



Syllabus: Practical Pharmaceutical Instrumental Analysis (131703316)

First Semester 2024 /2025

COURSE INFORMATION	
Course Name: Practical Pharmaceutical Instrumental Analysis (Hybrid education) Semester: First Department: Pharmaceutical Chemistry Faculty: Pharmaceutical Sciences	Course Code: 131703316 Sections: 1 - 9 Core Curriculum: 2020 study plan
Day(s) and Time(s): Sunday/ Thursday: 8:30-15:00 Laboratory: C-324 and C-322	Credit Hours: 1.5 Prerequisites: 131703315
COURSE DESCRIPTION	
This practical course provides instruction to students on various techniques of instrumental analysis. The session covers spectral analysis methods, including Potentiometric titration, flame photometry, polarimetry, UV-visible, and infrared (IR). Additionally, students are introduced to chromatographic techniques such as High Pressure Liquid Chromatography (HPLC) and Gas Chromatography (GC). These methods and other analytical procedures are utilized in the lab to analyze pharmaceutical preparations. To enhance the learning experience, this course incorporates a blended learning approach. Each experiment is accompanied by a video tutorial available online for the students. Before conducting the experiment in the laboratory, students must watch the video and complete an online quiz related to the experiment.	
DELIVERY METHODS	
The course will be delivered through a combination of active learning strategies. These will include: • PowerPoint lectures and active classroom based discussion • Collaborative learning through small groups acting in an interdisciplinary context. • Relevant films and documentaries • Video lectures • E-learning resources: e-reading assignments and practice quizzes through Model and Microsoft Team	

FACULTY INFORMATION

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REFERENCES AND LEARNING RESOURCES

Required Textbook(s):

1- Douglas A. Skoog, F. James Holler, Stanley R. Crouch, Principles of instrumental analysis (Cengage Learning: 2017) ISBN: 978-1-305-57721-3

Suggested Additional Resources:

1- James W. Robinson, Eileen M. Skelly Frame, George M. Frame, Undergraduate Instrumental analysis, (CRC Press Taylor & Francis Group: 2014) ISBN:978-1-420-061352

Course Objectives

1. To provide the students with the fundamental principles behind spectroscopic and electrochemical analytical methods.
2. Recognize the significance of employing diverse spectroscopic and electrochemical methods in pharmaceutical analysis and comprehend their practical applications.
3. To introduce the interaction between matter and electromagnetic radiation and its wide-ranging applications in drug analysis.
4. Acquire knowledge about the chromatographic separation and analysis of drugs.
5. Demonstrate the ability to conduct quantitative and qualitative drug analysis using various analytical instruments.
6. Provide in-depth knowledge regarding the applications of spectroscopic and electrochemical methods in pharmaceutical analysis.

Intended Learning Outcomes

A. Knowledge

A.1 Explain relevant knowledge about various analysis methods, particularly those pertaining to pharmaceutical analysis.

A.2 Interpret the practical aspects and the master utilization of various instruments, including UV-visible spectrophotometry, flame photometers, High-Performance Liquid Chromatography (HPLC), and Gas Chromatography (GC).

B. Skills

B.1 Choose suitable spectroscopic techniques for analyzing pharmaceutical materials.

B.2 Validate spectrophotometers, spectrofluorometers, flame photometers, HPLC-DAD, and GC-FID for qualitative and quantitative analysis of some pharmaceutical compounds.

C. Competencies

C.1: Compare the techniques suitable for specific analytical problems and choose the appropriate method for quantitative or qualitative analysis of a particular drug in a specific medium.

C.2 Interpret basic IR and NMR spectra and chromatograms for simple compounds.

C.3 Validate the acquired knowledge of various analytical drug identification and assay methods.

ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate, and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their instructor to ensure that their individual needs are met. The University, through its Special Needs section, will exert all efforts to accommodate individual needs.

Special Needs Section:

Tel: 00962-5-3903333 **Extension:** 4209

Deanship/ Department of Student Welfare Services
amalomoush@staff.hu.edu.jo

Location: Students Affairs

Email: amalomoush@hu.edu.jo

COURSE REGULATIONS

Participation

Class participation and attendance are important elements of every student's learning experience at The Hashemite University, and the student is expected to attend all classes. A student should not miss more than 15% of the classes during a semester. *Those exceeding this limit of 15% will receive a failing grade regardless of their performance.* It is a student's responsibility to monitor the frequency of their own absences. **Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign-in; failure to do so will result in a non-attendance being recorded.**

In exceptional cases, the student, with the instructor's prior permission, could be exempted from attending a class provided that the number of such occasions does not exceed the limit allowed by the University. The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

On average, students must spend 15 hrs of study and preparation weekly. 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, you must find out about any missed announcements or assignments.** For any clarification, please communicate with your instructor during her office hours by appointment. Listen well to the lecture; ask your instructor if you have a question. You will find the course material at the course team after the lecture.

Sharing of course materials is forbidden. No course material, including, but not limited to, course outlines, lecture hand-outs, videos, exams, and assignments, may be shared online or with anyone outside the class. Any suspected unauthorized sharing of materials will be reported to the university's Legal Affairs Office. If a student violates this restriction, it could lead to student misconduct procedures.

Plagiarism

Plagiarism is considered a serious academic offense and can result in your work losing marks or failing. HU expects its students to adopt and abide by the highest standards of conduct when interacting with their professors, peers, and the broader university community. As such, a student is expected not to engage in behaviours that compromise his/her integrity as well as that of The Hashemite University.

