

SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Analytical Chemistry)
Semester: IV
Syllabus with Effect from: June - 2013

Paper Code: PS04CANC02	Total Credit: 4
Title Of Paper: Electro-Analytical Methods	

Unit	Description in detail	Weightage (%)
I	<p>pH and Ion-Selective electrodes: Introduction, Construction and working of electrodes, Ion selective electrodes-Glassmembrane electrodes, Solid-state sensors, Liquid-membrane electrodes, Gas-sensing and Enzyme electrodes Interferences, Application of pH measurements, Ion-activity Evaluation Methods, Electrometric Measurement of pH and pI.</p>	25%
II	<p>Potentiometry: Introduction, types of electrodes and its classification, Location of the Equivalence point, EMF and thermodynamic of the cell reactions, Determination of activity co-efficient from EMF measurements, Potentiometric Titrations Methods and Its applications.</p> <p>Coulometry & Electrogravimetry: Introduction, First and Second law of faraday of electricity, Methods of Coulometry, Applications of Coulometry, Coulometric titrations, Advantages of Coulometric titrations, EG, Constant current & Potential electrolysis, Metal Deposites, Electrode, Applications.</p>	25%
III	<p>Conductometry: Introduction, Principle, Basic terms and their inter relationships, Measurement of conductance, factors affecting conductance, type & cell, Conductometric titrations, Applications such as Determination of degree of dissociation & dissociation constant of acids-bases, Determination of ionic product of water, Determination of Basicity of Organic compounds, Determination of solubility and solubility product of sparingly soluble salts, Determination of degree of hydrolysis and hydrolysis constant, advantages.</p> <p>High Frequency Conductance Measurements: Introduction, Types of Cells used, Instrumentation, Applications</p>	25%
IV	<p>Polarography & Voltametric Methods: Introduction, Principle, Apparatus and electrode systems, Component of limiting current, Polarographic maxima, Half-wave potential, Derivation of a relation between halfwave potential & diffusion co-efficient, The ILKOVIC equation, Factors governing diffusion current, Evaluation Methods, Applications of polarography; Modified voltametric techniques such as A. C. Polarography, Rapid Scan Polarography, Pulse polarography, Cyclic voltametry etc...</p> <p>Ampereometric titrations : Principle, Apparatus, Amperometric titrations. Biampereometric titrations - Titration with the Rotating platinum microelectrode, advantages and disadvantages, applications.</p>	25%



Basic Text & Reference Books:-

- Principles of Instrumental Analysis, 6th Edition 2006, by Douglas A. Skoog, F. James Hooer, Timothy A. Nieman.
- Instrumental Methods of Analysis, 6th Edition, by Willard, Merritt, Dean, Settle, CBS Publishers and Distributors.
- Contemporary Chemical Analysis, by J. F. Rubinson and K. A. Rubinson, Princtice-Hall International Inc. 1998.
- Analytical Chemistry, 6th Edition 2004, by Gary D. Christian, John Wiley & Sons Inc.
- Introduction to Instrumental Analysis, by Robert D. Braun, McGraw-Hill Book company, New Delhi.
- The Principles of Electrochemistry, by Duncan A. MacInnes, Dover Publications Inc., N.Y.
- Instrumental Methods of Chemical Analysis, 24th Edition 2005, by B. K. Sarma, Goel Publishing House, Meerut.

