DEPARTMENT OF CHEMISTRY
Faculty of Sciences

Course Outline

Course Title: ORGANIC CHEMISTRY – II

Course Code: **CHEM-373**

Course Duration: 1 semester

Credit Units: (3+1) 4 credit

Teacher: **Dr Muhammad Azhar Abbas Raja**

Department of Chemistry (Jinnah Block)

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Introduction to course

- Introduction to Reaction mechanism
- Comprehensive study on the mechanism of different types of reactions
- Oxidation and Reduction reactions
- Active Methylene Compounds
- catalyzed condensations, Conditions, mechanism and synthetic applications

Course pre-requisites

- The prerequisites is the Physical Chemistry (CHEM-181), Inorganic Chemistry (CHEM-161), Organic Chemistry (CHEM-271), chemistry special topics (CHEM-291) and (CHEM-372) in minimum grade "C" or better and promoted in VI semester in BS program by meeting the minimum criteria of Department of Chemistry.

Learning outcomes

- The main objective of this course is to build a fundamental understanding of organic reactions and reaction mechanisms. The types of reactive intermediates that will be reviewed in this course include addition reactions involving C=C, C≡C and C=O bonds, electrophilic and nucleophilic substitution reactions at aromatic systems. Active Methylene Compounds and alkylation, arylation and acylation of active methylene compounds. Conditions, mechanism and synthetic applications of various named reactions. This foundation of knowledge will allow students to attack new problems that they are faced with as they progress as scientists. This will be achieved by taking an in-depth mechanistic analysis of several synthetic processes.
- Compare and relate the selected topics with the ones in General Chemistry and generate the conceptual links between the two fields, in order to establish a broader perspective on these foundational topics.

Textbooks to be used for the course

- March, J., Advanced Organic Chemistry, Wiley, NY. (1992).
- Pine, S. H., Organic Chemistry, McGraw-Hill, New York. (1987).
- Clayden, Greeves, Warren and Wothers, Organic Chemistry, Oxford, London. (2001).
- Gould, E. S., Mechanism and Structure in Organic Chemistry, Holt, Rinehart & Winston, New York. (1959).
- House, H. O., Modern Synthetic Reactions, Benjamin, California. (1972).
- Some relevant material from internet sources.

Description of system of evaluation (Exam, assignments etc)

- Sessional 15 (Min. attendance 75 % is necessary to appear in exam)
  (Attendance, Assignment & presentation)
- Mid Term Exam 15%
- Project/Practical/Oral work 25%
- Final Exam. 45%

Detailed lesson plans for each lecture (*Weekly/Week wise*)

WEEK	CONTENT
1 - 2	REACTION MECHANISM I- (Introduction to reaction mechanism, methods of determination of reaction mechanism, comprehensive study on the mechanism of substitution, addition and elimination reaction with emphasis on their determination)
3 - 4	REACTION MECHANISM I- (comprehensive study on the mechanism of substitution, addition and elimination reaction with emphasis on their determination) Lab: ESTIMATION OF PHENOL & ACETONE.
5 - 6	OXIDATIOON AND REDUCTION (OXIDATION of saturated hydrocarbons, olefinic double bonds, aromatic rings, systems containing oxygen such as alcohols, aldehydes, ketones and dicarboxylic compounds) Lab: ESTIMATION OF AMINO GROUPS.
7 - 8	OXIDATION AND REDUCTION (oxidative decarboxylation of acids, system containing nitrogen such as amines, hydrazines and hydrazones) Lab: SYNTHESIS OF IODOFORM AND SULPHANILIC ACID
9	MID TERM Exam
10 - 11	OXIDATION AND REDUCTION (REDUCTION of cycloalkanes, alkenes, conjugated olefins, alkynes and aromatic rings.hydrogenolysis.).
12 - 13	OXIDATION AND REDUCTION (REDUCTION of benzylic and allylic systems, aldehydes and ketone, ALCOHOLS, PINACOLS, EPOXIDES, ACIDS AND THEIR

	DERIVATIVES. REDUCTION of system containing nitrogen such as imines, oximes and nitro compounds)
14 - 15	ACTIVE METHYLENE COMPOUNDS (alkylation, acylation and arylation of active methylene compounds. Acid and base catalyzed aldol condensation)
16 - 17	ACTIVE METHYLNE COMPOUNDS (conditions, mechanism and synthetic application of the following, claisen reaction, claisen- Schmidt reaction, knovenagel reaction, perkin reaction, reformatsky reaction, stobbes condensation, darzen's glycidic ester synthesis, mannich reaction and wittig reaction
18	FINAL Exam

Key dates and time of class meetings

Semester Start Date: *w.e.f* January 27, 2020.

Course	Mon	Tue	Wed	Thu
CHEM-373	02-03	02-03		02-03
				03-05 Lab