PHARMACEUTICAL ORGANIC CHEMISTRY –III (Theory)

Course Content:

Note: To emphasize on definition, types, mechanisms, examples, uses/applications

UNIT-I **10 Hours**

Stereo isomerism

a. Optical isomerism –
i. Optical activity, enantiomerism, diastereoisomerism, meso compounds
ii. Elements of symmetry, chiral and achiral molecules
iii. DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers
iv. Reactions of chiral molecules
v. Racemic modification and resolution of racemic mixture.
vi. Asymmetric synthesis: partial and absolute

UNIT-II **10 Hours**

b. Geometrical isomerism
i. Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems)
ii. Methods of determination of configuration of geometrical isomers.
c. Conformational isomerism in Ethane, n-Butane and Cyclohexane.
d. Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity.
e. Stereospecific and stereoselective reactions

UNIT-III **10 Hours**

Heterocyclic compounds:

a. Nomenclature and classification
b. Synthesis, reactions and medicinal uses of following compounds/derivatives
Pyrrole, Furan, and Thiophene - Relative aromaticity, reactivity and Basicity of pyrrole

UNIT-IV **8 Hours**

c. Synthesis, reactions and medicinal uses of following compounds/derivatives
I. Pyrazole, Imidazole, Oxazole and Thiazole.
II. Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine
d. Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives

UNIT-V **07 Hours**

Reactions of synthetic importance

a. Metal hydride reduction ($NaBH_4$ and $LiAlH_4$), Clemmensen reduction, Birch

reduction, Wolff Kishner reduction.
b. Oppenauer-oxidation and Dakin reaction.
c. Beckmanns rearrangement and Schmidt rearrangement.
d. Claisen-Schmidt condensation

Recommended Books (Latest Editions)

1. Organic chemistry by I.L. Finar, Volume-I & II.
2. A text book of organic chemistry – Arun Bahl, B.S. Bahl.
3. Heterocyclic Chemistry by Raj K. Bansal
4. Organic Chemistry by Morrison and Boyd
5. Heterocyclic Chemistry by T.L. Gilchrist