

## UEI621 ANALYTICAL INSTRUMENTATION

<b>L</b>	<b>T</b>	<b>P</b>	<b>Cr</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>3.5</b>

**Introduction:** Introduction to instrumental analysis-classification, advantages.

**Spectrometry:** Theory, Apparatus and Application of atomic absorption spectrometer, UV-visual spectrometer, Fourier transform infrared spectrometer, Nuclear magnetic resonance spectrometer, Mass spectrometry.

**Optical Techniques:** Working, Principle, Construction and application of turbidimetry, Nephelometry, Polarimetry, Refractometry.

**Chromatography:** Chromatographic techniques, High pressure liquid chromatography, Gas chromatography.

**Elemental Analysis:** Elemental analysis of C, H, N, S and O.

**Potentiometry :** Potential and standard potential, Theory of ion selective electrodes-Glass electrode, Gas sensing electrodes, Quantitative analysis.

**X-ray Analytical Methods:** Theory of X-ray spectral lines, Apparatus, Wavelength dispersive devices, Energy dispersive devices, Detectors, Scanning electron microscope, Chemical analysis by X-ray diffraction.

**Air Pollution Measurement:** Need of pollution monitoring unit, measurements and analysis of air pollutants like SO<sub>2</sub>, CO, Hydrocarbons, Petrochemical oxidants, Particulates.

**Water Pollution Measurement:** Measurement and analysis and control of water pollutant, Determination of inorganic, Organic substances, Waste water treatment, Odor measurement.

**COURSE LEARNING OUTCOME (CLO):**The student will be able to

1. Understand the concept of spectrometry and optical techniques
2. Understand the working of chromatography, elemental analyser and potentiometer
3. Understand the working of X- ray diffractometer and scanning electron microscope
4. Monitor selected parameters for air and water pollution

**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).

**Evaluation Scheme:**

<b>Sr. No.</b>	<b>Evaluation Elements</b>	<b>Weightage (%)</b>
1	MST	30
2	EST	45
3	Sessionals (May include Assignments/Projects/Tutorials/Quizzes/Lab Evaluations)	25