

Title of the Course: Environmental Pollution Practical II

Course Code: ENV 602

Number of Credits: 02

Effective from AY: 2022-2

Prerequisites for the course:	Students who have undergone M. Sc. Part I (Environmental Science).	
Objectives:	1. Introduction of basic laboratory techniques for analysis of environmental samples. 2. Evaluate the utility of various analytical techniques as a qualitative and quantitative tool.	
Content:	Module I 1. To prepare standard solution of different concentrations; Molarity, Normality, Parts per million, percentage (W/W, W/V, V/V). (3 hrs; Ref.1,2) 2. Procedures of water and wastewater sample collection from natural reservoirs and industries and preservation techniques. (3 hrs; Ref.1,3,4) 3. Calibration of glass electrode and determination of pH of different water samples (surface water, ground water and sea water). (3 hrs; Ref.7) 4. Calibration of conductivity meter and determination of conductivity of different water samples (surface water, ground water and sea water). (3 hrs; Ref.7) 5. Determination of pH and conductivity of soil samples. (3 hrs; Ref.7) 6. Standardisation of titrimetric reagents for acid base and complexometric titrations. (3 hrs; Ref. 2) 7. Determination of alkalinity of surface, ground and sea water sample using titrimetric analysis. (3 hrs; Ref. 3,4,7) 8. Determination of acidity of surface, ground and sea water sample using titrimetric analysis. (3 hrs; Ref. 3,4,7) 9. Estimation of total solids, dissolved solids, suspended solids of surface, ground and sea water samples (3 hrs; Ref.3,4) 10. Determination of moisture content of soil using gravimetry. (3 hrs; Ref. 3,4). Module II (Any 5 experiments) 1. Determination of nitrite in water sample using colorimetry (6 hrs; Ref.1,2,3) 2. Demonstration of UV-visible spectrophotometer and determination of nitrate in water. (6 hrs; Ref.1,2,3) 3. Determination of chromium in water sample by UV-Visible spectrophotometry. (6 hrs; Ref.1,2,3) 4. Estimation of total residual chlorine and hardness of water samples. (6 hrs; Ref.1,2,3) 5. Determination of Pb/Cd in water samples by MP-AES. (6 hrs; Ref. 2,3,4). 6. Determination of chemical oxygen demand in given water sample (6 hrs; Ref. 3,4). 7. Estimation of phosphate in water by colorimetry (6 hrs;	30 hrs. 30 hrs.

	Ref.3,4) 8. Determination of elements (Fe/Mn/Zn/Pb/Cd etc) in air using high volume sampler. (6 hrs; Ref.2,3,4). 9. Determination of adsorption capacity of activated charcoal for various coloured water samples. (3 hrs;Ref.2,4). 10. Estimation of sulphate in water samples (tap water) by turbidimetry. (6 hrs;Ref.3,4).	
Pedagogy:	Pre-lab and post-lab assignments or a combination of some of these. Sessions shall be interactive in nature to enable peer group learning.	
References / Readings:	1. Christian, G. D. (2013). <i>Analytical Chemistry</i> (Sixth Edition) Wiley. 2. Jeffery, G.H., Bassett, J., Mendham, J., Denney R.C. (1989). <i>Vogel's textbook of quantitative chemical analysis</i> (Fifth Edition) Longman Scientific & Technical, U.K. 3. Dey, A. K. (2010). <i>Environmental Chemistry</i> (Seventh Edition). New Age International Publishers. 4. Rice, E.W., Baird, R. B., Eaton, A, D., Clesceri, L. S. (2012) <i>Standard methods for the examination of water and waste water analysis</i>. (Twenty Second Edition). Amer Public Health Assn. 5. Sawyer, C. N., McCarty, P. L., and Parkin, G. F. (2002). <i>Chemistry for Environmental Engineering and Science</i>. (Fifth Edition). McGraw-Hill Education 6. Moore, J. W., and Moore, F. A. (2012). <i>Environmental Chemistry</i> Academic Press, New Delhi. 7. Hota R. N. (2021). <i>Geochemical Analysis</i> (Second Edition) CBS Publisher.	
Course Outcomes	1. Student will be able to use different techniques for qualitative and quantitative estimation of environmental samples. 2. Students will be in a position to determine an unknown concentration of pollutant in given sample (water and soil).	