Second year of Five Years integrated M. Sc. (Physics)

M.Sc-II, Semester – III	**L**	**T**	**P**	**C**
MS 211 BASIC SCIENCE ELECTIVE (BSE) Heterocyclic compounds	**3**	**0**	**0**	**3**

- **NOMENCLATURE OF HETEROCYCLES** **(04 Hours)**
  Replacement and systematic nomenclature (Hantzsch-Widman system) for monocyclic fused and bridged heterocycles.

- **AROMATIC HETEROCYLCES** **(05 Hours)**
  General chemical behaviour of aromatic heterocycles, classification (structural type), criteria of aromaticity (bond lengths, ring current and chemical shift in ^{1}H NMR spectra, empirical resonance energy, delocalization energy and Dewar resonance energy, diamagnetic susceptibility exallations). Heteroaromatic reactivity and tautomerism in aromatic heterocycles.

- **NON-AROMATIC HETEROCYCLES** **(06 Hours)**
  Strain bond angle and torsional strain and their consequences in small ring heterocycles, Conformation of six membered heterocycles with reference to molecular geometry, barrier to ring inversion, pyramidal inversion and 1,3-diaxial interaction, stereo-electronic effects, anneromeric and related effects. Attractive interactions- H-bonding and intermolecular nucleophillic – electrophilic interactions.

- **HETEROCYCLIC SYNTHESIS** **(04 Hours)**
  Principles of heterocyclic synthesis involving cyclization reactions and cycloaddition reactions.

- **SMALL RING HETEROCYLCES** **(05 Hours)**
  Three membered and four membered heterocylces- synthesis and reactions of aziridines, oxiranes, thirienes, azetidines, oxitanes and thietanes.

- **BENZO-FUSED FIVE MEMBERED HETEROCYLCES** **(05 Hours)**
  Synthesis and reactions including medicinal applications of benzo pyrroles, benzo furans and benzo thiophenes.

- **MESOIONIC HETEROCYCLES** **(05 Hours)**
  General classification, chemistry of some important mesoionic heterocycles of type A & B and their applications.

- **SIX-MEMBERED HETEROCYCLES** **(08 Hours)**
  Synthesis and reactions of Pyrillium salts and pyrrones and their comparison with pyridinium and thio pyrillium salts and pyridones. Synthesis and reactions of quinolizium and benzopyrillium salts, caumarins and chromones, diazines, triazines, tetrazines and thiazines.

(**Total Contact Time (Theory): 42 Hours)**

BOOKS RECOMMENDED:

1. **Gupta R. R., Kumar M. and V. Gupta**, *Heterocyclic Chemistry*, Vol 1-3, Springer Verlag 1998.
2. **Eiche T. Hauptmann S., Thieme ,** *The Chemistry of Heterocylcles*, 2002.
3. **Joule J. A., Mills K., Smith G. F**., *Heterocyclic Chemistry*, Chapman and Hall, 3rd Edn., 1995.
4. **Acheson R. M.,** *An introduction to the Heterocyclic compounds*, John Wiley, 3rd Edn, 1976.
5. **Gilchrist T. L.,** *Heterocyclic chemistry*, Longman scientific technical, 1987.