

Course Outcomes:

At the end of the course, the student will be able to...

CO 1: Demonstrate a comprehensive understanding of various instrumental methods of chemical analysis [K3].

CO 2: Analyze quantitatively different redox systems and neutralization systems using volumetric analysis [K4].

CO 3: Compare corrosion tendencies of different metals and their protection by surface coatings [K4].

CO 4: Apply theoretical knowledge and skills of preparation of polymers, complexes on substrates, adsorption processes, porosity, viscosity, etc. [K3].

Course Structure:

List of experiments: Following is the list of experiments common to all branches of engineering followed by the specific experiments proposed for different groups of branches:

Experiments common to all branches:

1. Determination of strength of acid in a lead-acid battery
2. Determination of strength of base using pH metric titration
3. Conductometric analysis of a base using a standard acid
4. Determination of ferrous iron by permanganometry
5. Comparison of corrosion rates of different metals/alloys
6. Preparation of Urea-formaldehyde resin
7. Determination of amount of iron in a solution by colorimetry
8. Chemistry of blueprinting
9. Adsorption of acetic acid on charcoal

Experiments for CE and ME branches:

10. Determination of total hardness of a water sample
11. Determination of calcium in Portland cement
12. Determination of porosity of a refractory material

13. Determination of viscosity of lubricating oil by Redwood viscometer

Experiments for ECE, EEE and EIE branches:

10. Determination of ferrous iron by dichrometry
11. Determination of ferrous iron by potentiometry
12. Verification of Lambert-Beer's law
13. Electroplating of copper on iron article

Experiments for CSE, AI and IT branches:

10. Determination of ferrous iron by dichrometry
11. Determination of ferrous iron by potentiometry
12. Conductometric analysis of mixture of acids
13. Preparation of conducting polyaniline from aniline

Textbook(s) / Reference(s):

Textbooks:

1. Mendham, J. (2009). *Vogel's Quantitative Chemical Analysis* (6th ed.). Pearson Education.
2. Theodore, J., & George Pope, F. (2021). *Elementary Practical Chemistry. Inorganic and Organic* (1st ed.). Legare Street Press.

References:

1. Akhil, N., Deepak, L., Atul, B., & Chaudari, P.B. (2023). *Practical Manual of Inorganic, Organic and Medicinal Chemistry* (1st ed.). IP Innovative.
2. Venkateswaran, V. (2012). *Basic Principles of Practical Chemistry* (2nd ed.). S. Chand & Sons.

E-Resources:

1. https://nitm.ac.in/ckfinder/userfiles/files/CY%20151_Labmanual%20Chemistry%20B_Tech%201st%20year.pdf
2. http://icv-au.vlabs.ac.in/inorganic-chemistry/Water_Analysis_Determination_of_Physical_Parameters/
3. http://pcv-au.vlabs.ac.in/physical-chemistry/EMF_Measurement/
4. http://pcv-au.vlabs.ac.in/physical-chemistry/Determination_of_Viscosity_of_Organic_Solvents/
5. http://vlabs.iitb.ac.in/vlabs-dev/labs/nitk_labs/Environmental_Engineering_1/experiments/determination-of-chloride-nitk/simulation.html
6. <https://chemcollective.org/vlabs>