



SECOND SEMESTER 2020-2021
Course Handout Part II

Date: 17.01.2021

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: **ANIL KUMAR**
Instructor: **Anil Kumar**

1. Scope and objective of the course: To familiarize the students with stereochemical concepts and their applications in organic synthesis; important functional group transformations; pericyclic reactions. Emphasis will be placed not only on the mechanistic and stereoelectronic features but also in preparation of optically active compounds.

Course learning outcome: After successful completion of the course, students will be able to understand:

- Principal of resolution of a racemic mixture
- Preparation & usefulness of optical active compounds
- Stereochemical aspects of the substitution and elimination reactions
- Thermal and photochemical reactions
- Mechanisms of pericyclic reactions
- Pericyclic reactions & various stereochemical notations

2. Text Book:

T1: E. L. Eliel, S. H. Wilen, L. N. Mander, John Wiley & Sons, 1st Ed., 2004

T2: Michael B. Smith & Jerry March, March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, John Wiley & Sons, 6th ed., 2007

3. Reference Books:

R1: J. Clayden, N. Greeves, S. Warren, P. Wothers, Organic Chemistry, OUP, 1st ed., 2000.

R2: R. T. Morrison, R. Boyd and S. K. Bhattacharjee, Organic Chemistry, 7th edition

R3: Francis A. Carey, Richard J. Sundberg, Advanced Organic Chemistry: Part A: Structure and Mechanisms, Springer; 5th edition, 2008

R4: Photochemistry and Pericyclic Reactions, New Academic Science, 3rd Edition, 2009

4. Course Plan:

Lect. No.	Learning objectives	Topics to be covered	Text book (topic no.)
1-2	Symmetry	Symmetry elements, symmetry operators, symmetry and molecular properties.	T1: Ch. 4, P. 71-87, 92-97
3-4	Introduction Stereoisomers	Nature of stereoisomers, Enantiomers and Diastereomers	T1: Ch. 3, P. 49-69.
5-7	Configuration	Absolute configuration, relative configuration and notation, determination of relative configuration,	T1: Ch. 5, P. 101-112, 117-123, 126-128, 130-144
8-9	Chirality in molecules devoid of chiral centers-1	Introduction, nomenclature, allenes	T1: Ch. 14, P. 1119-24, 1132



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10-12	Chirality in molecules devoid of chiral centers -2	Alkylidenecycloalkanes, Spiranes, biphenyl atropisomerism, molecules with planar chirality	T1: Ch. 14, P. 1133-50, 1166-76
13-14	Stereochemistry of alkenes	Cis-trans isomerism, determination of configuration of cis-trans isomers by chemical & physical methods	T1: Ch. 9, P. 539-574
15-17	Conformation of acyclic molecules	Conformation of unsaturated acyclic and miscellaneous molecules	T1: Ch. 10, P. 597-627
18-20	Conformations of cyclic molecules	Conformational aspects of the chemistry of six membered ring compounds	T1: Ch. 10, P. 665-754
21-23	Reaction mechanism	Revision of basic mechanisms, neighboring group participation in mechanism, E1cB	T2 : Ch. 10, P. 293-369, Ch. 17, 982-1006, Ch 23, P. 1149-1154; Lecture notes
24-28	Asymmetric synthesis	Resolution and stereoselective synthesis	T1: Ch. 12, P. 835-843, 858-886, 894-902, 905-908, 913-932, 947-952, R1 : Ch. 16, P. 399-404, Ch. 34, P. 881-904; Lecture notes
29-31	Pericyclic reactions-I	Introduction to pericyclic reactions, correlation diagrams, FMO approach & PMO approach, Woodward-Hofmann orbital symmetry rules	T2, Ch. 20, P. 1032-1040; Lecture notes
32-34	Pericyclic reactions-II	Electrocyclic reactions, chelotropic reaction	T2: Ch. 20, P. 1040-1048, Lecture notes
35-36	Pericyclic reactions-III	Sigmatropic reactions, cycloaddition reactions: Diels-Alder, Ene and 1,3-dipolar cycloaddition reactions.	T2, Ch. 20, P. 1048-1058, Lecture notes
37-40	Organic Photochemistry	α - and β -cleavage, intramolecular hydrogen abstraction, addition to π -systems, intramolecular Paterno - Buchi reaction, application of photochemistry	T2: Ch. 21, P. 1064-1090; Lecture notes

5. Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Remarks
Mid-term test	90 min.	25	TBA	-
Assignments/Quiz/	-	35	Continuous	-
Comprehensive Examination	120 min.	40	05/05 FN	-

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

7. Chamber consultation hours: Monday 4.00-5.00 PM

8. Notices: All the notices pertaining to this course will be displayed on Department of Chemistry, Notice Board/will be shared through BITS email only.

Instructor-in-Charge
 CHEM F243