

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

Date: 02/08/2016

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

1. Scope and objective of the course: Familiarize students with mechanistic, thermodynamics and kinetics aspects of chemical transformations of organic compounds, important intermediates involved in these transformations and functional group chemistry.

Student Learning Outcomes: Upon completion of CHEM F212, students should be able to

- Apply the concepts of electron pushing to the fundamental organic reaction mechanisms.
- Understand functional group chemistry, devise organic reactions, and determine organic products formed via substitution, elimination, addition and rearrangement reaction and the associated mechanisms.
- an ability to employ in the four basic areas of chemistry (analytical, inorganic, organic
- Employ critical thinking and efficient problem-solving skills in organic chemistry.
- Apply logical thinking to evaluate, analyze and use information from different sources.

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

Reference Book: (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.
1-3	Basic terminology and representation of organic reactions and determining reaction mechanism	Homolytic, heterolytic fission of bonds, concept of electrophiles and nucleophiles, curved and fish-hook arrows, movement of arrows, methods for determining mechanisms: identification of reaction intermediate, stereochemical evidence, isotope labelling, kinetic evidence.	T1: Ch. 4, Pg. 55-59. R1: Ch. 5, pg. 116-131.
4-6	Kinetics and Thermodynamics Aspects of Organic Reactions	Thermodynamic and kinetic control, Hammond postulate, Hammett equation, kinetic isotopic effect.	T1: Ch. 4, pg. 97-102. R1: Ch. 13, pg.319-330. Ch. 22, pg. 554-556. Ch. 41, pg.1090-1101.
7-12	Reactive intermediates: carbocations, carbanions, carbenes & nitrenes, free radicals	Structure, generation, stability and reactions	T1: Ch. 4, pg. 64-86.
13-16	Reactions of aromatic compounds	Aromatic nucleophilic substitutions: addition-elimination, elimination-addition (benzyne), aromatic nucleophilic substitution of hydrogen and aromatic	T1: Ch. 5C, pg. 262-284; Ch. 9, pg. 488-502. R1: Ch. 23, pg. 589-604.

		electrophilic substitutions	
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.
25-28	Functional group chemistry: Amines and nitro compounds	Synthesis, basicity and reactions of amines and nitro compounds	T1: Ch. 15, Pg. 696-736
29-35	Functional group chemistry: Carbonyl compounds	Synthesis and 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 and 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, classification and reactions.	T1: Ch. 26, Pg. 1228-1236, 1244-1253.

Component	Duration	Weightage (%)	Date and Time	Remarks
Mid-Term Exam	90 min.	30	<TEST_1>	Open Book
Tutorials	10 min.	30	Continuous	Seminar, take-home assignment and open book assignments
Compre. Examination	3 hr	40	<TEST_C>	Close 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**