8. Principles of Biochemistry - Horton & others.
9. Bioorganic chemistry - A chemical approach to enzyme action - Herman Dugas and Christopher Penney.

CH E 456 : ENVIRONMENTAL, ELECTRO AND POLYMER CHEMISTRY

COURSE OUTCOME:

- It is an elective course offered to students from disciplines other than chemistry.
- It aims at enhancing their general understanding of chemistry. Few important topics such as sources and detection of air pollution, batteries as power sources, devices of solar energy conversion,
- polymers used in day to day life and for medical and technical applications will be taught.
- Awareness of plastic pollution and technique of plastic waste management

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

Environmental segments, evolution of earth's atmosphere. Air pollution: Air pollutants, prevention and control, Green house gases and acid rain. Carbon monoxide, industrial sources and transportation sources. SO_x- sources, ambient concentration, test methods, control techniques - scrubbing, limestone injection process. Ozone hole and CFC's. Photochemical smog and PAN. NO_x - Sources, ambient concentration, test methods, thermodynamics and NO_x, control techniques. Particulates: Size distribution, particulate collection - settling chambers, centrifugal separators, wet scrubbers, electrostatic precipitators & fabric filters. Catalytic converters for mobile sources. Bhopal gas tragedy.

UNIT-II **[12 hrs]**

Corrosion: Introduction, consequence, type, prevention, & measurement. Conventional sources of energy, limitations, Importance of storage, Battery-Electrodes, Cell, battery Brief account of primary, secondary, lithium battery and fuel cells. Semiconductor electrodes and Solar energy system. 7 hrs

Introduction to bioelectrochemistry, electrochemical communication in biological organisms.

Theory and applications of Electroplating and electroless plating. 7hrs .

Reaction Kinetics-Theory and applications of different types of reactions- Oscillatory, chain reaction, branched chain reaction. . Energy of activation and thermodynamic parameters, Collision theory of reaction rates limitations and basics of transition state theory. 5 hrs

UNIT- III **[12 hrs]**

Polymers: Introduction-Basic concepts and classification of polymers, Molecular weight and its distribution, Chemistry of polymerization- Step, chain, Coordination, Copolymerization. Polymerization techniques- bulk, solution, suspension, emulsion, poly-condensation, solid and gas phase polymerization. Chemical and geometrical structure of polymer molecules, Structure property relationship- Physical, Thermal and mechanical properties 6hrs

Synthesis, properties, structural features and applications of some important commercial polymers (PE, PP,PS, PVC, PMMA, PET, Nylon-6,Nylon-6,6) , Engineering polymers (Kevlar, Nomex, ABS, PC, Teflon). Applications of polymers in separations: reverse osmosis, ultra and nano-filtration. Applications in electronics- conducting polymers and electronic shielding, Applications of polymers in medicine.

Management of plastics in environment- recycling, incineration and biodegradation.
6hrs

REFERENCES:
1. A.K. De : Environmental Chemistry, (Wiley Eastern).
2. S.K.Banerji : Environmental Chemistry, (Prentice Hall India), 1993.
3. Sawyer and McCarty, Chemistry for Environmental Engineering(McGraw Hill) 1978.
4. An Introduction to metallic corrosion and its prevention-Raj Narayan (Oxford-IBH, New Delhi), 1983.
5.Chemical& Electrochemical Energy Systems, R. Narayan & B. Viswanathan (University Press), 1998.
6. Industrial Electrochemistry, D. Peltcher & F. C. Walsh (Chapman & Hall)1990.
7. F.W. Billmeyer, Text book of Polymer science, 3rd Ednn, A Wiley- Interscience Publication, New York, 2005
8.. V.R. Gowariker, Polymer Science, New Age International (P) Ltd., New Delhi, 2012
9. R.W. Dyson, Specialty Polymers, Chapman and Hall, New York, 1987
10. J.R. Fried, Polymer Science and Technology, Prentice Hall of India Pvt. Ltd., New Delhi, 1999
11. P. Ghosh, Polymer Science and Technology, Tata - McGraw Hill, New Delhi, 1995

CH P 457: INORGANIC CHEMISTRY PRACTICALS-II

COURSE OUTCOME:

- The students will have hands on experience in the qualitative analysis of mixtures of Inorganic Salts containing 3 cations in which 1 less common metal ion and 2 anions.
- Students will learn the systematic methods of separation techniques.
- Apart from inorganic radicals they also learn the separation organic radicals.

Qualitative Analysis of mixtures of Inorganic Salts containing 3 cations and 2 anions (1 less common metal ions like Tl, W, Mo, V, Zr, Th, U, Ce, Ti and Li to be included among anions organic acid radicals, phosphate, borate and fluoride separation included).

REFERENCES:

1. Vogel's Text Book of Quantitative Chemical Analysis (5th Ed), G. H. Jeffrey, J. Bassette, J.Mendham and R. C. Denny, Longman, 1999

2. Vogel's Qualitative Inorganic Analysis (7th Ed), G. Svehla, Longman (2001).

CH P 458 : ORGANIC CHEMISTRY PRACTICALS-II

COURSE OUTCOME:

- Student will gain the in-depth knowledge and skill in organic separations,
- purifications, qualitative analyses.
- Separation of binary mixtures of organic compounds containing both mono and bifunctional groups
- Students will learn preparation of suitable derivatives.

Separation and systematic qualitative analysis of binary mixtures of organic compounds containing both mono and bifunctional groups and preparation of suitable derivatives.