Second Year of M. Sc.(Physics)
M. Sc. II, Semester – IV

	L	T	P	C
MC 202: ORGANIC CHEMISTRY – I	**3**	**1**	**2**	**5**

- **CYCLOALKANES AND DIENES** **(04 Hours)**
  Cycloalkanes: Nomenclature, methods of formation, chemical reactions, Baeyer's strain theory and it's limitations, theory of strainless ring. Dienes: Nomenclature, classification, methods of formation of butadiene, chemical reactions, 1,2 and 1,4 additions, Diel's – Alder reaction.

- **BENZENE AND ITS HOMOLOGUES** **(06 Hours)**
  Aromaticity, Mobius and Huckel polyenes, Huckel rule, annulene, mechanism of substitution reactions, directive effects of substituents, *o*, *p* and *m*-directing groups, effect of substituents on reactivity, theory of activity and deactivity effects. Fused ring compounds: Chemistry of naphthalene, anthracene and phenanthrene.

- **UNIT PROCESSES** **(06 Hours)**
  Sulphonation: Definition, methods, sulphonating agents, sulphonation of benzene with the help of SO_3 , H_2SO_4, oleum and $ClSO_3H$ Nitration: Definition, methods, nitrating agents, factors affecting nitration, nitration of benzene, naphthalene, importance of nitration in manufacture of artificial perfume.

- **HETROCYCLIC COMPOUNDS** **(07 Hours)**
  Nomenclature, aromaticity, synthesis, properties, uses and canonical structures of pyrrole, furan and thiophene.

- **CARBOHYDRATES** **(05 Hours)**
  Introduction to disaccharides, glycosidic bond, structure determination of sucrose, lactose, maltose and cellobiose.

- **PHOTOCHEMISTRY** **(06 Hours)**
  Laws of photochemistry, nature of electronically excited states, geometry, dipole moment, acid base properties, internal conversion, intersystem crossing, phosphorescence, fluorescence, quantum yield, examples of low and high quantum yield, actinometry, rate of photochemical reactions, photochemical reactions of >C=C<, >C=O, benzene ring, and nitrogen containing compounds, photooxygenations, photochemistry of air and air pollution, chemi- and bioluminescence.

- **COMPOUND CONTANING ACTIVE METHYLENE GROUP** **(02 Hours)**
  Malonic ester and acetoacetic ester: preparation and its synthetic applications.

- **PETROCHEMICALS** **(06 Hours)**
  Petrochemicals obtained from C_1 cut of petroleum, manufacture and applications of ammonia, formaldehyde, hexamethylene tetramine, chlorinated methane. Petrochemicals obtained from C_2 cut of petroleum, manufacture and applications of chemicals obtained from ethanol, acetaldehyde (Wacker Cheime Process), ethylene dioxide, ethylene glycol.

(Total Contact Time (Theory): 42 Hours)

BOOKS RECOMMENDED:

1. **Morrison R. T. and Boyd R.N.,** '*Organic Chemistry'*, 6th Edn., Prentice Hall, 1992.
2. **Bahl A. and Bahl B. S.**, '*A Textbook of organic Chemistry'*, 2nd Edn., S. Chand, 2005.
3. **Kumar S**., '*Introduction to Petrochemicals'*. 6th Edn, Oxford & IBH, 2000.
4. **March J**., *'Inorganic Chemistry'*, 5th Edn., S. Chand, 2001.
5. **Finar I. L**., '*Organic Chemistry*' volume 1 &2 6th edition Longman, London 2006.