Programme: M. Sc. Part-I (Chemistry)
Course Code: ACC-402
Title of the Course: Laboratory Course in Analytical Chemistry
Number of Credits: 02 **Effective from AY: 2018-19**

Prerequisites for the course:	Should have studied practical chemistry courses at F.Y B.Sc, S.Y. B .Sc & T Y B Sc levels so as to have basic knowledge of quantitative analysis.	
Course Objectives:	Introduction of various experimental techniques for analysis. Learning data analysis, handling and interpretation of spectra	
Course Outcomes:	Students should be in a position to use standardized material to determine an unknown concentration. To gain experience with some statistics to analyse data in laboratory Students should be in position to use different techniques for qualitative and quantitative estimation	
Content:	*This course consists of 6 units of experiments in various areas of Analytical chemistry. Minimum 12 experiments shall be carried out and at least 02 experiment from each unit shall be conducted.* **UNIT 1: STATISTICS** 1.Calibration of apparatus (balance, volumetric flasks, pipettes and burettes) and preparation of standard solutions and standardisation **UNIT 2: COLORIMETRY AND UV-VISIBLE SPECTROPHOTOMETRY** 2.Estimation of Iron from Pharmaceutical sample (capsule) by thiocyanate method 3. Estimation of lead/nitrate in water sample 4. Estimation of KNO_3 by UV spectroscopy and $K_2Cr_2O_7$ by Visible spectroscopy 5. Simultaneous determination and Verification of law of additivity of absorbances ($K_2Cr_2O_7$ and KMnO4) 6.Estimation of phosphoric acid in cola drinks by molybdenum blue method **UNIT 3: FLAME SPECTROPHOTOMETRY** 7.Estimation of Na 8.Estimation of K or Ca **UNIT 4: VOLUMETRY** 9.Estimation of Ca in pharmaceutical tablet. 10.Estimation of Al and/or Mg in antacid tablet **UNIT 5: ION EXCHANGE CHROMATOGRAPHY &SOLVENT EXTRACTION** 11.Separation and Estimation of Zn and Cd 12.Separation and Estimation of chloride and bromide 13.Extraction of Cu as copper dithiocarbamate (DTC) using solvent extraction and estimation by spectrophotometry	

	UNIT 6: INTERPRETATION EXERCIES 14.Thermal studies: TGDTA and Isothermal weight loss studies of various hydrated solids like $CuSO_4 \cdot 5H_2O$, $Ca_2C_2O_4 \cdot H_2O$, $Fe_2C_2O_4 \cdot 2H_2O$ 15. X-ray powder diffractometry: Calculation of lattice parameters from X-ray powder pattern of cubic system such as $NiMn_2O_4$, $CoFe_2O_4$ etc.	
Pedagogy:	Prelab exercises / assignments / presentations / lab hand-out or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.	
Text Books/ References / Readings	1. J. H. Kennedy, *Analytical Chemistry Principles*, Saunders College Publishing, Second Edition 1990. 2. G. D. Christian, *Analytical chemistry*, 5th Ed, John Willey and Sons, 1994 3. J. Mendham, R.C. Denney, J.D. Barnes and M. Thomas; *Vogel's Textbook of Quantitative Inorganic Analysis;* 6th Edition, Pearson Education Asia 2005 4. A. J. Elias, *Collection of interesting chemistry experiments*, University press, 2002. 5. R.A. Day & A.L. Underwood, *Quantitative Analysis*, 6th Edition, Prentice Hall, 2001. 6. J. Kenkel, *Analytical Chemistry for Technicians*, 3rd Edition, Lewis publishers, 2002.	