of reaction, Rate constant, Activation energy and Arrhenius theory, Catalysis.

UNIT III (7 Lectures): Introduction to Polymers, Polymerisation mechanism (chain, step-growth, emulsion), Polymer Structure-Property Relationship, Specialized materials like conducting polymers, rubbers and biopolymers, Introduction to lubrication, Polymer-based lubricants, Mechanism and Applications of polymer-based lubricants.

UNIT IV (7 Lectures): Electrode potential, Spontaneity of electrochemical reactions Electrochemical Methods: Cyclic Voltammetry, Voltammogram, Li-ion and Li-polymer batteries. Hard and soft water: Disadvantages and treatment methods, Purification of domestic water, estimation of DO and chemicals in water, Desalination of brackish water by RO and electrodialysis, Removal of Heavy Metals from Industrial Waste Water.

EVALUATION

Final grades will be weighted average of performance in

Continuous Assessment	20%
Midterm Exam	30%
Endterm Exam	50%

depending on the institute's academic policy.

Textbook(s):

1. Engineering Chemistry by P.C. Jain & M. Jain: Dhanpat Rai Publishing Company (P) Ltd, New Delhi. 16th Edition.
2. Engineering Chemistry: Fundamentals and Applications by Shikha Agarwal, Cambridge university press.

Reference book(s):

1. Atkins, Peter William, Julio De Paula, and James Keeler. Atkins physical chemistry. Oxford university press, 2023.
2. Spectroscopy of organic compounds, by P.S. Kalsi, New Age International (P) Ltd.
3. Fundamentals of molecular spectroscopy by Colin Banwell and Elaine McCash, Tata McGraw Hill Education Pvt. Ltd.

Online/E-Resources:

