

PAPER CODE: 1SC2030301	TITLE OF PAPER: ORGANIC CHEMISTRY-I
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Course Objective: To impart knowledge and training in chemistry at advanced level, make aware with recent analytical technique, use of reagents and reactions in laboratory, synthesis and study of materials, the exploration of their properties and development of ways to use the mineral life.

Teaching scheme (hours) per week		Credit		Theory Marks		Practical Marks		Total
Theory	Practical	Theory	Practical	University Assessment	Cont. Assessment	University Assessment	Cont. Assessment	
4	-	4	-	60	40	-	-	100

UNIT	DISCRIPTION IN DETAIL	WEIGHTAGE
I	Asymmetric synthesis Principles and applications of asymmetric synthesis: Chiral auxiliaries, methods of asymmetric induction – substrate, reagent and catalyst controlled reactions stereoselectivity in cyclic compounds, enantio-selectivity, diastereo-selectivity, Methods of determination of enantiomer purity, polarimeter enantiomeric and diastereomeric excess, stereoselective aldol reactions. Cram's rule, Felkin-Anh rule, Cram's chelate model, asymmetric epoxidation and asymmetric dihydroxylation. i) Asymmetric hydrogenation using chiral Wilkinson biphosphine and Noyori catalysts; approaches to L- DOPA and L- α - amino acids. ii) Asymmetric aldol reaction and asymmetric Diels-Alder reaction. iii) Chiron approach to stereoselective synthesis of (-) PGE ₂ and (-) shikimic acid.	25%
II	Elimination reactions α , β and γ elimination reaction, regioselectivity of the elimination, E ₁ CB mechanism, E ₂ Mechanism, Hoffmann degradation of quaternary ammonium salt, dehalogenation, E _i mechanism, Chugaev reaction, cope elimination, pyrolysis of selenoxide and sulfoxide, dehydration of aldoxime.	25%

III	Name reactions (synthesis of alkene) Shapiro reaction, petersen synthesis, Julia olefination, McMurry reaction, Wittig reaction, Corey-Fuchs reaction, Appel reaction, DEAD reagent, Corey-Winter, Tebbe reagent, Eschenmore fragmentation. Multi-component reactions: Ugi, Passerini, Biginelli and Mannich reactions Ring formation reactions: Pausan-Khand, Bergman and Nazarov cyclization.	25%
IV	Advanced Chemistry of Carbohydrates, Nucleosides and Nucleotides Carbohydrates: Structures; Reactions at the anomeric centre; Reactions at the non-anomeric centre; protection-deprotection; chemical synthesis of oligosaccharides; chiral pool; natural products; Nucleosides: Structures; Modification of carbohydrate moiety; Modification of heterocycle moiety; ring conformation; DNA and RNA; oligonucleotide synthesis; PNA, LNA and other unnatural oligonucleotides.	25%

Learning Outcomes

Students can understand the atomic and molecular basis of organic chemistry. They can know the impact of organic chemistry on the fields of medicine, pharmacy and its impact on the global economy. They can understand the fundamental principles of molecular structure and shape as they relate to organic molecules and their properties. They can identify organic molecules by functional group: alkane, alkene, alkyne, haloalkane, alcohol, thiol, ether, sulfide, amine, aldehyde, ketone, carboxylic acid and carboxylic acid derivatives.

List of Books

1. *Principles of Organic Synthesis*: R.O.C Norman & J.M. Coxon (ELBS)
2. *Mechanism in Organic Chemistry*: Peter Sykes (Orient Longman)
3. *Modern Methods of Organic Synthesis*: W. Carruthers (Cambridge)
4. *Organic Reaction Mechanism*: V.K.Ahluwalia and R.K.Parashar (Narosa)
5. *Advanced organic chemistry* part-A F.A.Carey and R.G.Sundbreg
6. *Stereochemistry of carbon compounds* by E.L.Eliel
7. *Stereochemistry of organic compounds* by Nasipuri
8. *Advanced Organic chemistry reaction mechanism and structure* by Jerry March
9. *Organic chemistry* by J. Clayden, Oxford University Press
10. *Reaction Mechanism in Organic chemistry* by S.M.Mechanism and S.P.Singh
11. *Pericyclic reaction* by Jagdamba singh
12. *Principles of organic synthesis* R O C Norman and J.M. Coxon. Blackie academic and Professional
13. *A Guide book to Mechanism in organic chemistry*, Peter Sykes Longman
14. *Organic chemistry* by R.T. Morrison and R.N. Boyd, Prentice-Hall.
15. *Reaction and mechanism in organic chemistry* by P.S. Kalsi, New Age International.
16. *Organic Reactions, Stereochemistry and Mechanism*: P.S. Kalsi (New Age.)

