2nd Semester 2015-16
Course Handout (Part II)

Date: 8th Jan, 2016

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further details regarding the course.

Course No: **CHEM F415**

Course Title: **Frontiers in Organic Chemistry**

Instructor-in-charge: **Rajeev Sakhuja**

1. Scope and objective of the course: This course is designed to give understanding of traditional organic reactions and synthesis up through modern synthetic reactions with concurrent development of strategies for synthesis design. An emphasis will be placed on assembling the most important reaction methodologies in the context of complex molecule synthesis.

2. Text Book:

1. Paul Wyatt & Stuart Warren, Organic Synthesis: Strategy and Control, Wiley.

Reference Books:

R1. J. Clayden, N. Greeves, S. Warren, P. Wothers, Organic Chemistry, Oxford University Press.

R2. Reviews on selective topics.

3. Course Plan:

Lec. No.	Learning objectives	Topics to be Covered	Page No
1-6	Introduction: Planning organic synthesis	Background of *Chemo*-, *Regio*- and *Stereo*- Selectivity with relevant examples (brief).	**TB:** Ch 2,3,4
7-12	Cross Coupling reactions	Introduction and selective examples on metal-catalyzed sp, sp^2 and sp^3 C-C formation and C-X (X=heteroatom) couplings.	**TB:** Ch 15 and Class notes
13-17	Metal catalyzed cyclization	Metal-catalyzed carbocyclization: From Ru and Rh-mediated cycloadditions to Pt and Au chemistry; Ring closing metathesis	**R1:** Ch 40, Class notes
18-22	Olefin functionalization	Direct functionalization of olefins, including hydroamination, hydrogenation, hydrosilylation, hydroformylation.	**TB:** Ch8 and Class notes

23-25	Radical chemistry	Introduction, generation of radicals using different methods and potential application for C-C and C-X bond formation.	Class notes
26-30	Metal free catalysis	Need of metal free catalysis, Introduction to the development of organocatalysis: amine catalysis (enamine and iminium ion); towards metal-free catalysis, phase transfer catalysis.	Class notes
31-34	Asymmetric Synthesis	Introduction, Chiral pool & auxiliaries, Chiral reagents, Asymmetric catalysis: formation of C-C, C-H, C-O, C-N bonds. (selective examples).	**TB**: 23, 24, 25, 26 **R1:** Ch. 41
35-40	Multi-component reactions and Tandem Reactions	Introduction and emphasis on Ugi, Mannich, Biginelli reaction, Pauson–Khand reaction, Passerini reaction. Introduction and selective examples of Tandem reactions.	**TB**: Ch. 36 and Class notes

4. Evaluation

Component	Duration	Weightage (%)	Remarks	Date and Time
Mid -Sem. Examination	90 min.	30	Closed Book	16/3 2:00 -3:30 PM
Tutorial tests/Seminar	-	25	Closed Book/power point presentation	Continuous/to be announced
Comprehensive Examination	3 hrs	45	Open Book + Closed Book	**9/5 FN**

5. Make-up(s) will be granted only for genuine reasons according to BITS guidelines.

6. Chamber consultation hours: To be announced in the class.

7. Notices: All the notices pertaining to this course will be displayed on **Department of Chemistry Notice Board only**.

Instructor-in-Charge
CHEM F415