Plagiarism includes the following examples, and it applies to all student assignments or submitted work:

- **Use of someone else's work, ideas, images, or words without his/her permission or reference to them.**
- **Use someone else's wording, name, phrase, sentence, paragraph, or essay without quotation marks.**
- **Misrepresentation of the sources that were used.**

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected

Late or Missed Assignments

In all cases of assessment, students who fail to attend an exam, class project, or deliver a presentation on the scheduled date without prior permission and/or are unable to provide a medical note will automatically receive a fail grade for this part of the assessment.

- Submitting a term paper on time is a key part of the assessment process. Students who fail to submit their work by the deadline specified will automatically receive a 10% penalty. Assignments over 24 hours late will receive a further 10% penalty. Each subsequent 24 hours will result in a further 10% penalty.
- In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with University regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.

Missed Assessments

In all cases of assessment, students who fails to attend an exam on the scheduled date without prior permission, and/or are unable to provide a medical note, will automatically receive a failure grade for this part of the assessment

- In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with university regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.

Cheating

Cheating, academic misconduct, fabrication and plagiarism will not be tolerated, and the university policy will be applied. Cheating policy: The participation, the commitment of cheating will lead to applying all following penalties together:

- Failing the subject, he/she cheated at
- Failing the other subjects taken in the same course.
- Not allowed to register for the next semester
- The summer semester is not considered as a semester

Student Complaints Policy

Students at Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

COURSE ASSESSMENT

Students will be graded through the following means of assessment, and their final grade will be calculated from the evaluation forms listed below, with their grade weighting taken into account. The criteria for grading are listed at the end of the syllabus.

Students will be graded through the following means of assessment:

Course Assessment Plan						
Assessment	Grade Weighting	Deadline Assessment	CILOs			
			A	B	C	D
Practical Exam	20%	Add date/time	A			
Quizzes	15%		A	B		
Homework	15%		A	B	C	
Final Exam	50%	Add date/time	A	B	C	D

Description of Exams

Test questions will predominately come from the material presented in the lectures. Semester exams will be conducted during the regularly scheduled lecture period. The exam will consist of a combination of multiple choice, short answer, match, true and false, and/or descriptive questions.

Homework: This will be given for each chapter; while the chapter is in progress, you are supposed to work on it continuously and submit it in the next lecture when I finish the chapter. You are also expected to work on in-chapter examples, self-tests, and a representative number of end-of-chapter problems. The answers to self-tests and end-of-chapter exercises are given at the end of the book.

Quizzes: Unannounced quizzes will be given during or/and at the end of each chapter based on previous lectures. It will ensure that you come prepared for the class.

No make-up exams, homework, or quizzes will be given. Only documented absences will be considered as per HU guidelines.

Letter Grade	Description	Grade Points
A+	Excellent	4.00
A		3.75
A-		3.50
B+	Very Good	3.25
B		3.00
B-		2.75
C+	Good	2.50
C		2.25
C-		2.00
D+	Pass	1.75
D	Pass	1.50
F	Fail	0.00
I	Incomplete	-

WEEKLY LECTURE SCHEDULE AND CONTENT DISTRIBUTION

“Lecture hours and weeks are approximate and may change as needed.”

Note: For Chem 101 sections with 2 lecture periods per week (S/T, M/W, or T/R), one lecture period covers

1. lecture hours (60 minutes). The course content specifies the sections in chapters 1-10 of the textbook that will be included in quizzes, homework, and exams.

“Lecture hours and weeks are approximate and may change as needed.”

Note: For the 2 lecture periods per week (S/T, M/W), one lecture period covers 1 lecture hour (60 minutes). The course content specifies textbook chapters that will be included in exams.

Week Number	No. of Hours	CILOs	Subject	Delivery Methods	Assessment Methods
1.	3	A, B, D	Safety Rules	Lecturing	Quiz
2.	3	A, B, D	Introduction to Instrumental Analysis, Pharmacopeias and Monographs	Lecturing	Quiz and report
3.	3	A, B, D	Potentiometric titration	Lecturing discussion Practical work	Quiz and report
4.	3	A, B, D	Ultraviolet (UV)-Visible Spectroscopy- Qualitative analysis	Lecturing discussion Practical work	Quiz and report
5.	3	A, B, D	Ultraviolet (UV)-Visible Spectroscopy- Quantitative analysis	Lecturing discussion Practical work	Quiz and report
6.	3	A, B, D	Ultraviolet (UV)-Visible Spectroscopy- Quantitative analysis	Lecturing discussion Practical work	Quiz and report
7.	3	A, B, D	Polarimetry	Lecturing discussion Practical work	Quiz and report
8.	3	A, B, D	Flame photometry	Lecturing discussion Practical work	Quiz and report
9.	3	A, B, D	Infrared (IR)	Lecturing discussion Practical work	Quiz and report
10.	3	A, B, D	Solid Phase Extraction	Lecturing discussion Practical work	Quiz and report
11.	3	A, B, D	High-Performance Liquid Chromatography HPLC	Lecturing discussion Practical work	Quiz and report
12.	3	A, B, D	Gas Chromatography (GC)	Lecturing discussion Practical work	Quiz and report

13.	3	A, B, D	Practical Final Exam	Practical work	Quiz
14.			University Final Exam		