

OC 831: Selected Topics in Organic Chemistry

Credit: 3

Semester: 4

A. Objective of the course:

- The importance of conformational analysis and the dependence of chemical reactions/properties on conformation will be dealt.
- To look into the origin of Asymmetric synthesis and its applications in industries.
- Students will be exposed to non-conventional organic synthesis using physical methods such as microwave and ultrasound.
- A brief introduction to air and water pollution and remedial measures will be given.

B. Outline of the course:

Sr. No.	Title of Unit	Minimum No. of hrs.
1.	Concepts of Stereochemistry	08
2.	Asymmetric Synthesis	08
3.	Pericyclic Reactions	08
4.	Catalysis	08
5.	Physical Methods for Organic Reactions	07
6.	Miscellaneous	06

C. Detailed Syllabus:

Sr. No	Title of Unit	Min No. of hrs.	Weightage (%)
1.	Concepts of Stereochemistry	08	18
	Conformational Analysis of acyclic, cyclic and Fused Systems		
2.	Asymmetric Synthesis	08	18
	Resolution – Optical and Kinetic Determination of enantiomeric /diastereomeric excess Methods of asymmetric induction-substrate, reagents and catalyst controlled reactions		
3.	Pericyclic Reactions	08	18
	Electrocyclic, Cycloaddition, and Sigmatropic Reactions Principles and Application of Photochemical reaction in Organic Chemistry		
4.	Catalysis	08	18
	Introduction, The Basics of catalysis, Homogeneous catalysis, Heterogeneous catalysis and Biocatalysis		
5.	Physical Methods for Organic Reactions	07	16
	Microwave assisted organic synthesis: Theory and Applications		

#### D. Pedagogy:

Subject matters will be discussed in interactive class room sessions using classical black-board teaching to power-point presentations. Interactive session in the form of seminars will be conducted by respective faculty members on weekly basis. Each student will give one seminar in a course. Problem solving sessions will also be conducted by respective faculty members on weekly basis. Course materials will be provided to the students from various primary and secondary sources of information. Internal test and quiz will be conducted as a part of continuous evaluation and suggestions will be given to students in order to improve their performance.

#### E. Student Learning Outcomes / objectives:

- It is aimed that the students will recognize the remarkable predictive power of two simple methods, Huckel & first order perturbation.
- Ensuring that the students can appreciate the assumptions involved for improved molecular orbital calculations like Pariser Parr Pople calculations etc.
- The students will know the importance of the predictive power of Hammett linear free energy relationship.

#### F. References:

1. Molecular Orbital theory of organic Chemistry by M. J. S. Dewar, Publisher: McGraw -Hill, New York.
2. Molecular Orbital theory for organic Chemists by A. Streitwieser, Publisher: Wiley, New York
3. Valence by C.A. Coulson, Publisher: Oxford University Press, London and New York.
4. Chemical applications of group theory by F.A. Cotton, Publisher: Wiley Interscience, New York.
5. Quantum mechanics for Organic Chemists by Howard E. Zimmerman, Publisher: Academic Press, New York.
6. Approximate Molecular orbital Theory by J. Pople and D.L. Beveridge, Publisher: McGraw Hill, New York.
7. Group Theory and Symmetry in Chemistry by L.H. Hall Publisher: McGraw -Hill Book Company.

	Ultrasound assisted organic synthesis: Theory and Applications		
6.	Miscellaneous	06	12
	Introduction to Environmental Chemistry Synthesis of Vitamins (Vitamin B <sub>1</sub> , B <sub>6</sub> , C and Biotin)		

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#### E. Student Learning Outcomes / objectives:

- The topics are so designed to provide students important concepts on conformational analysis and how do conformations govern chemical reactions/properties. *Entrepreneurship*
- Ensuring that the students can recognize the importance of non-conventional synthesis using microwave and ultrasound. *Employability*
- The students will gain knowledge about the importance of Asymmetric synthesis. *Entrepreneurship*
- The dangers posed by water and air pollution and remedial measures will be discussed and this will help the students to address the problems which common citizen face. *Employability*

#### F. References:

1. Practical Microwave synthesis for Organic Chemist by C. Oliver Kappe, Publisher: Wiley-VCH.
2. Review "Ultrasound in Synthetic Organic Chemistry" by Timothy J. Mason. Chemical Society Reviews 1997, Vol. 26, Page No. 443-451.
3. Stereochemistry of carbon compounds by E. L. Eliel, Publisher: McGraw Hill.
4. Stereochemistry and mechanism through solved problems by P. S. Kalsi, Publisher: Wiley Eastern Ltd.
5. Stereochemistry: Conformation and Mechanism P. S. Kalsi, Publisher: New Age International.
6. Stereochemistry of organic compounds by D. Nasipuri, Publisher: New Academic Sciences.
7. Organic Chemistry Vol 2 by I. L. Finar, Publisher: ELBS Publication.
8. Environmental Chemistry by Samir K Banerji, Publisher: Prentice -Hall of India Pvt. Ltd
9. Catalysis: Concepts and Green Applications by Gadi Rothenberg, Publisher: Wiley-VCH Verlag GmbH & Co.