

Programme: M. Sc. (Chemistry, Part-II)

Course Code: OCO-504

Title of the Course: Retrosynthesis in Organic Chemistry

Number of Credits: 3

Effective from AY: 2019-20

<u>Prerequisites for the course:</u>	Should have studied the synthetic organic chemistry at M. Sc. part-I (Chemistry) levels and part II organic level CHOC-501, 502, 503 and 504 courses.	
<u>Course Objective:</u>	1. Study of various logical steps related to planning of organic synthesis. 2. To apprehend the complexity of synthesis of complex organic molecules. 3. To apply the knowledge gained in organic synthesis for making new molecules.	
<u>Course Outcome</u>	1. Students should be in a position to understand how retrosynthesis can be used in finding out easily available chemical precursors for making organic molecules. 2. Students should be in a position to apply various reactions in constructions of simple to complex molecules.	
<u>Content:</u>	1. Introduction to disconnection 2. One-Group disconnection 2.1 Disconnection of simple alcohols 2.2 Compounds derived from alcohols. 2.3 Review problems. 2.4 Disconnections of simple olefins 2.5 Disconnection of aryl ketones 2.6 Control 2.7 Disconnection of simple ketones and acids 2.8 Summary and revision 3. Two-group disconnection 3.1 1,3-Dioxygenated Skeletons 3.2 B-Hydroxy carbonyl compounds 3.3 a,b-Unsaturated carbonyl compounds. 3.4 Review problems 3.5 1,5-Diacarbonyl compounds 3.6 Mannich reaction 3.7 Summary and revision 4. 'Illogical' Two group disconnection 4.1 The 1,2-Dioxygenated Pattern (a) a-Hydroxy carbonyl compounds.	2 hours 3 hours 4 hours 8 hours

	(b) 1,2-Diols (c) 'Illogical' Electrophiles (d) Review problems 4.2 The 1,4-Dioxygenated Pattern (a) 1,4-Dicarbonyl Compounds (b) γ-Hydroxy Carbonyl Compounds. (c) Other 'Illogical' Synthons (d) Review Problems 4.3 1,6-Dicarbonyl compounds 4.4 Synthesis of lactones, Review Problems 5. General review problems. 6. Pericyclic reactions: problems 7. Heteroatom and heterocyclic compounds 7.1 Ethers and amines 7.2 Heterocyclic compounds 7.3 Amino acids 7.4 Review problems 8. Special methods for small rings. 8.1 Three-Membered Rings. 8.2 Four-membered rings. 8.3 Review Problems 9. General review problems. 10. Strategy 10.1 Convergent synthesis 10.2 Strategic Devices (a) C-Heteroatom Bonds. (b) Polycyclic compounds: The Common Atom Approach 10.3 Considering All Possible Disconnections, 10.4 Alternative FGI's Before Disconnection- The Cost of Synthesis 10.5 Features Which Dominate Strategy, 10.6 Functional Group Addition 10.7 Molecules with Unrelated Functional Groups. 10.8 Revision Problems.	2 hours 2 hours 3 hours 2 hours 2 hours 8 hours
Pedagogy:	Lectures & tutorials. Seminars / assignments / presentations / self-study or a combination of some of these could also be used	

	to some extent	
<u>References/Readings</u>	1. S. Warren, <i>Designing Organic Synthesis</i>, John Wiley & Sons. 2. G. S. Zweifel & M. H. Nantz, <i>Modern Organic Synthesis: An Introduction</i>, W.H. Freeman and Company, New York. 3. J. Clayden, N. Greeves & S. Warren, <i>Organic Chemistry</i>, Oxford, 2016.	