The Hashemite University

جامعـــــــــة الهاشمـيـــــــــــة

Faculty of Pharmaceutical Sciences

كلية العلوم الصيدلانية

Practical Pharmaceutical Organic Chemistry (#131703212)
Second Semester 2024 /2025

COURSE INFORMATION	
Course Name: Practical Pharmaceutical Organic Chemistry **Learning method:** Hybrid learning **Semester:** First **Department:** pharmaceutical chemistry **Faculty:** Pharmaceutical Sciences	**Course Code:** 131703212 **Section:** As per semester **Core Curriculum**: 2019 Study Plan **JNQF Level:** 7
Day(s) and Time(s): According to HU courses timetable/semester **Classroom:** As per semester **Date prepared:** January 2020 **Date updated:** February 2024	**Credit Hours:** 1 **Prerequisites**:

Course Description

This course is created to cover practical applications of various methods and techniques used for the identification of functional groups of organic compounds of pharmaceutical interest, giving more attention to chemical identification. The laboratory includes two parts; the first part includes the various separation and purification techniques of organic compounds such as crystallization, distillation, extraction, and chromatography. The second part concentrates on the identification of functional groups of organic compounds of pharmaceutical interest, giving more attention to chemical identification.

Course Objectives

1- Teach the student the principle of team-work and how to show respect for the students and teacher opinion.
2- Learn how to follow general policies and safety precautions in the lab.
3- Learn how to deal with heat sources in the lab.
4- Learn the student's various types of general and specific chemical reactions of certain organic compounds.
5- Learn the students how to perform the synthesis of organic compounds and the specific mechanism of organic reactions.
6- Learn the student's different lab techniques as recrystallization, melting point determination of the prepared chemical compound.
7- Adapt group discussion technique.

Course Learning Outcomes (CLOs)

A. Knowledge and Understanding: Student is expected to understand

A-1 Physical behavior and chemical identification of functional groups in organic compounds.
A-2 The importance of functional groups in pharmaceutical behavior of Drugs.
A-3. Practical experience in drugs synthesis and identification based on these functional groups.

B. Intellectual Analytical and Cognitive Skills: Student is expected to

B-1 Application of practical experience in identification of any unknown functional group or drugs incorporating these groups; such as Alcohols, Phenols, Ethers, Aldehydes, Ketons, Carboxylic acids and their derivatives, Nitro and Amino compounds.
B-2 Ability to synthesis some simple organic compounds and drugs such as Aspirin in organic laboratory implementing all techniques gained in this course.
B-3 Ability to understand and explain theoretical mechanism or behavior of certain drugs based on simple laboratory tests or reactions.

C. Subject-Specific Skills: Student is expected to

C-1 Chemical and physical identification of basic organic functional groups through basic practical test performed in any organic laboratory.
C-2 Acquaint practical skills regarding synthesis techniques, and preparation tools, in addition to methods of identification, classification, chemical and physical evaluation.
C-3 Practicing special techniques related to organic synthesis such as crystallization, melting point determination, distillation and refluxing.
C-4 Acquaint practical skills regarding to safe chemical handling and disposal.

Reading list

1. Textbook:	Pharmaceutical Organic Chemistry-Laboratory Manual
2. other resources	I. Abdelnour L., Hussein A., Zahra J.: Selected Experiments in Organic Chemistry. 2th Ed. University of Jordan. II. Gilbert J. C. and Martin S. F. (2011): Experimental Organic Chemistry A Miniscale and Microscale Approach. 5th Ed. Cengage Learning USA III. Shriner R.L., Herman C.K.F., Morill T.C., Curtin D.Y. and Fuson R.C. (1998): The Systematic Identification of Organic Compounds. , 7th Ed. A John Wiley & Sons,Ltd., Publication. England.

C-5 Utilizing the concept of functional groups alteration, modification, derivitization in pharmaceutical drugs as tools for identification, characterization, purification, or even to improving the biological activity of a drug.

D. Transferable Key Skills: Students is expected to

D-1 Work in a team to organize and plan a synthetic experiment and fulfill course library requirements (writing scientific report). This must reflect positively on his future training of how to choose the right tools and approaches to conduct his experiment.
D-2 Master the rules of laboratory safety protocols and procedures needed for next laboratories.
D-3 Share, discuss and express ideas while working in group discussion sessions (Group discussion sessions to answer some questions.)
D-4 Gaining some electronic and internet experience while answering some problems through visiting specific web sites related to organic chemistry and answering preparing assignments using internet, and PC.
D-5 Developing problem solving approach.

