

20CY209 ADVANCED ORGANIC CHEMISTRY (EL - I)

Hours Per Week :

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4	-	-	4

Course Description and Objectives:

This course offers students the basis to propose the retrosynthetic analysis to carry out organic reactions. Use of protecting and deprotecting groups with introduction to organometallic catalysis via organometallic and modern reagent will be taught for construction of C-C, C=C, C≡C bond formation. Finally, this course will help student in understanding the biosynthesis of some of the important natural products and design a retrosynthetic strategy for few natural products.

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes
1.	Design and construct the retrosynthetic strategy for an organic reactions in 3-4 steps.
2.	Apply the concepts of protecting and deprotecting groups involved during functional transformation.
3.	Apply some of common organometallic reagents to carry out the some of the important steps in an organic protocol.
4.	Apply some of the modern reagents towards C-C, C=C, C≡C bond formation.
5.	Investigate the pathways to mimic biosynthesis of natural products such as Terpenes- alkaloids, carbohydrates: amino acids and steroids.

UNIT - I :

Retrosynthetic analysis, Strategy and Problems : Synthetic analysis and Planning: Retrosynthetic analysis, synthetic equivalent, control of stereochemistry, Retrosynthesis-principles, synthons, disconnections (1/2 bond). Three to four steps synthesis using common and basic organic reactions. Problem solving

UNIT - II :

Protection and Deprotection Techniques : Protecting Groups for Alcohols: ester, ether, TBDMS, Protection of 1,2 and 1,3-diols: Cyclic Acetal, Protecting Groups of Aldehydes and Ketones, Protecting Group of Carboxylic Acid, Protecting Groups of Amino Groups: Boc, CBz, etc. Use of protecting groups in multi-step synthesis: Different protection and deprotection methods

UNIT - III :

Organometallic reagents : Introduction to organometallic catalysis. Grubbs catalysts, Sonagashira, Negishi, Suzuki, Stille, Kumada, Heck coupling and other reactions.

UNIT - IV :

Modern Reagents and organometallic catalysis : Modern methods for C-C, C=C, C≡C bond formation,

UNIT - V :

Chemistry of Natural Products : Biosynthesis- elementary pathways. Types of natural products. Isolation techniques. classifications, synthesis and structural aspects- Terpenes- alkaloids, carbohydrates: amino acids, steroids – selected examples

Text Books:

1. A. Carey and R. J. Sundberg, *Advanced Organic Chemistry, Part B, Fifth Edition*, 2007.
2. *Organic Chemistry*, I.L. Finar, Vol-2, 6th edition, Pearson Education.
3. E. J. Corey and X. M. Cheng, *The Logics of Chemical Synthesis*, Wiley, 1989.
4. M. Nogrady, *Stereoselective Synthesis: A Practical Approach*, Wiley, 2008.
5. E. M. Carreira, L. Kvaerno *Classics in Stereoselective Synthesis*, Wiley-VCH: Weinheim, Germany, 2009.

Reference Books

1. K. C. Nicolaou, E. J. Sorenson, *Classics in Total Synthesis*, Wiley-VCH
2. K. C. Nicolaou, S. A. Snyder, *Classics in Total Synthesis II*, Wiley-VCH.