



The University of Jordan

Accreditation & Quality Assurance Center

COURSE Syllabus

1	Course title	<i>Instrumental pharmaceutical Analysis</i>
2	Course number	1201315
3	Credit hours (theory, practical)	2 theory and a separate 1 hr practical course
	Contact hours (theory, practical)	2 theory and a separate 3 hr practical course per weak
4	Prerequisites/corequisites	Chemical pharmaceutical Analysis 1201201
5	Program title	BSc Pharmacy
6	Program code	
7	Awarding institution	University Of Jordan
8	Faculty	Pharmacy
9	Department	Pharmaceutical Sciences
10	Level of course	intermediate
11	Year of study and semester (s)	3 rd year any semester (currently first semester)
12	Final Qualification	
13	Other department (s) involved in teaching the course	--
14	Language of Instruction	English
15	Date of production/revision	Januray 2016

16. Course Coordinator:

Office numbers, office hours, phone numbers, and email addresses should be listed.

Office No.: 129

Office hours:

Day/Time	Sunday	Monday	Tuesday	Wednesday	Thursday
	9-10	8-10	9-10	8-10	
	11-12	1-2	11-12	1-2	

Phone No. : 0777 484573

Email: l.hamdan@ju.edu.jo ; or iimad68@yahoo.com

17. Other instructors:

Office numbers, office hours, phone numbers, and email addresses should be listed.

18. Course Description:

As stated in the approved study plan.

The course is about understanding the merits of different instrumental analytical techniques and how they might be employed to analyse drugs in dosage forms (mainly) and in other matrices (such as plasma).

19. Course aims and outcomes:**A- Aims:**

The course aims to accomplish the following goals:

1. To provide students with a solid background in principles of pharmaceutical analysis.
3. To introduce students to a wide range of instrumental analytical techniques that are useful in modern pharmaceutical analysis, some of which they will gain hands on experience in the practical sessions accompanying the course.
4. To develop skills necessary to solve analytical problems related to instrumental techniques.

B- Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to ...

1. Knowledge and Understanding: Student is expected to:

Compare and contrast between different instrumental analytical techniques

2. Intellectual Analytical and Cognitive Skills: Student is expected

To do calculations associated with the quantitative analysis of drugs based on instrumentations.

3. Subject-Specific Skills: Student is expected to:

- Criticize and evaluate instrumental analytical methods

4. Transferable Key Skills: Students is expected to :

- choose a proper analytical for the quantitative or qualitative analysis of certain drug in certain media.

- draw conclusions based on analysis and calculations

20. Topic Outline and Schedule:

Topic	Week	Instructor	Achieved ILOs	Evaluation Methods	Reference
Unit 1 Review	Review of the analytical principles and relevance to pharmaceutical analysis. And preparation of diluted solutions?	Dr. Imad Hamdan	Good grasp of the general pharmaceutical analysis	Exam	Relevant questions in the exam
Ultraviolet spectroscopy 1:	Basic concepts of light (spectrum and electromagnetic radiation) and interaction with matter, theory of excitation and structural requirements for light absorption. Basic design of UV/Viz spectroscopy Beer's Lambert's Law	Dr. Imad Hamdan	Understanding the theory behind UV spectrophotometry	Exam	Relevant questions in the exam
Ultraviolet spectroscopy 2:	Quantitative applications of Beer's Lambert's Law and its use in analysis Important considerations in using UV/Viz spectroscopy e.g. potential deviations from linearity and how to diagnose and resolve the problem. Effect of solvents and pH on spectra.	Dr. Imad Hamdan	Develop methods based on UV , evaluate and even criticize methods developed by others perhaps to perform UV analysis	Exam	Relevant questions in the exam
Flame emission and atomic absorption spectroscopy	-Theory -Basic design and Application of each of the techniques	Dr. Imad Hamdan	Obtain good theoretical background of the technique	Exam	Relevant questions in the exam
Spectrofluorometry:	Fluorescence origine, excited and ground state. Effect of structure, temperature and solvent. Basic design of a spectrofluorometr . Applications	Dr. Imad Hamdan	Understand the theoretical background of the technique	Exam	Relevant questions in the exam

