BACHELORS WITH CHEMISTRY AS MAJOR
8th SEMESTER

CHM822J1: CHEMISTRY _ APPLIED CHEMISTRY

CREDITS: THEORY-3, PRACTICAL-1

THEORY (3 CREDITS: 45 HOURS)

Course Objectives:

- *Introduce variety of materials to the students having significance in energy, industry and health.*

Learning outcomes:

The students will acquire knowledge of chemistry involved in:

- *Batteries and their types.*
- *Pharmaceuticals, and agrochemicals.*
- *Different types of polymers used in day today life.*
- *Different types of medicines used.*

Unit I. Chemistry for Energy (15 Hours)

Batteries: Primary and secondary batteries, components and working of battery, composition and working of following batteries; Pb acid, Li, Zn-air battery.

Fuel Cells: Introduction, types, composition and working of fuel cells: hydrogen fuel cell, phosphoric acid fuel cell and Direct methanol fuel cell.

Solar Cells: Introduction, photo voltaic, photoelectrochemical and dye-sensitised solar cells.

Unit II: Chemistry for Industry (15 Hours)

Fertilizers: Different types of fertilizers, Manufacture of the following fertilizers; Urea, ammonium nitrate, calcium ammonium nitrate, ammonium phosphates, superphosphate of lime.

Polymers: Preparation, properties and applications of the big six Polymers: Low Density Polyethylene (LDPE), High Density Polyethylene (HDPE), Polypropylene (PP), Polystyrene (PS), Polyvinyl Chloride (PVC) and Polyethylene - Tetra phthalate (PET or PETE)- their chemical characteristics and uses. Elastomers: Natural rubber, Vulcanization of rubber & Synthetic rubber

Unit III: Chemistry for Health (15 Hours)

Different systems of medicines, drug discovery and development, bioavailability, bioequivalence of drugs, mechanism of action of antibiotics (penicillin and sulfa drugs). Hypnotics (structure and synthesis of glutethimide), sedatives (structure and synthesis of diazepam), and analgesics (structure and synthesis of phenacetin). Gastrointestinal tract disorders and drugs. Metals and metalloids in Therapy, Treatment of Arthritis with gold compounds, metals and metalloids in diagnostic imaging.

Chemistry of Abortion pills and dental amalgams. Introduction to herbal drugs.

Practical (1 credits: 30 Hours)

1. Determination of free acidity in ammonium sulphate fertilizer
2. Construction and working of electrochemical cell
3. Preparation of pigment (zinc oxide-cobalt oxide).
4. Preparation of Phenol-formaldehyde Resin.
5. Preparation of benzocaine (local anaesthetic)

Recommended Books

1. Felder, R. M. and Rousseau, R.W., Elementary Principles of Chemical Processes, Wiley Publishers, New Delhi, 2005.
2. Understanding Batteries, Ronald Dell, David Anthony James Rand, Royal Society of Chemistry, 2001.
3. Introduction to Materials Chemistry by Harry R. Allcock, Wiley
4. Stocchi, E., Industrial Chemistry, Vol I, Ellis Horwood Ltd. UK, 1990
5. Introduction to Medicinal Chemistry, Alex Gringauz (Wiley- VCH-1997).
6. Medicinal Chemistry- An Introduction, Gareth Thomas (Wiley-2000).
7. 3rd Edition. 3. Medicinal Chemistry, Ashutosh Kar. (Wiley Eastern-1993)
8. Principles of Modern Chemistry; 2nd edn; Oxtoby and Nachtrieb; Saunders College Publications; 1987.
9. www.chemistryincontext; (American Chemical Society)
10. Organic Chemistry; Pearson New International Edition, Paula Y. Bruice, 2014.
11. Organic Chemistry; 8th Edition, L.G. Wade, 2016.