BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI – Hyderabad Campus
SECOND SEMESTER 2021-22
Course Handout Part II

Date: 15-01-2022

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: **Manab Chakravarty**
Instructor: **Arijit Mukherjee**

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	Chapter in the Text Book

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
21-26	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
27-31	Resolution and stereoselective synthesis	Asymmetric synthesis; common approaches	**R1** : Ch.16, 399-404, Ch.34, 881-904, Lecture notes
32-40	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

4. Evaluation Scheme:

Component	Duration	Weightage	Date & Time	Nature of Component

		(%)		
Midsem Examination	90 min	30	16/03 9.00am to10.30am	**Closed Book**
Class tests*	15 min	20	Continuous	**Open Book**
Assignment/HW/Seminar	-	10	Continuous	**Open book**
Comprehensive Examination	2 hrs	40	19/05 FN	**Closed book**

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 **Chemistry Department Notice Board and CMS**.
8. **Academic Honesty and Integrity Policy:** Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.
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. 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