

CH-435 Quality Control & Assurance

Credit Hours: 2-1

Pre-requisite: Nil

Course Objectives:

1. To improve comprehension of students about various electroanalytical techniques.

Detailed Contents

2. Introduction to Quality and QA/QC, History, quality in service vs. product, Evolution of quality systems, and key principles of QMS.
3. Philosophies and Principles: Deming's 14 Points & Transformational Management, Customer focus, specification, and measurement, Role of leadership, teamwork, and training, Resource and design management
4. Tools and Techniques: Tools of QC and QA: Check sheets, Pareto charts, cause-effect diagrams, Statistical Process Control (SPC) basic, Six Sigma: DMAIC methodology, Problem-solving approaches (PDCA, 5 Whys, Root Cause Analysis)
5. Implementation and Auditing: Implementation of QMS, Internal vs. External Audits, Documentation and record-keeping, Management reviews and continuous improvement,
6. Standards, Certifications, and Ethics: ISO standards (9001, 14001, 17025), Accreditation process and agencies, Workplace ethics and regulatory compliance, Responsibilities of QA/QC departments

Course Outcomes

7. Students will acquire knowledge about the theoretical and instrumental aspects of potentiometry, coulometry, electrogravimetry, voltammetry and polarography.

Relevant Experiments:

8. Analytical Techniques in QC: UV-Vis Spectrophotometry (e.g., purity test of paracetamol), pH and Conductivity Measurements, Titrimetric Assays (acid/base or redox), Gravimetric Analysis for solid content determination, Organic Detection in QA: TLC for purity detection in organic samples, Melting point determination for identification, FTIR for functional group analysis, Documentation and Process Control: Preparing sample SOPs (Standard Operating Procedures), Simulated audit checklist and QA report, Control chart creation from dummy data (mean \pm SD) Nil

Recommended Books:

1. Christian, G. D., *Analytical Chemistry*, 6th ed., John-Wiley & Sons, New York,(2006).
2. Harris, D. C., *Quantitative Chemical Analysis* 8th ed.,W.H. Freeman andCompany, New York, (2009).
3. Kealey, D. and Haines , P. J., *BIOS Instant Notes in Analytical Chemistry*, Bios Scientific Publishers Limited, Oxford, UK, (2002).
4. Sharma, B. K., *Instrumental Methods of Chemical Analysis*, 24th ed., Goel Publishing House, Meerut, India, (2005).
5. Skoog, D. A. and West, D. M., *Fundamentals of Analytical Chemistry*, 8th ed., Hot Reinehart Inc., London, (2008).
6. Fritz, Schulz, *Electroanalytical Methods: Guide to Experiments and Applications*. 2nd revised, Springer-Verlag Berlin, Germany, (2010).
7. Monk,P.M.S, *Fundamentals of Electroanalytical Chemistry*, John-Wiley & Sons Ltd, England, (2001).