GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: V

ENVIRONMENTAL ENGINEERING

Subject Name: **Advanced Environmental Instrumentation**
Subject Code: **151302**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
2	0	4	6	70	30	50

Sr. No.	Course Content
1.	Introduction to instrumental method of analysis.
2.	**Spectroscopy:** • Fundamental Principles of Spectroscopy • Ultraviolet and Visible Spectroscopy • Infrared Spectroscopy • Raman Spectroscopy • Atomic Absorption Spectroscopy • Flame Emission Spectroscopy • Fluorometry • Electron Microscopy • Mass Spectroscopy
3.	**Chromatography:** • Solvent Extraction methods in analysis • Liquid –Liquid Chromatography • Adsorption Column Chromatography • Ion exchange Chromatography • Gas Chromatography • Thin layer Chromatography • High Pressure (Performance) Liquid Chromatography • Radio Chromatography
4.	**Miscellaneous Methods:** • Conductometric Titration • pH and its Instrumentation • Electrogravimetric Analysis • Polarimetry • Themo analytic methods
5.	Other instruments like TOC analyzer, Ion selective meter, etc..
6.	Statistical Treatment of data

List of Practical:

1. Determination of turbidity from water sample using Nephelo turbidity meter.
2. Determination of flouride concentration in drinking water using spectrophotometer.
3. Colorimetric analysis for copper using UV-Vis spectrophotometer.
4. Preparation of calibration curve of chromium using UV- Vis spectrophotometer.
5. Determination of metals (chromium/nickel/copper/arsenic) using Atomic Absorption Spectrophotometer.
6. Determination of cations and anions using Ion-Chromatograph
7. Determination of TOC from wastewater using TOC analyzer.

Tutorials: (based on working principle & application in Env. Engg.)

1. Flame photometer
2. Gas Chromatograph
3. High Performance Liquid Chromatograph

Reference Books:

1. Standard methods for the examination of water and wastewater; published by American public Health Association, American water works Association, Water pollution control federation (21st Edition & later).
2. Chemistry for Environmental Engineering by Sawyer and M C Carty
   (4th Edition- McGraw-Hill Publishing Company Ltd.)