UEI720: ANALYTICAL INSTRUMENTATION

L	T	P	Cr
3	1	2	4.5

Course objectives: To introduce the concept of analytical Instrumentation, methods, techniques and applications

Introduction: Introduction to instrumental analysis-classification and its advantages, Sampling systems for gas analysis and liquid analysis.

Spectrometry: Introduction to atomic absorption spectrometer, emission spectrometer UV-visual spectrometer, infrared spectrometer, excitation sources: arc and spark, Nuclear magnetic resonance spectrometer, Mass spectrometry, biomedical applications of spectrometry.

Chromatography: Introduction to Chromatographic techniques, Liquid chromatography, Gas chromatography, Applications of chromatography. Introduction to optical Techniques and their Working, turbidimetry, Nephelometry, Polarimetry, Refractometry.

X-ray Analytical Methods: Introduction to X-ray spectral analysis, Fluorescence X-ray spectrometer Wavelength dispersive devices, Energy dispersive devices, Detectors, Scanning electron microscope, X-ray diffractometer, X ray absorption spectrometer Applications of X ray analytical methods in biomedical, industrial applications. **Potentiometry :** Potential and standard potential, ion selective electrode, Glass electrode, Gas sensing electrode. Application of potentiometry.

Course Learning Outcomes (CLO):

After the successful completion of the course the students will be able to:

1. explain the concept of spectrometry and optical techniques
2. elucidate the working of chromatography, elemental analyser
3. illustrate the working of X- ray diffractometer and scanning electron microscope
4. explain the concept of potentiometry and its applications

Text Books:

1. *Braun, R.D., Introduction to Instrumental Analysis, Mc-Graw Hill (2008).*
2. *Khandpur, R.S., Handbook of Biomedical Instrumentation, Tata McGraw–Hill (2000)*
3. *Mathur, R.P., Water and Waste Water Testing Laboratory Manual, Nem Chand and Brothers (1982).*
4. *Patranabis D. Principles of Industrial & Instrumentation, Tata McGraw–Hill (1998)*

Evaluation Scheme:

S.NO.	Evaluation Elements	Weightage (%)
1	MST	30
2	EST	45
3	Sessional (May include Assignments//Quizzes/Lab Evaluations)	25