

**BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI**  
**INSTRUCTION DIVISION**  
**FIRST SEMESTER 2015-2016**  
**Course Handout (Part II)**

Date: 03.08.2015

In addition to part I (general handout for all courses appended to the timetable) this portion gives specific details regarding the course.

**Course No.** : CHEM F311  
**Course Title** : Organic Chemistry - III  
**Instructor-In-Charge** : Dr. Dalip Kumar

**1. Course Description:**

This course emphasizes on applications of important reagents and reactions in organic synthesis and disconnection or *synthon* approach. In *disconnection* or *synthon* approach the target molecule is broken down by a series of disconnections into possible starting materials followed by synthesis.

**2. Scope and Objective of the Course:**

The aim of this course is to familiarize the students with retro-synthetic analysis and enable the student to design the synthesis using organic compounds using appropriate reagents.

**3. Text Book:**

**TB1:** Michael B. Smith & Jerry March, Advanced Organic Chemistry, John Wiley & Sons, 6<sup>th</sup> ed., 2012.

**TB2:** Stuart Warren: Organic Synthesis: The Disconnection Approach: John Wiley & Sons, 2004.

**Reference Books:**

**R1:** Paul Wyatt, Stuart Warren: Organic Synthesis: Strategy and Control, Wiley; 1<sup>st</sup> edition, 2007

**R2:** Morrison & Boyd, Organic Chemistry, 6<sup>th</sup> edition, Prentice-Hall, Inc., 1992.

**4. Course Plan:**

Lec. No.	Learning Objectives	Topic(s) to be Covered	Chap(s). No(s).
1.	Introduction	Organic synthesis and its applications	-
2-4	Common organic reagents	DIBAL, 9-BBN, Birch Reduction, OsO <sub>4</sub> , Ti(Oi-Pr) <sub>4</sub> , Swern Oxidation	<b>TB1:</b> class notes
5-7	Organometallic reagents	organoboranes, organosilicon reagents, organotin reagent	<b>TB1:</b> class notes
8-11	Transition metal catalyzed reactions (coupling reactions)	Carbon-carbon bond forming reactions (Suzuki, Heck, Sonogashira, Stille reaction), Carbon-nitrogen bond forming reactions (Buchwald-Hartwig reaction)	<b>TB1:</b> class notes
12	Introduction of disconnection approach	Basic principles of disconnection approach in organic synthesis	<b>TB2:</b> 1
13-14	Synthesis of aromatic Compounds	Basic Principles: Synthesis of Aromatic Compounds, The Order of Events	<b>TB2:</b> 2, 3
15-24	One group C-X and C-C disconnections	One Group C-X Disconnections, Chemoselectivity, Synthesis of Alcohols, General Strategy of Choosing Disconnection, Stereoselectivity, Synthesis of Carbonyl Compounds, Regioselectivity, Alkene Synthesis, Use of acetylenes for synthesis.	<b>TB2:</b> 4, 5, 10-16

25-34	Two group C-X and C-C disconnections	Two Group C-X Disconnections, Reversal of Polarity, Cyclisation Reactions, Summary of Strategy, Amine Synthesis, Diels-Alder Reactions, 1,3-Difunctionalised Compounds and $\alpha,\beta$ -Unsaturated Carbonyl Compounds, Control in Carbonyl Condensations, 1,5-Difunctionalised Compounds, Michael addition and Robinson annelation, Use of Aliphatic Nitro Compounds in Synthesis, 1,2-Difunctionalised compounds, FGA and its Reverse, 1,4-Difunctionalised Compounds, Reconnections, 1,6-Difunctionalised Compounds, Strategy of Carbonyl Disconnections.	<b>TB2:</b> 6-9, 17-28
35-38	Ring synthesis (Saturated heterocycles)	Introduction to Ring synthesis, Synthesis of three, four, five and six membered Rings and General strategy of Ring Synthesis	<b>TB2:</b> 29, 30, 32, 34, 36, 37.
39-40	Synthesis of heterocyclic compounds	Aromatic Heterocycles and Advanced Strategy	<b>TB2:</b> 39, 40

### 5. Evaluation scheme

Component	Duration	Weightage (%)	Date and Time	Remarks
Mid Term Test	90 min.	35	6/10 2:00 - 3:30 PM	Close Book
Assignments/Quiz	----	20	Continuous	Close Book
Compre. Exam.	3 hrs.	45	4/12 FN	Partially Open Book

**6. Chamber Consultation Hour:** To be announced in the class.

**7. Notices:** Notices concerning the course will be displayed on Chemistry Department notice board only.

**Instructor-in-Charge**  
**CHEM F311**  
**Organic Chemistry III**