NATIONALLY HARMONISED B.Sc. CHEMICAL ENGINEERING PROGRAM

Course N *Code*	Chem2063			
Course Name	Analytical Chemistry			
Degree Program	B. Sc. in Chemical Engineering			
Module	**Applied Chemistry**			
Module Coordinator	N.N.			
Lecturer	**Service course by Chemistry Department**			
ECTS Credits	**6 CP**			
Contact Hours (per week)	Lecture	Tutorial	Laboratory or Practice	Home study
	2	**2**	**3**	**3**
Students load per semester	**32**	**32**	**48**	**48**
Mode of delivery	**Parallel /Semester wise**			
Course Objectives & Competences to be Acquired	• The course is aimed to equip the students with chemical equilibra, gravimetric analysis, acid, base, buffers and volumetric analysis. • It will also enables the students to know sampling technique, method of using the response of using instruments for quantitative analysis, curve fittings, the working curve methods. • The student will be able to discuss molecular and spectroscopy, potentiometry, various forms of chromatography for chemical analysis.			
Course Description/Course Contents	• **Analytical Chemistry** • Instrumental analysis • Steps in Chemical Analysis • Application of Chemical analysis • **Chemical Equilibrium** • The dissociation of water • Equilibrium constant measurement and factors affecting chemical equilibrium • **Gravimetric Analysis and solubility** • The precipitation process, precipitations from homogeneous solution, solubility products, factors affecting solubility and differential precipitation and electrogravimetry. • **Acid, base and buffers** • Titration calculation, precipitate titrations, acid-base titration, acid-base indicators, primary standard for acid and base, acid-base titration in none aqueous solvents. • **Errors in the chemical analysis and sampling**			

	• Determinate error in chemical analysis, random error, selection of mathematical model, normal distribution of error, the standard deviation, variance and statistical control, data treatment, confidence limits, discarding an analytical results, potential source of error in chemical analysis, sampling, sample size and collecting the sample. • **Instrumental quantitative analysis** • Curve Fitting • **Molecular Spectroscopy and Atomic Spectroscopy**. • **Potentiometry and none potentiometric electroanalyis** • Potential and standard potentials, formula potentials, liquid injection potentials, theory of ion-selective electrodes, apparatus for potentiometry, use of potentiometry for qualitative analysis. • Voltammetry and polarography, polarographic principle, polarographic analysis, voltametry at solid electrodes, type of valarometry and principles, electrogravimetry, coulometry, condactometry titration, • **Liquid Chromatography and Gas Chromatography** • **Liquid Chromatography** • Chromatogrhic band broadenin, efficiency, resolution, liquid chromatography, liquid-solid(adsorption) chromatography, LSC stationary phase, LSC mobile phase, LSC detectors, functional group adsorbed on LSC columns, liquid-liquid (partion) chromatography, ion exchange chromatography, ion exchange resins, ion exchange apparatus. • **Gas Chromatography** • Retention time and retention volume, efficiency, apparatus, carrier gases injection systems, columns , solid apparatus, stationary liquid phase, stationary solid phase, detectors, flow meters, temperature effects, quantitative and qualitative analysis. • **Analytical Automation** Automated laboratory analysis, computer control of laboratory equipment, automated laboratory apparatus, continuous flow analyzers, discrete sample analyzers, centrifugal force analyzers, automated titrators, process control and process control analyzers
Pre-requisites	None
Semester	Year II, Semester II
Status of Course	Compulsory
Teaching & Learning Methods	Lectures, tutorials, lab practical
Assessment/Evaluation & Grading System	• **Continuous Assessment ....50%** • lab Practical....................30% • Assignments..............10% • Quizzes.....................10%

	• **Final examination 50%**
Course Policy	**Attendance**: As per nationally harmonized academic policy **Assessments**: students are supposed to handle all assessments on time. **Cheating/plagiarism:**it is strictly forbidden and any misconduct is accountable per the students' code of conduct.
Literature	
Approval section	Course team