Infra red Spectroscopy:	<ul style="list-style-type: none"> - Basic designs of the instrument and practical handling of the sample. - Origin of IR band, modes of vibrations, uses of IR for identification and elucidation of compounds. Effect of hydrogen bonding on absorption bands. 	Dr. Imad Hamdan	<p>Understand the basics of the instrument, origin of IR signal, the handling of IR sample and potential of IR in identification</p> <p>In addition the student is expected to resolve introductory level IR interpretation problems.</p>	Exam	Relevant questions in the exam
NMR Spectroscopy1	Introduction to theory of NMR, origin of NMR signal, chemical shift concept.	Dr. Imad Hamdan	Understand the theory behind nmr signal	Exam	Relevant questions in the exam
NMR Spectroscopy2 Applications and examples on NMR	Interpretation of NMR spectra Worked examples	Dr. Imad Hamdan	Interpretation of basic NMR spectra	Exam	Relevant questions in the exam
Mass spectrometer,	Mass spectrum, Fagmentation. - Application examples	Dr. Imad Hamdan	Understand basic theory of MS in addition to interpret basic MS spectra	Exam	Relevant questions in the exam
Introduction to chromatography	Basic theory, plate thory, efficiency , concepts	Dr. Imad Hamdan	Understand basic concepts in chromatography	Exam	Relevant questions in the exam
HPLC -introduction	Basic designs, components, function,.Types of stationary phasea and chromatographic modes i.e. normal vs reversed phase	Dr. Imad Hamdan	Know the basic components of HPLC , Major modes of HPLC and how to utelize it for quantification of drugs	Exam	Relevant questions in the exam
HPLC and its applications and TLC	specific applications, drugs in dosage forms, calibrations curves, external standard, drugs in plasma.	Dr. Imad Hamdan	Mention examples where HPLC is employed in pharmaceutical analysis	Exam	Relevant questions in the exam
Gas chromatography	Basic concepts and examples of applications	Dr. Imad Hamdan	Understand basic mechanism and components in GC separations	Exam	Relevant questions in the exam

Electrochemistry principles	Basic concepts and applications in electrochemistry, very brief	Dr. Imad Hamdan	Understand basic concepts in electrochemical analysis	Exam	Relevant questions in the exam

21. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

Lectures

Learning skills:

- 1- Critical thinking
- 2- Scientific reasoning
- 3- Problem-solving skills
- 4- Self-directed learning

22. Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Majority of the students passed the exams where questions were designed to cover all the intended knowledge to be acquired.

23. Course Policies:

A- Attendance policies: All students attended more than 90% of the course, if not any student with higher than absence rate would be denied his final exam.

B- Absences from exams and handing in assignments on time:

Absence in final exam is the authority of the dean, in case the dean accepts to make up for the student, those students would have to set for the exam somewhere within the upcoming semester.

No assignments were given instead planned and unplanned quizzes were given and students had to submit within the same lecture time.

C- Health and safety procedures: !!!!

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Strict rules are followed regarding cheating and /or misconduct. In all exams any attempt of cheating the responsible students would be reported to a special committee and if found really guilty, then the stated punishment in the university law would be applied and that may include enforced drop of the ultimate courses that he registered for in that semester.

E- Grading policy:

Only 15% of the ultimate grades will be based on short essay questions so that the possible bias of the instructor might be kept to minimum. The rest 85% of grading were based on MCQs and a scanner is employed to do the markings. The students have the chance to discuss model answers and if for any reason a students thinks he should have had a higher mark he would have the chance to review his exam papers with the instructor.

F- Available university services that support achievement in the course:

24. Required equipment:

For lectures a board and a computer with a data show system

25. References:

A- Required book (s), assigned reading and audio-visuals:

***Textbook:**

1-Douglas A. Skoog, F James Holler and Stanley Crouch (2007) Principles of Instrumental Analysis. 6th Edition or later.

B- Recommended books, materials, and media:

2-Pharmaceutical Analysis: A Textbook for Pharmacy Students and Pharmaceutical, 2005 by David G. Watson.

3.. Roger E. Schirmer (Editor) Modern methods of Pharmaceutical Analysis, 1982

4-- Kenth A. Connors , A text book of Pharmaceutical Analysis, 1982

26. Additional information:**List of expected competencies in line with the faculty strategic plan:**

- Identify analytical method development and validation used in pharmaceutical analysis (point 3.11 in the faculty list).
- Recognize quality assurance principles (point 3.8 in the faculty list).
- Recognize quality control principles (point 3.9 in the faculty list).

Name of Course Coordinator: -Dr. Imad Hamdan-Signature: ----- Date: -----

Head of curriculum committee/Department: ----- Signature: -----

Head of Department: ----- Signature: -----

Head of curriculum committee/Faculty: ----- Signature: -----

Dean: ----- -Signature: -----

Copy to:

Head of Department
Assistant Dean for Quality Assurance
Course File