Important regulations

- **On average, students need to spend 1 hrs of study and preparation weekly.**
- **Excellent attendence is expected. According to the university policy, students who miss more than 15% of the lecture hours with or without excuse will be dismissed from the course**
- **At the beginning of the lectures, be on time and don't leave before the end of the lecture without an accepted excuse**
- **If you missed a class, it is your responsibility to find out about any announcements or assignments you have missed**
- **For any clarification, please communicate your instructor at his posted office hours or by appointment**
- **Switch off your mobile or keep it silent throughout the lecture**
- **Listen well to the lecture and avoid side discussions, if you have a question, ask your instructor and not your collegue**
- **If you have any information, document your reference, if you didn't, then you broke the intellectual property rights law and the law will be applied**
  - **For more informations, visit the website:**
  - **http://www.plagiarism.org/**
- **Exams are scheduled to be given three times throughout the semester, your are expected to attend all. If not, make-up exams will be offered for valid reasons. It may be different from regular exams in content and format.**
- **Cheating, academic diconduct, fabrication and plagiarism will not be tolerated, and the university policy will be applied**

	Course Contents					
Date	**Week**	**Credit Hours**	**ILOs**	**Topics**	**Teaching Procedure**	**Assessment methods**
25/2-29/5	1	3	A B C D	Laboratory rules and safety precautions and	Lecturing discussion	Class participation
25/2-29/5	1	3	A B C D	Experiment 1: Melting Point Determination	Lecturing discussion Practical work	Class participation Laboratory Report Lab work evaluation Assignment
3-7/3	2	3	A B C D	Experiment 2: Recrystallization	Lecturing discussion Practical work	Class participation Laboratory Report Lab work evaluation Assignment
10-15/3	3	3	A B C D	Experiment 3: Identification of Alcohols and phenols	Lecturing discussion Practical work	Class participation Laboratory Report Lab work evaluation Assignment
17-21/3	4	3	A B C D	Experiment 4: Identification of Aldehydes and ketones	Lecturing discussion Practical work	Class participation Laboratory Report Lab work evaluation Assignment
24-28/3	5	***Off week (First exam duration "one week only")***				
31/3-4/4	6	3	A B C D	Experiment 5: Identification of Carboxylic acids	Lecturing discussion Practical work	Class participation Laboratory Report Lab work evaluation Assignment
7-11/4	7	***Eid al-Fitr Holiday (23-24/4)***				
14-18/4	8	3	A B C D	Experiment 6: Chromatography	Lecturing discussion Practical work	Class participation Laboratory Report Lab work evaluation Assignment
21-25/4	9	3	A B C D	Experiment 7: Boiling point and distillation	Lecturing discussion Practical work	Class participation Laboratory Report Lab work evaluation Assignment
28/4-2/5		***Midterm Exam (30/4-3/5)***				
5-9/5	11	3	A B C D	Experiment 8: Extraction (Caffeine from tea leaves)	Lecturing discussion Practical work	Class participation Laboratory Report Lab work evaluation Assignment
12-16/5	12	3	A B C D	Experiment 9: Synthesis of Aspirin (Acetylsalicylic Acid)	Lecturing discussion Practical work	Class participation Laboratory Report Lab work evaluation Assignment
19-23/5	13	3	A B C D	Experiment 10: Synthesis of Paracetamol (Acetaminophen)	Lecturing discussion Practical work	Class participation Laboratory Report Lab work evaluation Assignment

	14	***Final Exam***

Grade Distribution		
Assessment	**Grade**	**Date**
1. Quizzes	15%	➢ **Quiz 1 - week 2 (3-7/5):** Experiment 1 & Experiment 2 ➢ **-Quiz 2 - week 4 (17-21/3):** Experiment 3 & Experiment 4 ➢ **Quiz 3 - week 8 (14-18/4):** Experiment 6 & Experiment 7
2. Reports	10%	Weekly
3. Lab Evaluation (lab performance, readiness, etc)	10%	weekly
4. Mid Exam (Practical+Therotical)	25%	To be announced
5. Final Exam (Theoretical)	40%	The 14th week

Student Evaluation (out of 10):

Each student is evaluated weekly based on the following points:

A. Attendance punctuality **(2 mark)**
B. Behavior and adherence to basic lab requirements (e.g. Appearance: Lab-Coat, hair) **(1.5 mark)**
C. Availability of Gloves & Cleaning tools **(2 mark)**
D. Balance & Machines Use & Tools Use & their Cleaning **(2 mark)**
E. Teamwork **(1 mark)**
F. Procedure: Preparation & Adherence **&** Time frame **(1.5 mark)**

Reading List	
1. Textbook:	**Pharmaceutical Organic Chemistry-Laboratory Manual**
	I. Abdelnour L., Hussein A., Zahra J.: Selected Experiments in Organic Chemistry. 2th Ed. University of Jordan. **II. Gilbert J. C. and Martin S. F. (2011): Experimental Organic Chemistry A Miniscale and Microscale Approach. 5th Ed. Cengage Learning USA** **II. Shriner R.L., Herman C.K.F., Morill T.C., Curtin D.Y. and Fuson R.C. (1998): The Systematic Identification of Organic Compounds. , 7th Ed. A John Wiley & Sons, Ltd., Publication. England.**