3. Verification of the inverse square law.
4. Determination of half life of radionuclides.

4. Determination of Linear and mass attenuation coefficient.
5. Preparation of Fricke and Ceric sulphate dosimeters & calculation of G-value & dose rate.
6. Study of isotope dilution analysis; 8. Radiochemical Determination of I-131 in sea water.
7. Determination of β-particle range and, axmum energy (by half thickness method).

C. Voltammetry & Polarography (Any Three experiments are to be carried out)
1. Determination of the half-wave potential of Cd (II), Cu(II)& Zn(II) ions in 0.1M solutions.
2. Determination of metal ions individually and in mixtures,
3. Determination of the formula and the stability constant of a lead oxalate.
4. Study of the polarogram of supporting electrolyte with and without dissolved oxygen,
5. Determination of Huckel value of aromatic hydrocarbon reduction at dropping mercury electrode.
6. Amperometric titrations.
7. Coulometric titration
8. Percentage purity of copper sulphate by electrogravimetric method.

REFERENCES:
1. Findlay's Practical Physical Chemistry- B. P. Levitt (Longman, London).
2. Experiments in Physical Chemistry–James and Prichard.
3. Experimental Physical Chemistry - Daniels et al.
4. Experimental Physical Chemistry-Das & Behera (Tata McGraw Hill, New Delhi)1983.
5. Advanced Practical Physical Chemistry–Yadav (1989).
6. Experiments in Physical Chemistry–J. C. Ghosh (Bharathi Bhavan)1974.
7. Nucleonix systems Pvt. Ltd, Hyderabad.

4th SEMESTER

CH H 551 BIOINORGANIC CHEMISTRY

COURSE OUTCOME:

- In this course, students will learn metal and non metal ions in biological systems,
- Biological nitrogen fixation, Photocatalysis,
- Transport and storage of dioxygen, Metal storage and Transport, Metalloproteins as enzymes,
- Therapeutic uses of metals, Metal complexes as drugs, Treatment of toxicity due to inorganics.

UNIT -I: [15 Hours]

Metal and non metal ions in biological systems-essential and trace metals, ion transport across membranes, active transport of ions across biological membranes, ionophores.
Biological nitrogen fixation, Molybdenum nitrogenase Model compounds, in vitro fixation of nitrogen throgh dinitrogen complexex. Metal complexes in transmission of energy-chlorophylls. photosystems I ans II in cleavage of water, model systems.

UNIT-II: [15Hours]

Transport and storage of dioxygen- heme proteins, oxygen uptake, functions of haemoglobin, myoglobin, hemerythrin and hemocyanins, synthetic oxygen carriers.

Metal storage and transport – ferritin, transferrin and ceruloplasmin. Electron transfer proteins-cytochromes, iron-sulphur proteins. Metalloproteins as enzymes – carboxy peptidase, carbonic anhydrase, alcohol dehydrogenase, catalases, peroxidases, cytochrome P 450, superoxide dismutase, copper oxidases, vitamin B12 coenzyme.

UNIT – III **[15 HOURS]**

Therapeutic uses of Metals - Metals in medicine: Metals and human biochemistry, general requirements. Disease due to metal deficiency and treatment: Iron, zinc, copper, sodium, potassium, magnesium, calcium and selenium.

Metal complexes as drugs and therapeutic agents: Antibacterial agents, antiviral agents, metal complexes in cancer therapy, metal complexes for the treatment of rheumatoid arthritis, vanadium in diabetes, metal complexes as radio diagnostic agents.

Treatment of toxicity due to inorganics: General aspects of mechanism of metal ion toxicity, (i)
Mechanism of antidote complex with poison, rendering it inert: arsenic, lead, mercury, iron, copper (ii) Antidote accelerated metabolic conversion of poison to non-toxic product: cyanide and carbon monoxide

REFERENCES

1. M.N.Hughes: Inorganic Chemistry of Biological Processes, (2nd edn.) Wiley, 1988.
2. I.Bertini. H.B.Gray, S.J.Lippard and J.S.Valentine: Bioinorganic Chemistry, Viva Books, 1998.
3. J.E Huheey, R.L.Keiter and A.L.Keiter: Inorganic Chemistry(4th edn),Addison Wesley, 2000.
4. K. Hussain Reddy, Bioinorganic Chemistry - New Age International Ltd. (2003).
5. R.W. Hay, Bioinorganic Chemistry - Ellis Horwood Ltd., (1984)
6. Asim K Das, Bioinorganic chemistry, Books & Allied (P) Ltd.

CH H 552: ORGANIC SYNTHETIC METHODS

COURSE OUTCOME:

Enable the students:

- To acquire knowledge on the various reagents employed for oxidation and reduction of various kinds of organic molecules.
- To understand the various methods of halogenations of carbonyl compounds, benzylic and allylic halogenations.
- To understand the synthetic design with diverse chemical reactions, planning of organic synthesis and functionality.
- To learn the principles and technologies used in disconnection approach, the utility of protecting group strategy in organic synthesis and retrosynthetic analysis.

UNIT–I: **[15 Hours]**

Reduction Reactions: Catalytic hydrogenation-Introduction, catalysts and solvents, mechanisms and stereochemistry of catalytic hydrogenations. Hydrogenolysis and homogeneous catalytic hydrogenation.

Metal hydride reduction: Reduction with LiAlH4and NaBH4, Stereo chemistry of reduction, Reduction with diborane and related reactions.

Dissolving Metal Reductions: Mechanisms of reduction of carbonyl compounds, Bimolecular reductions of esters, Birch reduction, Wolf-Kishner reduction and reduction with diimide.

Oxidation reactions: Mechanism of oxidation reaction with chromium and manganese salts, Osmium tetroxide, peracids, periodic acid and Lead tetra acetate.

Halogenation: Halogenation of carbonyl compounds. Benzyllic and Allylic halogenations.