

Applied Chemistry

CY 104 S1

CY 104 S2

Scheme

L	T	P	Credit
3	0	2	04

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- **WATER** (08 Hours)
Structure of water, physical and chemical properties, Hydrogen bonding, Specifications for water in industries, types of water (raw water, cooling water, boiler water, nuclear water), Hardness of water, Estimation and units of Hardness, Boiler feed water, Boiler Problems - Scales & Sludge, Priming, Foaming, Carryover, Caustic Embrittlement, Boiler corrosion, Desalination. Water softening (lime-soda, zeolite and ion-exchange) methods.
 - **POLYMER** (06 Hours)
Introduction of Polymers: Classification of polymers, nomenclature, functionality in polymers, number and weight average molecular weight, molecular weight distribution (PDI), Chain Architecture (Linear/Branched, Tacticity, Isomerism), homopolymers, copolymers, graft copolymers and their characteristic properties in reference to their applications. Types of polymerization: addition, condensation, chain growth and step growth. Polymerization techniques: bulk, suspension and emulsion polymerization. Moulding constituents of Polymer, Moulding (Injection, Extrusion and Compressing) methods.
 - **CHEMISTRY OF MATERIALS** (08 Hours)
Alloys: Introduction, Necessity of making alloys, classification, Metal-Metal alloy: Brass (properties and applications), Metal-Non-metal alloy: Steel (properties), Composites: Introduction, classification, particulate composites, structural composites (Laminar and Sandwich), Advantages and applications of Composites, Nanomaterials – properties synthesis (sol-gel) and applications, Basics of Green Chemistry.
 - **INSTRUMENTAL TECHNIQUES** (06 Hours)
Theoretical and Experimental: Conductometry, Colorimetry, Potentiometry, pH-metry.
 - **DYES AND DRUGS** (09 Hours)
Introduction to Dyes: Sources and classification of dyes (chemical composition and applications), Requirements for a true dye, Witt's theory, Mode of application, Mechanisms of dyeing; Thermodynamics of dyeing; Kinetics of dyeing; Dye-fibre interactions; Role of fibre structure in dyeing.
Introduction to Drugs: Sources and classification of drugs, requirement for an ideal drug, routes of administration, pharmaceutical phase, pharmacokinetic phase, bioavailability of a drug and pharmacodynamics phase, Examples of Drug Action: Concept of antibiotics, Structure and activity of Penicillin, Properties and synthesis of Vitamin-C.
 - **CORROSION AND ITS CONTROL** (05 Hours)
Introduction, types and mechanism of (Chemical and Electrochemical) corrosion, Types of Electrochemical corrosion (Galvanic, Pitting, Crevice), Passivity, Galvanic series, Factors influencing corrosion, Protective measures against corrosion: (i) Modification of the environment (ii) Modification of the properties of the Metal (iii) Prevention of corrosion by Materials selection and Design (iv) Other corrosion prevention methods.

(Total Lecture Hours: 42)

PRACTICALS:

1. Potentiometric redox titration of Fe^{2+} against standard Ce^{4+} solution.
2. pH-metric titration of acidic water against standard base.
3. Iodometric determination of Cu in Brass sample.
4. Complexometric determination of hardness of water.
5. Titrimetric determination of *l* - Ascorbic acid (Vitamin-C).
6. Estimation of COD in waste water.
7. Determination of DO in waste water.
8. Conductometric titration to determine the strength of strong acid by strong base.
9. Electrode deposition study of Cu.
10. Concentration determination of Co as a Pollutant using Spectrophotometer.

BOOK RECOMMENDED:-

1. Jain P.C. and Jain M. 'Engg. Chemistry' Dhanpat Rai Publishing Co. New Delhi, 15th Edition 2006.
2. Chawla S., 'A Textbook of Engineering Chemistry', Dhanpat Rai & Co., Latest Edition, 2015.
3. Tripathy S.K., Pandhy A.K. and Panda A.K. 'Material Science & Engineering', Scitech Publications (India) Pvt. Ltd., 2nd Edition, 2009.
4. Vogel A. I. and Mendham J., 'Vogel's Textbook of Quantitative Chemical Analysis Hall, 6th Edition, 2002.
5. Sharma B. K. 'Engg. Chemistry', Krishana Prakashan Media (P) Ltd, 2008.