OC H 503: Advanced Heterocyclic Chemistry

COURSE OUTCOME:

- Students will understand the various types of systematic nomenclature of simple, fused and bridged heterocyclic compounds with one or more diverse heteroatoms.
- Students will get the sound knowledge on the structure, synthesis and reactions of various three, four, five, six and seven membered simple and fused heterocyclic compounds with one or more heteroatom
- Study the use of heterocycles in functional group and ring transformations.
- Students will acquire knowledge about the synthesis and reactions of mesionic compounds, structure and synthesis of anthocyanins, anthocyanidins, flavones, flavonols and isoflavones.

UNIT -II: Heterocyclic Chemistry-I **[15 Hours]**

Introduction, Biologically important heterocycles, Nomenclature of Heterocycles, Replacement and systematic nomenclature, Hantzsch-Widman system for monocyclic, fused and bridged heterocycles. Synthesis and reactions of three membered heterocycles-aziridines, oxiranes, episulfides, diaziridines, oxazirines and diazirines. Synthesis and reactions of four membered heterocycles-oxetanes, azetidines and thietanes. Synthesis & reactions of five membered eterocycles-furan, pyrrole, thiophene, oxazoles, imidazoles and thiazoles.

UNIT -II: Heterocyclic Chemistry-II **[15 Hours]**

Structure, synthesis and reactions of six membered heterocycles- pyridine, α- and γ-Pyrones, oxazines. Pyrazines, Pyridazines, Pyrimidines. Synthesis and reactions of seven heterocycles- Azepines, Oxepines and Thiepines. Synthesis and reactions of fused heterocycles- benzofuran, benzothiophene & indole.selenophenes, tellurophenes, Quinolines, Isoquinolines, Coumarins, Naphthyridines and Purines.

UNIT -III: Heterocyclic Chemistry-III **[15 Hours]**

Mesoionic compounds: Introduction, Synthesis and reactions of sydnones.

Anthocyanins and Anthocyanidins: Introduction and general methods of synthesis.

Flavones, Flavonols and Isoflavones: Introduction and synthesis of flavone, flavonal andquercetin. Structural elucidation and synthesis of Uric acid, Caffeine.

Heterocycles in functional group and ring transformations: Alkanes from thiophenes,dienes from pyrroles, alcohols from isooxazolines, conversion of coumarin to benzofuran, sydnone to pyrazole, chromones to pyrazoles, furans to pyridines, pyrrole to pyridines, pyrimidine to pyrazole, isatins to quinolines, indoles to quinoline. Dimroth and Cornforth rearrangements.

References:

1 An Introduction To the Chemistry of Heterocyclic Compounds-Acheson (Wiley Eastern),1997.
2. Heterocyclic Chemistry- J.Joule & G.Smith (Van Nostrand ELBS), 1978.
3. Polymer Science- V.R.Gowariker, N.V.Vishwanathan & T.Shridhar (Wiley Eastern)
4. Comprehensive Heterocyclic Chemistry Vol-I-VI Ed. Katritzky & Rees (Pergamon), 1984.
5. Organic Chemistry, Vol I & II, I.L.Finar (Longmann ELBS, London), 1973.
6. Natural Products Chemistry, Vol-I & II- G.R.Chatwal(Himalaya), 1990