2-vaishali nagar, Near Amrapali railway crossing, Raiya road, Rajkot-360001. Ph.No.-(0281)2440478, 2472590	**3-vaishali nagar, Near Amrapali railway crossing, Raiya road, Rajkot-360001. Ph.No.-(0281)2471645**	**Behind marketing yard, Near Lalpari lake, Between Amargadh-Bhichri, Rajkot-360002. Ph.No.-90990 63150**

M. Sc. SEMESTER-II

C-204: ANALYTICAL CHEMISTRY

1. Environmental Chemistry

Concept and scope of Environmental Chemistry. Terminologyand classification of environmental segments, particles, ions and radicals in the atmosphere. Air pollution: Introduction, major sources of air pollution, air pollutants. Sources of pollutants: gaseous NOx, SOx, CO, hydrocarbons, particulates (Inorganic and Organic particulate matters).Effect of pollutants on humans, animals, materials, and vegetation.

Greenhouse effect and global warming:El Nino and La Nina phenomenon, Asian brown cloud.

Ozone layer: Creation, mechanism of depletion and its effect.

Smog: Sulphurous and photochemical smog, formation mechanism, and its control.

Analysis of air pollutants: Sampling techniques of gases and particulate, analysis of NOx, SOx, CO, H2S, oxidants and ozone by chromatography and spectrophotometric methods. Analysis of particulates by HVAS techniques.

Water pollution: Introduction, sources of pollutants, water pollutants, classification of inorganic, organic, thermal and radioactive pollutants.

Analysis of water pollution: Determination of pH, conductivity, TDS, acidity, alkalinity, chloride, iron, sulphate, sulphide, fluoride, ammonia, nitrate, nitrite, calcium, magnesium, DO,BOD, COD, etc.

Soil pollution: Origin and nature of soil, sources of soil pollution, purpose of analysis. Methods of soil analysis:pH, moisture, total nitrogen, lime potential, total sulphur, manganese, iron, Na, K, Ca, Mg, etc.

2. Green Chemistry

Introduction, importance andtwelve principles of Green Chemistry. Designing a green synthesis using theseprinciples. Green Chemistry in day to day life. Green solvents (alternatives of organic solvents).

Ionic liquids, supercritical fluids, CO2 and H2O and aqueous phase organic synthesis. Non-traditional greener alternative approaches:Green reagents, catalysis, biocatalysis. Applications of non-conventional energy sources: Microwave, ultrasonic assisted synthesis, electro-synthesis and sunlight (UV) radiation assisted synthesis.

3. Analytical Chemometrics

Propagation of measurement of uncertainties, useful statistical tests: Test of significance, F-test, t-test, chisquare-test, correlation coefficient, confidence limist of mean, comparison of mean with true values. Regression analysis (least square method for linear and nonlinear plots). Statistics of sampling and detection limit evaluation.Specific study for analytical method radiation by using validation parameters: (1) accuracy, (2) precision (repeatability and reproducibility), (3) linearity and range, (4) Limit of Detection (LOD) and Limit of quantification (LOQ),(5) selectivity/specificity, and (6) Robustness and Ruggedness.

Reference Books

1. Fundamentals of Mathematical Statistics:by S.C. Chand and V.K.Kapoor: S.Chand and Co.
2. Practical Statistics (Vol 1 and 2) by Singh, Atlantic Publishers.2003.
3. V.K.Ahluwalia, Green Chemistry: Environmentally Benign Reactions. CRC, 2008.
4. Environmental Chemistry by H.Kaur, 3 edition PragatiPrakashan, Meerut.
5. Environmental Chemistry 7rdedition by A.K.De, New Age International Publishers; New Delhi.
6. Spectroscopy 6 edition by H.Kaur, PragatiPrakashan, Meerut.
7. Environmental Chemistry by V.K.Ahluwalia Ane Books India First Edition.