

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**B.E. SEMESTER : V**  
**ENVIRONMENTAL SCIENCE AND ENGINEERING**

**Subject Name: Applied Statistics & Environmental Instrumentations**

**Subject Code:153702**

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

Sr No	Course Contents
1	Introduction: Nature and objectives of research, Scope and formulation of hypothesis, Introduction to Statistical Analysis: Measures of Central Tendency and Dispersion, Mean, Median, Mode, Range, Mean deviation, Standard Deviation.
2	Random Variables and Probability Distribution: Definition, Distributions, Functions, Mathematical Expectation, Binomial, Poisson, Geometric, Negative binomial, Exponential, Normal and log-normal distributions. Hypothesis Testing: Tests of Significance based on normal, t and chi-square distributions, Analysis of variance technique Linear Regression and Correlation: Linear regression, Least square principle and fitted models, Karl Pearson's correlation coefficient, Rank Correlation, Lines of regression.
3	Introduction to instrumental method of analysis. <b>Spectroscopy:</b> Fundamental Principles of Spectroscopy, Ultraviolet and Visible Spectroscopy, Infrared Spectroscopy, Raman Spectroscopy, Atomic Absorption Spectroscopy, Flame Emission Spectroscopy, Fluorometry, Electron Microscopy, Mass Spectroscopy <b>Chromatography:</b> 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 Electro gravimetric Analysis, Polarimetry, and Other instruments like TOC analyzer, Ion selective meter, etc..

**LIST OF PRACTICALS:**

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.

**TEXT BOOKS:**

1. Dowdy, S., Wearden, S. and Chilko, D., Statistics for Research, Wiley Series (2004)
2. Walpole, R.E., Myers, R.H., Myers, S.L. and Ye, K., Probability and Statistics for Engineers and Scientists, Pearson Education (2002).
3. 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).
4. Chemistry for Environmental Engineering by Sawyer and M C Carty (4th Edition-McGraw-Hill Publishing Company Ltd.)