

**OC 824: Retrosynthetic Analysis (Organic  
synthesis: The disconnection approach)**

**Credit: 3**

**Semester: 3**

**A. Outline of the course:**

<i>Sr. No.</i>	<i>Title of Unit</i>	<i>Minimum No. of hrs.</i>
1.	Introduction	05
2.	One and two group Disconnection	11
3.	Illogical two group disconnection	06
4.	Pericyclic reactions	05
5.	Ring synthesis and synthesis of acyclic and cyclic hetero compounds	09
6.	Miscellaneous topics	09

## B. Detailed Syllabus:

Sr. No.	Title of Unit	Minimum No. of hrs	Weightage (%)
1.	<b>Introduction</b>	<b>05</b>	<b>11</b>
	Concept of synthon, synthetic equivalence, function group interconversion, concept and design of synthesis, criteria of good disconnection.		
2.	<b>One and two group Disconnection</b>	<b>11</b>	<b>24</b>
	<b>One group disconnection:</b> Disconnection and synthesis of alcohols, olefins, simple ketones, acids and its derivative. <b>Two group disconnection:</b> Disconnections in 1,3-dioxygenated skeletons, preparation of $\beta$ -hydroxy carbonyl compounds, $\alpha$ , $\beta$ -unsaturated carbonyl compounds 1,3-dicarbonyls, 1,5-dicarbonyls and use of Mannich reaction.		
3.	<b>Illogical two group disconnection</b>	<b>06</b>	<b>13</b>
	Disconnection and synthesis of $\alpha$ -hydroxyl carbonyl compounds, 1,2-diols, 1,4 and 1,6-dicarbonyl compounds.		
4.	<b>Pericyclic reactions</b>	<b>05</b>	<b>11</b>
	Disconnections based on Diels - alder reaction and its use in organic synthesis.		
5.	<b>Ring synthesis and synthesis of acyclic and cyclic hetero compounds</b>	<b>09</b>	<b>20</b>
	Special method for small ring preparations, synthesis of 3 and 4 member ring compounds. Synthesis of ethers, amines, nitrogen and oxygen containing acyclic and cyclic (five and six member) hetero compounds.		
6.	<b>Miscellaneous topics</b>	<b>09</b>	<b>20</b>
	<b>Protecting groups:</b> Protection of organic functional groups, protecting reagents and removal of protecting groups. <b>Umpolung of reactivity:</b> Umpolung of carbonyl group, synthesis based on umpolung of carbonyl group—synthesis of 1,2 and 1,3-diketones, cyclic ketones etc.		

### C. Pedagogy:

The topics 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.

### D. Course Outcomes (COs):

At the end of the course, the students will be able to

CO1	Ensuring that the students acquire better insight to design synthesis of molecules of choice.
CO2	At the end, students would acquire sufficient knowledge for future study/research.

- **Course Articulation matrix**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	3	3	-	-	3	3	-	3	-
CO2	3	3	3	3	-	-	3	3	3	3	-

- Correlation Levels 1, 2 or 3 defined below  
1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

### E. References:

1. Organic synthesis: the disconnection approach by Stuart Warren.  
Publisher: John Wiley and Sons (1994)
2. Selected Organic synthesis by Ian Fleming.  
Publisher: John Wiley and Sons (1977)
3. Organic synthesis: strategy and control by Paul Wyatt and Stuart Warren.  
Publisher: John Wiley and Sons (2007)
4. The logic of chemical synthesis by E. J. Corey and Xue-Min Chelg.  
Publisher: John Wiley and Sons.