BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI – Hyderabad Campus
SECOND SEMESTER 2023-24
Course Handout Part II

Date: 09-01-2024

In addition to Part-I (General Handout for all courses appended to the time table) this portion gives further details regarding the course.

Course No: **CHEM F243**
Course Title: **Organic Chemistry-II**
Instructor-in-charge: **Anupam Bhattacharya**
Instructor: **Manab Chakravarty**

1. Scope and objective of the course: Stereochemistry is highly important to most life-saving drugs, many materials that cater to our essential needs. Hence, this course will familiarize the students with stereochemical concepts and their applications in organic synthesis; important functional group transformations, and pericyclic reactions. Emphasis will be placed not only on the mechanistic and stereoelectronic features but also on how they are utilized in target synthesis.

2. Text Books: E. L. Eliel, S. H. Wilen & L. N. Mander, Stereochemistry of Organic Compounds, John Wiley & Sons, 1st Ed., 2004. **(T1)**

Michael B. Smith & Jerry March, Advanced Organic Chemistry, John Wiley & Sons, 6th ed., 2012. **(T2)**

Reference Books:

J. Clayden, N. Greeves, S. Warren, P. Wothers, Organic Chemistry, OUP, 1st ed., 2000. **(R1)**
R. T. Morrison, R. Boyd and S. K. Bhattacharjee, Organic Chemistry, 7th ed. **(R2)**
Subrata Sengupta, Basic Stereochemistry of organic molecules, Oxford University Press **(R3)**

3. Course Plan:

Lec. No.	Topics to be Covered	Learning objectives	Text book (topic no.)

1-2	Nature of stereoisomers, Enantiomers and Diastereomers	Introduction to stereoisomers; identifying enantiomers and diastereomers; also to understand their difference	**T1**: Ch. 3, pg. 49-69.
3-5	Symmetry elements, symmetry operators, symmetry and molecular properties.	Introduction to symmetry elements; to identify symmetry elements in molecules; associate molecules with symmetry point groups.	**T1**: Ch. 4, pg. 71-87, 92-97
6-8	Relative and absolute configuration, relative configuration and notation, determination of relative configuration	What is meant by relative and absolute configuration? How relative configuration is determined? Rules governing R/S nomenclature (absolute configuration).	**T1**: Ch. 5, pg. 101-112, 117-123, 126-128, 130-144
9-10	Introduction, nomenclature, allenes	Chirality in molecules devoid of chiral centers – 1. Why these molecules are considered as chiral? Important examples and their applications.	**T1**: Ch. 14, pg. 1119-24, 1132
11-13	Alkylidenecycloalkanes, Spriranes, Biphenyl atropisomersism, Molecules with planar chirality	Chirality in molecules devoid of chiral centers -2. Why these molecules are considered as chiral? Important examples and their applications.	**T1**: Ch. 14, pg. 1133-50, 1166-76
14-15	*cis-trans* isomerism, determination of configuration of *cis-trans* isomers by chemical & physical methods	Stereochemistry of alkenes; E-Z nomenclature of alkenes; methods for the determination of configuration.	**T1**: Ch. 9, pg. 539-574
16-17	Conformation of unsaturated acyclic and miscellaneous molecules	What is conformation of a molecule? Importance and important examples. Conformation of acyclic molecules;	**T1**: Ch. 10, pg. 597-627

		identifying stable and unstable conformations. What are the various interactions leading to stable/unstable conformations?	
18-20	Conformational aspects of the chemistry of six membered ring compounds	Understanding the conformations of cyclic molecules; identifying stable and unstable conformations. What are the various interactions leading to stable/unstable conformations in cyclohexane?	**T1**: Ch. 10, pg. 665-754
21-29	Types of Pericyclic reactions (electrocyclic, cycloaddition & sigmatropic), correlation diagrams, FMO approach & PMO approach, Woodward-Hofmann rules	Pericyclic reactions; type; mechanism and applications	**R2**: Ch. 20 1032-1048, Lecture notes
30-35	Different reaction mechanisms involved in organic transformations such as SN1/SN2/SN'/SNi, neighboring group mechanism E1, E2, E1cB, addition to C=C double bond.	Understand diverse reaction mechanism, ranging from substitution to elimination. Non-classical carbocations, reason for their stability and examples.	**T2** : Ch. 10: 425-519, Ch. 17: 1477-1506, Lecture notes
36-40	Resolution and stereoselective synthesis	Asymmetric synthesis; common approaches	**R1** : Ch.16, 399-404, Ch.34, 881-904, Lecture notes

4. Evaluation Scheme:

Component	Duration	Weightage	Date & Time	Remarks

		(%)		
Midsem Examination	90 min	25	15/03 - 9.30 - 11.00AM	**Closed Book**
Class tests*	15 min	30	Continuous	**Open Book**
Comprehensive Examination	3 hrs	45	16/05 FN	**Closed book**

***Equal numbers of class tests will be conducted before and after the mid-semester examination.**

5. Make-up(s) will be granted only for genuine reasons.

6. Chamber consultation hours: To be announced in the class.

7. Notices: All the notices pertaining to this course will be displayed on the **Chemistry Department Notice Board or CMS**.

8. Academic Integrity Policy: It is expected that in compliance with institute rules and regulations, academic integrity should be adhered to in all the evaluation components. Malpractice in any form will have serious implications

9. Course Policies:

(a) **Absences:** Students are responsible for all materials presented in the course as well as for acquiring missed information.

(b) **Electronic Devices: Cell phones must be turned off in class.** All electronic devices must be off during class or exams unless specifically informed by the course instructors. This includes laptop computers as well as programmable calculators. You will be allowed only a simple scientific calculator for exams (if required).

Instructor-in-Charge
CHEM F243