

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI – Hyderabad
Campus
Second SEMESTER 2019-2020
Course Handout Part II

Date: 10-01-

2020

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 G531**

Course Title: **Recent Advances in Chemistry**

Instructor-in-charge: **Anupam Bhattacharyya**

Description: The course is aimed at providing an overview of recent developments in selected areas of chemistry. Topics to be covered may be drawn from: modern theories of structure, bonding and reactivity, spectroscopy, chemical dynamics, phase transitions, surface phenomena, solid state materials, and synthetic and mechanistic organic and inorganic chemistry, or such other topics as may emerge in the development of the subject.

1. Scope and objective of the course: Stereochemistry is highly important to the most of the life-saving drugs, many materials that cater our essential needs. Hence this course is to 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 the way in which they are utilised 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.	Learning objectives	Topics to be Covered	Text book (topic no.)
1-2	Introduction Stereoisomers	Nature of stereoisomers, Enantiomers and Diastereomers	T1: Ch. 3, pg. 49-69.
3-5	Symmetry	Symmetry elements, symmetry operators, symmetry and molecular properties.	T1: Ch. 4, pg. 71-87, 92-97

6-8	Configuration	Relative and absolute configuration, relative configuration and notation, determination of relative configuration	T1: Ch. 5, pg. 101-112, 117-123, 126-128, 130-144
9-10	Chirality in molecules devoid of chiral centers - 1	Introduction, nomenclature, allenes	T1: Ch. 14, pg. 1119-24, 1132
11-13	Chirality in molecules devoid of chiral centers - 2	Alkylidenecycloalkanes, Spiranes, Biphenyl atropisomerism, Molecules with planar chirality	T1: Ch. 14, pg. 1133-50, 1166-76
14-15	Stereochemistry of alkenes	<i>cis-trans</i> isomerism, determination of configuration of <i>cis-trans</i> isomers by chemical & physical methods	T1: Ch. 9, pg. 539-574
16-17	Conformation of acyclic molecules	Conformation of unsaturated acyclic and miscellaneous molecules	T1: Ch. 10, pg. 597-627
18-20	Conformations of cyclic molecules	Conformational aspects of the chemistry of six membered ring compounds	T1: Ch. 10, pg. 665-754
21-26	Reaction mechanism	Different reaction mechanisms involved in organic transformations such as SN1/SN2/SN'/S _N i, neighboring group mechanism E1, E2, E1cB, addition to C=C double bond.	T2 : Ch. 10: 425-519, Ch. 17: 1477-1506, Lecture notes
27-30	Asymmetric synthesis	Resolution and stereoselective synthesis	R1 : Ch.16, 399-404, Ch.34, 881-904, Lecture notes
31-38	Pericyclic reactions	Types of Pericyclic reactions (electrocyclic, cycloaddition & sigmatropic), correlation diagrams, FMO approach & PMO approach, Woodward-Hofmann rules	R2: Ch. 20 1032-1048, Lecture notes

4. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Remarks
Midsem	90min	20	Will be Announced	Closed Book
Seminar	10 min	40	Will be Announced	Closed Book
Comprehensive Examination	3 hrs	40		Open 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 only.

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.

**Instructor-in-
Charge**