BACHELORS WITH WATER MANAGEMENT AS MAJOR (CT – I)
3rd SEMESTER

WMG324J WATER MANAGEMENT _ WATER CHEMISTRY

CREDITS: THEORY: 4, PRACTICAL:2

COURSE OUTCOME:

Water chemistry is an introductory course that explores the chemical properties, composition, and behaviour of water. The aim of the course is to develop a comprehensive understanding of the fundamental concepts and principles of water chemistry. The course is designed to develop critical thinking and problem-solving skills in the context of water chemistry. The student will be able to interpret and communicate results related to water quality.

UNIT I: STOICHIOMETRY
Concept: Mole, molarity, normality, molality, Chemical equilibrium, Acid-base reactions, Titrimetry, Gravimetry

UNIT II: ANALYTICAL CHEMISTRY
Potentiometry, Conductometry and Turbidimetry, Spectrophotometry: UV-Visible, Flame photometry, Chromatography: principle and applications

UNIT III: WATER CHEMISTRY
Chemical in freshwaters, Solubility of gases in water, Redox potential, potential energy, Dissolved oxygen: Sources, forms, transformations and distribution, Carbon: forms and transformations, Carbonate-bicarbonate system

UNIT IV: NUTRIENT AND ENERGY DYNAMICS
Nitrogen: Sources, quantity and cycling, Phosphorus: Sources, quantity and cycling, Transport and Spiralling, factors influencing nutrient dynamics, Nutrient budgeting, Organic matter decomposition

PRACTICAL:
1. Standardization of reagents – titrants (acids, bases)
2. Measurement of suspended solids in different water samples
3. Determine of transparency in a lake ecosystem
4. Estimation of salinity in water samples
5. Experimental verification of Beer-Lambert's law
6. Determination of turbidity of water samples
7. Determination of dissolved oxygen content in water samples
8. Determination of CO_2 in water samples

SUGGESTED READINGS:

1. Environmental Chemistry by Colin Baird and Michael Cann - Year: 2012
2. Quantitative Chemical Analysis by Daniel C. Harris - Year: 2015 (This may varydependingon the edition.)
3. Instrumental Methods of Chemical Analysis by B.K. Sharma - Year: 2006
4. Analytical Chemistry: Principles and Techniques by Christian Gary D. - Year: 2017
5. Modern Analytical Chemistry by David Harvey - Year: 2018
6. Environmental Chemistry by Stanley E. Manahan - Year: 2016
7. Environmental Chemistry by Colin Baird and Michael Cann - Year: 2012
8. Introduction to Environmental Engineering and Science by Gilbert M. Masters and Wendell P. Ela - Year: 2020
9. Environmental Chemistry by A.K. De - Year: 2014
10. Analytical Chemistry by A.K. Srivastava - Year: 2012

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