

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
INSTRUCTION DIVISION
Course Handout

Date: 28th July, 2015

Course No: CHEM F212
 Course Title: **ORGANIC CHEMISTRY-I**
 Instructor-in-charge: ANIL KUMAR
 Instructor: Rajeev Sakhuja

1. Scope and objective of the course: To familiarize the students with basic mechanistic aspects of organic reactions including mechanistic types, thermodynamics and kinetics, the important intermediates involved in organic reactions, functional group chemistry.

2. Text Book: T1: R. T. Morrison, R. Boyd and S. K. Bhattacharjee, Organic Chemistry, 7th edition.

Reference Books: (R1) J. Clayden, N. Greeves, S. Warren, P. Wothers, Organic Chemistry

3. Course Plan:

Lec. No.	Learning objectives	Topics to be Covered	Text book , Chapter, Page no.
1-2	Basic terminology and representation of organic reactions	Homolytic, heterolytic fission of bonds, concept of electrophiles and nucleophiles; how to write organic reaction mechanisms; movement of arrows; curved and fish-hook arrows; examples	T1: Ch. 4, Pg. 55-59. R1: Ch. 5, pg. 116-131.
3-4	Reactive intermediates: carbocations	Structure, generation, stability and reactions	T1: Ch. 4, pg. 64-69.
5	Reactive intermediates: carbanions	Structure, generation, stability and reactions	T1: Ch. 4, pg. 69-72.
6	Reactive intermediates: free radicals	Structure, generation, stability and reactions	T1: Ch. 4, pg. 81-86.
7-8	Reactive intermediates: Carbenes & nitrenes	Structure, generation, stability and reactions	T1: Ch. 4, pg. 72-78.
9-12	Reactions of aromatic compounds	Aromatic nucleophilic substitutions- S_NAr & benzyne mechanism & aromatic electrophilic substitutions	T1: Ch. 5C, pg. 262-284; Ch. 9, pg. 488-502. R1: Ch. 23, pg. 589-604.
13-16	Thermodynamics and kinetics of reactions	Thermodynamic and kinetic control; Hammond postulate; methods to determine mechanisms (Hammett equation, kinetic isotopic effect); examples	T1: Ch. 4, pg. 97-102. R1: Ch. 13, pg.319-330. Ch. 22, pg. 554-556. Ch. 41, pg.1090-1101.
17-20	Functional group chemistry: Alkyl and aryl halides	Synthesis and reactions of alkyl and aryl halides	T1: Ch. 8, pg. 426-462. Ch. 9, pg. 482-485.
21-24	Functional group chemistry: Alcohols, phenol and ethers	Synthesis and reactions of alcohols, phenol, ethers and diols, acid/base catalysed ring opening reactions	T1: Ch. 10, Pg. 507-537. Ch. 11, pg. 545-562. Lecture notes (epoxides)
25-28	Functional group	Synthesis, basicity and reactions of	T1: Ch. 15, Pg. 696-736.

	chemistry: Amines and nitro compounds	amines and nitro compounds	and Lecture Notes (Nitro compounds)
29-35	Functional group chemistry: Carbonyl compounds	Synthesis, reactivity of carbonyl compounds, enolates, malonate and ethyl acetoacetate synthesis aldol, crossed aldol and Claisen condensation; conjugate addition reactions of α , β -unsaturated carbonyl compounds with special reference to Michael addition, Mannich reaction, Wittig reaction	T1: Ch. 12, Pg. 571-611. R1: Ch. 21, pg. 524-541. Lecture notes (malonate & ethyl acetoacetate)
36-38	Functional group chemistry: Carboxylic acid & derivatives	Synthesis, reactions of carboxylic acid & derivatives, conversion of acids to other derivatives	T1: Ch. 13, Pg. 624-648; Ch. 14, Pg. 657-685.
39-40	Carbohydrates	Introduction to carbohydrates and their reactions	T1: Ch. 26, Pg. 1228-1236, 1244-1253.

Component	Duration	Weightage (%)	Date and Time	Remarks
Mid-Term Test	90 min.	30	8/10 2:00 - 3:30 PM	Open Book
Tutorial tests	10 min.	25	Continuous	Closed Book
Compre. Examination	3 hr	45	9/12 FN	Closed Book

5. Make-up(s) will be granted only for genuine reasons.

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

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

**Instructor-in-Charge
Organic Chemistry - I**