

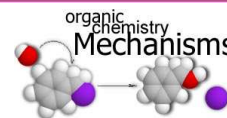
CHEM 344

# ORGANIC REACTION MECHANISM

FOR CHEMISTRY' STUDENTS, COLLEGE OF SCIENCE

PRE-REQUISITES COURSE; CHEM 241

CREDIT HOURS; 2 (2+0+0)



Prof. Mohamed El-Newehy

Dr. Zainab Almarhoon

Dr. Monirah A. Al-Shaikh

<http://fac.ksu.edu.sa/melnewehy><https://fac.ksu.edu.sa/zalmarhoon><https://faculty.ksu.edu.sa/ar/mshaikh>

Chemistry Department, College of Science, King Saud University

1

## TOPICS TO BE COVERED

- Identification of different types of organic reactions (Lectures; 2 h)
- Physical method for identification of reactions mechanism. (Lectures; 2 h)
- Nucleophilic substitution reactions ( $S_N^1$  &  $S_N^2$ ) (Lectures; 3 h)
- 1<sup>st</sup> Midterm Exam (Lectures; 1 h)
- Elimination reactions (Lectures; 3 h)
- Solving problems (Lectures; 2 h)
- Addition to carbon-carbon double bond (Lectures; 3 h)
- Addition to carbonyl group. (Lectures; 3 h)
- 2<sup>nd</sup> Midterm Exam (Lectures; 1 h)
- Aromatic substitution reactions. (Lectures; 5 h)
- Rearrangment. (Lectures; 2 h) 2

## REFERENCES

- 1) *Reaction mechanisms of organic chemistry, 9th Edition, 2001.*
- 2) *Organic reaction mechanism, 4th Edition by V.K. Ahluwalia et al., 2016.*
- 3) *Guide Book to mechanism in organic chemistry by Peter Sykes.*
- 4) *Organic reaction mechanism, Salem Alshowiman et al. (Arabic Edition).*

3

## SCHEDULE OF ASSESSMENT TASKS DURING THE SEMESTER

Assessment task	Week Due	Percentage of Total Assessment Score
1. Home work	All weeks	10 %
2. Quizzes	4,8	10 %
3. 1 <sup>st</sup> Midterm exam	5	20 %
4. 2 <sup>nd</sup> Midterm exam	9	20 %
<b>5. Final exam</b>	<b>13</b>	<b>40 %</b>

4

## COURSE OBJECTIVES

Upon successful completion of this course, the student will be able to:

- Recall the methods used for investigation the reactions mechanism, energy considerations and stereochemical considerations.
- Recognize reaction intermediates, symmetry-controlled reactions and kinetics.
- Recognize molecular rearrangements, structure-reactivity correlations and medium effect.
- Realize the use of isotopes to understand the reaction.
- Use the applications of reactions (electrophilic and nucleophilic reactions, as well as substitution, elimination and addition reactions).

5

## COURSE LEARNING OUTCOMES

### 1. Knowledge

- 1.1 To know the reaction mechanisms, kinetic and thermodynamic considerations.
- 1.2 To describe reaction intermediate, medium effect and controlled reactions.
- 1.3 To recognize and characterize the types of reactions mechanism and illustrate the principles of molecular rearrangements and structure-reactivity.

### 2. Skills

- 2.1 To compare and distinguish reactivity based on the physical and chemical properties of the molecular structure.
- 2.2 To discuss the principles of rearrangements, structure-reactivity correlations and the main differences in organic reactions mechanism
- 2.3 To apply the reaction mechanisms, stereochemistry and kinetics in identification of organic reactions.

### 3. Competence

- 3.1 To exchange ideas, principles and information and communicate the scientific information in written and oral formats

6