

### **CHG5114: Analytical Chemistry (4 credits: 3-1-0)**

Errors and Statistical Treatment of Data: Accuracy and precision, errors, Statistical treatment of data, error distributions, finite data analysis, standard deviation, criteria for rejection of data, method of least squares. Infrared Spectroscopy: Basic concepts, Characteristic vibrational frequencies of organic compounds and factors affecting stretching frequencies. UV Spectroscopy: UV-Visible, Basic concepts and factors affecting the position of UV bands, Characteristic absorption of Organic compounds, Application of UV spectroscopy. Mass Spectroscopy: Mass spectral fragmentation of organic compounds, McLafferty rearrangements, Applications. Nuclear Magnetic Resonance Spectroscopy: Basic Concepts, chemical shifts, spin-spin interaction, Fourier transform technique and nuclear Overhauser effect (NOE). Coupling constants, two-dimensional NMR spectroscopy, NOESY, DEPT and INEPT terminologies. Structural elucidation of organic compounds using UV, NMR, IR and Mass spectroscopy. Atomic spectrometry: Atomic absorption spectrometry (AAS) - absorption of characteristic radiation, instrumentation - Hollow cathode lamp - sampling - quantitative measurements and interferences - atomic emission - instrumentation, plasma sources – instrumentation. Thermogravimetry, Differential Thermal Analysis (DTA), and Differential Scanning Calorimetry (DSC).

#### **Text Books/Reference:**

1. Analytical Chemistry: (J.W) G. D. Christain
2. Introduction to Spectroscopy, 5<sup>th</sup> Edition, by Donald I. Pavia, Gary M. Lampman, George A. Kriz, and James R. Vyvyan
3. Modern Analytical Chemistry, David Harvey, McGraw Hill, 2000.
4. Organic Spectroscopy, Kemp W.
5. Treatise on Analytical Chemistry: Vol I to VII – I. M. Kolthoff
6. Spectroscopic identification of organic compounds- R.M. Silverstein and G. C. Bassler
7. Spectroscopic methods in organic chemistry- D.H. Williams and I. Fleming
8. Absorption spectroscopy of organic molecules- V.M. Parikh
9. Applications of spectroscopic techniques in Organic chemistry- P. S. Kalsi
10. A Text book of Qualitative Inorganic Analysis- A. I. Vogel