SS829 ELECTROANALYTICAL TECHNIQUES 3 0 3 4

UNIT I: The electrolyte double layer, the mechanism of electron transfer - exchange current – kinetics and transport – reversible and irreversible reactions.

UNIT II: Study of electrode reactions: Cyclic voltammetry – reversible, irreversible and quasi reversible processes – study of reaction mechanism, adsorption, quantitative applications – spectroelectrochemistry – scanning electrochemical microscopy.

UNIT III: Controlled potential and current techniques: Chronoamperometry –pulse voltammetry - square wave and staircase voltammetry - AC voltammetry - stripping voltammetry - bulk electrolysis – chronopotentiometry - Tafel polarisation - electrogravimetry - flow analysis.

UNIT IV: Electrochemical impedance spectroscopy: Faradaic impedance – equivalent circuits – AC impedance- Bode and Nyquist plots – applications.

UNIT V: Electrochemical instrumentation: Operational amplifiers – current and voltage feedback - potentiostat and galvanostat – troubleshooting in electrochemical systems.

TEXT BOOKS/REFERENCES:

1. Joseph Wang, “Analytical Electrochemistry” Second Edition, John Wiley & Sons, 2001.
2. Christopher M. A. Brett and Ana Maria Oliveira Brett, “Electrochemistry: Principles, Methods, and Applications”, Oxford University Press, 1994
3. Allen J. Bard and Larry R. Faulkner, “Electrochemical Methods: Fundamentals and Applications”, Second Edition, John Wiley & Sons, 2001.
4. V.S. Bagotsky, “Fundamentals of Electrochemistry”, Second Edition, John Wiley & Sons, 2006.
5. Evgenij Barsoukov and J. Ross Macdonald, “Impedance Spectroscopy: Theory, Experiment, and Applications”, Second Edition, John Wiley & Sons, 2005.