

Advanced Instrumental Analysis (Chem. 664)

The objective of this course is to provide an in depth study of certain select analytical methodology. The focus will be more on organic analysis, than inorganic, although some of them will be covered. Separation techniques such as chromatography and electrophoresis will be covered in details along with sample preparation techniques.

Text Book:

1. Instrumental Analysis by Skoog and Leary. Harcourt Publishers (any Ed. will do).
2. Sample Preparation Techniques in Analytical Chemistry. Ed. S. Mitra, John Wiley and sons

(the second book will be used for only one topic, so purchase is not mandatory)

Topics to be Covered and Schedule

1. Analytical methods and figures of merit (Week 1).
2. Fundamentals of spectroscopy (Week 2).
6. Selected topics in Spectroscopy (Week 3-5).
3. Gas Chromatography (Week 6,7)
4. High performance liquid chromatography (Week 8,9)
5. Mass spectroscopy (Week 10).
6. Electrophoresis and bioseparations (Week 11,12).
7. Sample preparation techniques (Week 13).
8. Class presentations (Week 14).

Grading:

Midterm and final – 42.5% each
Project – 15%

Learning outcomes:

By the end of the course, you should be able to do the following:

1. Understand instrumental analysis and the figures of merit for the analytical instruments.
2. Have learnt the fundamentals of spectroscopic analysis
3. Have applied these concepts in molecular spectroscopy through the use of UV visible spectroscopy.
4. Have learnt about the analysis of metals.
5. Have learnt about time domain spectroscopy and FTIR.
6. Have learnt the different separation techniques.
7. Acquired the concepts of mass spectrometry and the detailed instrumentation.