

School of Pharmacy

Department of Medicinal Chemistry

Course information:

Provider Group: Medicinal Chemistry

Course title: Organic Chemistry II

Credit (Theory or Practical): 3 Credits (Theory)

Responsible Lecturer: Dr. Mokhtari

Course Lecturers: Dr. Mokhtari, Dr. Golsanamlu, Dr. Asadi

Prerequisite: Organic Chemistry I

Responsible Lecturer information:

Academic rank: Assistant Professor

Specialization: Medicinal Chemistry

Workplace: School of Pharmacy

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Course Description:

- Course objectives:

This course is a continuation of Organic Chemistry I. The studies proceed to aromatic compounds, phenols, aldehydes, ketones, carboxylic acids and their functional derivatives, amines, and heterocyclic compounds. Emphasis is placed on group functionality and reaction mechanisms.

Student Learning Objectives:

1. Give names and formulas of aromatic compounds, phenols, aldehydes, ketones, carboxylic acids and their functional derivatives, amines, and heterocyclic compounds and the synthesis pathways.
2. Make clear characteristic properties of each functional group.
3. Comprehend reaction mechanisms: nucleophilic substitution, elimination, electrophilic addition, electrophilic aromatic substitution, nucleophilic addition, nucleophilic acyl substitution and

nucleophilic aromatic substitution and apply this knowledge to predict the major product in organic reactions, such as those involving aromatic compounds, amines, aldehydes, ketones, carboxylic acid and derivatives.

4. Discuss how resonance dictates reaction orientations in aromatic and conjugated systems.
5. Discuss how electron withdrawing/releasing groups (de)activate aromatic substitution.
6. Analyze the nature of a reagent: as a nucleophile, free radical, or electrophile and use this knowledge to propose the synthesis of organic compounds, such as aromatic compounds, amines, aldehydes, ketones, carboxylic acid and derivatives.

Students are expected to:

1. Recognize main functional groups in organic compounds;
2. Name aromatic compounds, phenols, aldehydes, ketones, carboxylic acids and their functional derivatives, amines, and heterocyclic compounds using the I.U.P.A.C. system;
3. Analyze the structure of a given compound and predict the type of bonding, hybridization state, and effect of the structure on the physical properties of such a compound;
4. Recognize nucleophiles and electrophiles and their reactivity, in order to predict and understand mechanisms for the different types of organic reactions: free radical, nucleophilic substitution, elimination, and electrophilic addition;
5. Considering resonance in conjugated systems and electron-withdrawing or electron-donating properties of neighboring groups in conjugated and aromatic systems, predict the major product in an organic reaction, such as those involving aromatic compounds, aldehydes, ketones, carboxylic acids, amines and heterocycles by applying the knowledge of reaction mechanisms;

Educational approach:

- Virtual In person Blended

Teaching-learning methods with regard to the chosen educational approach:

In person approach

- Interactive lecture (question and answer, quiz, group discussion, etc.)
- Small group discussion
- Team-based learning (TBL)
- Problem-based learning (PBL)
- Scenario-based learning
- Using students in teaching (peer teaching)
- Game-based learning
- Name others.....

Organic Chemistry II Course Plan (M-Pharm)

Wednesdays 10-13

	Subject	Lecturer	Date
1	Aromatic Compounds	Dr. Mokhtari	02.07.1404
2	Reactions of Aromatic Compounds	Dr. Mokhtari	09.07.1404
3	Solving problem	Dr. Mokhtari	16.07.1404
4	Aldehyde and ketones; structure, properties, preparation	Dr. Mokhtari	23.07.1404
5	Aldehyde and ketones; Reactions	Dr. Mokhtari	30.07.1404
6	Solving problem	Dr. Mokhtari	07.08.1404
	Exam of sessions 1-6		14.08.1404 10-11:30
7	Carboxylic acid and nitriles	Dr. Golsanamlu	21.08.1404
8	Carboxylic acid derivatives	Dr. Golsanamlu	28.08.1404
9	Alpha substitution reactions	Dr. Golsanamlu	05.09.1404
10	Carbonyl condensation reaction	Dr. Golsanamlu	12.09.1404
11	α , β - unsaturated carbonyl compound	Dr. Golsanamlu	19.09.1404
12	Solving problem	Dr. Golsanamlu	26.09.1404
	Exam of sessions 7-12		03.10.1404 13-14
13	Amines	Dr. Asadi	03.10.1404
14	Amine-Heterocycles	Dr. Asadi	10.10.1404
15	Heterocycles	Dr. Asadi	17.10.1404
16	Solving problem	Dr. Asadi	24.10.1404

Student Duties and Expectations:

Students are expected to attend class regularly, complete assignments on time, study assigned resources, and actively participate in class activities throughout the course.

Important notes:

Absence of more than three sessions will result in the course being dropped.

Student Assessment Method:

Specify the type of assessment:

- Formative assessment
- Summative assessment

The contribution of course instructors' grades

Contents	Class activity	1 st exam	2 nd exam	3 rd exam	Final score
Dr. Mokhtari	1.5	6	-	-	7.5
Dr. Golsanamlou	1.5	-	6	-	7.5
Dr. Asadi	1	-	-	4	5

References:

- 1- Mc. Murry, J. Organic Chemistry; 10th ed., Books/cole Publishing Company; 2023.
- 2- Wade, L.G. Organic Chemistry; 9th ed.; Prentice- Hall Inc.; 2015.
- 3- Morrison, R.T.; Boyd, R.N. Organic Chemistry; 6th ed.; Prentice Hall; 1992.
- 4- Klein, David R. Organic Chemistry. 3rd ed.; John Wiley & Sons; 2017.