

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
HYDERABAD CAMPUS
INSTRUCTION DIVISION
FIRST SEMESTER 2016-2017
Course Handout (Part II)

Date: 01-08-2016

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 : Anupam Bhattacharya

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 retrosynthetic 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, 6th ed., 2012.

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

Reference Books:

R1: Carruthers and Coldham, Modern Methods of Organic Synthesis, Cambridge, 4th edition, 2004.

R2: Fuhrhop and Li, Organic Synthesis: Concepts and Methods; Wiley, 3rd edition, 2014.

4. Course Plan:

Lec. No.	Learning Objectives	Topic(s) to be Covered	Chap(s). No(s).
1	Introduction	Organic synthesis and its applications	Class notes
2-5	Common organic reagents	NaBH ₄ (SS), LAH(SS), DIBAL, BH ₃ , Birch reduction, Swern oxidation, OsO ₄ , O ₃ (SS), DMP, m-CPBA(SS), Ti(Oi-Pr) ₄ , Lindlar catalyst, NBS (SS), NaIO ₄ (SS)	TB1: 15-13; class notes, SS: self-study
6-9	Organometallic reagents	Grignard reagent(SS), organolithium reagents (SS), organocuprates (SS), organozinc reagents, organoboranes, organosilicon reagents, organotin compound.	Class notes, SS: self-study
10-12	Transition metal catalyzed organic reactions	C-C bond forming reactions (Suzuki, Heck, Negishi, Sonogashira, Stille reaction), C-N bond forming reactions (Buchwald-Hartwig reaction)	TB1: 13-12, 13-10, class notes
13-14	Introduction of disconnection approach	Basic principles of disconnection approach in organic synthesis	TB2: 1
15-18	Synthesis of aromatic Compounds	Basic Principles: Synthesis of Aromatic Compounds, The Order of Events	TB2: 2, 3

19-26	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.	TB2: 4, 5, 10-16
27-33	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 α,β -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.	TB2: 6-9, 17-28
34-37	Ring synthesis (saturated heterocycles)	Introduction to Ring synthesis, Synthesis of three, four, five and six membered Rings and general strategy of Ring Synthesis	TB2: 29, 30, 32, 34, 36, 37
38-42	Synthesis of heterocyclic compounds	Aromatic Heterocycles and advanced strategy	TB2: 39, 40

5. Evaluation scheme.

Component	Duration	Weightage (%)	Date and Time	Remarks
Test 1	1 hr	20	13/9, 10.00—11.00 AM	Closed Book
Test 2	1 hr	20	21/10, 10.00—11.00 AM	Closed Book
Class tests	15 min	20	Continuous	Closed Book
Comprehensive Examination	3 hrs	40 (20% open book)	14/12 AN	Closed/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**