

Course Title	Analytical Chemistry & Industrial Chemistry
Course Code	CHE301G3
Credit Value	03 (45 hours of lectures and tutorials)
Notional Hours	105 hours of independent learning and industrial visit
Objective/s	<ul style="list-style-type: none"> • Apply error analysis in different calibration methods • Understand important concepts in separation and analytical techniques. • Explain different industrial process, waste management, and pollution control
Intended Learning Outcomes	<ul style="list-style-type: none"> • Assess the compounds using different titrimetric methods • Examine the compounds using different gravimetric methods • Determine the chemical properties of compounds using electrochemical methods • Choose appropriate separation techniques in identification of inorganic compounds • Describe different industrial processes, waste management systems, and Chemistry of metal extraction
Detailed syllabus	<p>Analytical Chemistry</p> <p>Analytical Tools: Introduction, accuracy and precision, types of errors, standard deviation, test of significance, rejection of results, correlation coefficient, detection limits, sampling, standardization and calibrations</p> <p>Titrimetry: Neutralization of mixtures of acids and bases, poly functional acids and bases and amphiprotic substances, complexometric, redox and precipitation titrations, conditional formation constants, selection of indicators, constructing titration curves</p> <p>Gravimetry: Types of gravimetric analysis, precipitation mechanism, precipitate contamination, practical aspects of thermogravimetry</p> <p>Electroanalytical techniques: Classification of electroanalytical methods, electrogravimetry, polarography, potentiometry, amperometry, coulometry, conductometry</p> <p>Separation techniques: Distillation, solvent and solid phase extractions, electrophoresis, chromatography: principles, instrumentation, applications of LC, GC, TLC, HPLC and ion exchange chromatography.</p> <p>Spectroscopic techniques: Introduction, instrumentation and applications of atomic absorption and emission spectroscopies</p>

	<p>Industrial Chemistry Industrial manufacture, waste minimization, and pollution control of the following: paper, glass, plastic, paint, textile, tea, rubber, cement, ceramic, and sugar</p> <p>Metallurgy Extraction, purification of metals and their uses, Ellingham diagram</p>
Teaching and Learning Methods / Activities	Lectures, tutorials, assignments, group discussions and industrial visits
Evaluation	In course examination 30% End of course examination 70%
Recommended References	<ul style="list-style-type: none"> • Daniel C. H., <i>Quantitative Chemical Analysis</i>, 9th Edition, 2015 • Douglas A. S., Donald M. West, F. James Holler, Stanley R. Crouch, <i>Fundamentals of Analytical Chemistry</i>, 9th Edition, 2013 • Heaton, C. A., <i>An Introduction to Industrial Chemistry</i>; 3rd Edition, 1996. • Njenga, H. N. and Madkour, L. H., <i>Industrial Chemistry</i>, 2013.