Under-graduate course **Chemical Analysis Lab** (2 theory classes and 1 lab/Week: 3 Credits = 2:0:1): UWE

Analyses of compounds are an integral aspect of chemistry. We get to know the structure, spatial orientation and purity of compounds we synthesize through analysis which helps us to advance in our investigation. To address this purpose a bevy of instruments ranging from UV spectroscopy, IR spectroscopy to High Pressure Liquid Chromatography are available. However accurately understanding the output from these instruments is an essential attribute for a successful chemist. In this course we will learn to interpret and understand working of various types of analytical instruments commonly used for analysis in a chemistry lab.

*Prerequisite*: CHY101

**Instructor:** Goutam Chowdhury, Gouriprasanna Roy, Parthapratim Munshi, Debdas Ray and Subhabrata Sen

1. **Course Evaluation:** 5 Quizzes (4% each); 1 final theory exam (20%); regular lab assessment: 30% and 1 final lab exam: 30%

**Course outline:**

1. Introduction-Infra Red Spectroscopy (1 experiment and 2 lectures) (**GPR**)
2. Ultra Violet Spectroscopy (2 experiments and 4 lectures) (**GPR**)
3. Fluorescence Spectroscopy (3 experiments and 6 lectures) (**DDR**)
4. Nuclear Magnetic Resonance Spectroscopy (3 experiments and 6 lectures) (**SBS**)
5. Liquid chromatograph mass spectrometry and high performance liquid chromatography (3 experiments and 6 lectures) (**GC**)
6. X-Ray crystallography (3 experiments and 6 lectures) (**PPM**)

**Books:**

1. *X-ray structure determination: A Practical Guide* (2nd Ed.) by George H. Stout and Lyle H Jensen, Wiley-Interscience, New York, 1989.
2. *Spectroscopy of organic compounds,* 6th Edition byP. S. KALSI, New Age International Publishers.
3. *Spectrometric Identification of Organic Compounds, 6th Edition* by R. M. Silverstein and F. X. Webster, Wiley Student Edition.
4. *Molecular Fluorescence: Principles and Applications*. Bernard Valeur, Wiley-VCH

**Schedule:**

1. 6 lectures and 3 labs will be on Introduction-IR-UV (Instructor: GPR)
2. 1st Quiz on Introduction-IR-UV
3. 6 lectures and 3 labs will be on Fluorescence Spectroscopy (Instructor: DDR)
4. 2nd Quiz on Fluorescence spectroscopy
5. 6 lectures and 3 labs will be on NMR (Instructor: SBS)
6. 3rd Quiz on NMR
7. 6 lectures and 3 labs will be on LCMS and HPLC (Instructor: GC)
8. 4th Quiz on LCMS-HPLC
9. 6 lectures and 3 labs will be on X-ray crystallography (Instructor: PPM)
10. 5th Quiz on X-ray crystallography
11. Final Lab exam after all the labs are over
12. Final exam (theory)

* **Nuclear Magnetic Resonance Spectroscopy (3 experiments and 3 lectures) (SBS)**

1. History of nuclear magnetic resonance spectroscopy (NMR)
2. Principal of NMR
3. Principal of understanding NMR spectra
4. 2D-NMR
5. Quiz 3