

**UNIT- II:****[12 Hours]**

Hydrologic cycle, sources, chemistry of sea water, criteria and standards of water quality- safe drinking water, maximum contamination levels of inorganic and organic chemicals, radiological contaminants, turbidity, microbial contaminants. Public health significance and measurement of colour, turbidity, total solids, acidity, alkalinity, hardness, chloride, residual chlorine, sulphate, fluoride, phosphate and different forms of nitrogen in natural and polluted water. Chemical sources of taste and odour, treatment for their removal, sampling and monitoring techniques. Determination and significance of DO, BOD, COD and TOC. Water purification for drinking and industrial purposes, disinfection techniques, demineralization, desalination processes and reverse osmosis. Treatment of liquid radioactive wastes

**UNIT- III:****[12 Hours]**

**Green Chemistry:** Definition and principles, planning a green synthesis in a chemical laboratory, Green preparation-Aqueous phase reactions, solid state (solventless) reactions, photochemical reactions, Phase transfer catalyst catalysed reactions (Quaternary ammonium salts & Crown ethers), enzymatic transformations & reactions in ionic liquids.

**Sonochemistry:** Introduction, instrumentation, the phenomenon of cavitation, Sonochemical esterification, substitution, addition, oxidation, reduction and coupling reactions.

**Microwave induced organic synthesis:** Introduction, reaction vessel and reaction medium, concept, specific effect, atom efficiency, % atom utilisation, advantages and limitations, alkylation of active methylene compounds, N-alkylation, condensation of active methylene compounds with aldehydes, Diels-Alder reaction, Leuckardt reductive amination of ketones, ortho ester Claisen rearrangement.

**References:**

1. Organic Spectroscopy-3<sup>rd</sup> Ed.-W.Kemp (Pargrave Publishers, New York), 1991.
2. Spectrometric Identification of Organic Compounds - Silverstein, Bassler & Monnill (Wiley) 1981.
3. Applications of Absorption Spectroscopy of Organic Compounds-Dyer(Prentice Hall, NY) 1965.
4. Spectroscopy of Organic Compounds-3<sup>rd</sup> Ed.-P.S.Kalsi (New Age, New Delhi) 2000.
5. Spectroscopic Methods in Organic Chemistry - Williams and Fleming, TMH.
6. A.K. De : Environmental Chemistry, (Wiley Eastern).
7. S.K.Banerji : Environmental Chemistry, ( Prentice Hall India), 1993.
- 8 S.D. Faust and O.M. Aly : Chemistry of Water Treatment, (Butterworths), 1983.
9. Sawyer and McCarty, Chemistry for Environmental Engineering(McGraw Hill) 1978
10. I.Williams, Environmental Chemistry, John Wiley, 2001.
11. S.M.Khopkar, Environmental Pollution Analysis, (Wiley Eastern).
12. Organic Synthesis-Special Techniques, V.K.Ahluwalia & R. Aggarwal, Narosa, 2001. Green Chemistry-Environment friendly alternatives- R.Sanghi & M.M.Srivatsava Narosa, 2003.
13. Green Chemistry-Environment benign reactions- V.K.Ahluwalia, Ane Books India, 2006.

**OC P 507: Organic Chemistry Practicals – III****COURSE OUTCOME:**

Enable the students:

- To understand and learn the principle of quantitative estimation of different types of organic molecules, methods such as sugars, amino acids, phenols, carboxylic acids, amides, esters, aldehydes, ketones, urea, acid-ester mixture, amide-ester mixture.
- To know the estimation of functional groups like hydroxyl, vic-hydroxy, enol, amino, amide, unsaturation, nitro group
- Semi-micro analysis of nitrogen, halogen, alkoxy, C-methyl and active hydrogens. and semi-micro analysis of nitrogen, halogen, alkoxy, C-methyl and active hydrogens. and semi-micro analysis of nitrogen, halogen, alkoxy, C-methyl and active hydrogens.

Quantitative determination of sugars, amino acids, phenols, carboxylic acids, amides, esters, aldehydes, ketones, urea by various methods. Determinations of acid & ester and acid & amide in the mixtures.

Determination of functional groups like hydroxyl, vic-hydroxyl, enol, amino, amide, unsaturation and nitro groups by various methods. Semi-micro analysis of Nitrogen, Halogen, Alkoxy, C-methyl and active hydrogens.

### OC P 508: Organic Chemistry Practicals – IV

#### COURSE OUTCOME:

Enable the students:

- To gain the knowledge about the isolation and characterization of caffeine, ricinolic acid, azelic acid, piperine, hesperidine, cysteine, casein, lycopene, carotenes, lipase and sucrose.
- To understand the extraction of groundnut oil and coconut oil, determination of saponification and iodine values. value of the oils and fats.
- To know the identification and purification of organic compounds by paper, TLC and column chromatographic techniques.
- To learn the characterization of natural products by oxidation and derivatisation.

Isolation and Characterization of natural products like Caffeine, Ricinoleic acid, Azelic acid, Piperine, Hesperidine, Cysteine, Casein, Lycopene and enzymes like Lipase and Sucrase. Extraction of Groundnut oil and Coconut oil. Determination of Saponification oils and fats, Determination of Iodine values of oils and fats using ICl & chloramine-T. Isolation of Carotenes-Purification by paper, TLC and Column. Characterization of natural products by oxidation studies, Derivatization of natural products.

### OC P 509: Organic Chemistry Practicals – V

#### COURSE OUTCOME:

Enable the students:

- To acquire in-depth knowledge and skill on separation and purification of ternary mixture of organic compounds,
- Identification and qualitative analysis of the individual compounds of the mixture,
- Characterization by derivatization,
- Recording physical constant, TLC and spectral techniques.