Zarqa University
Faculty: Pharmacy

Instructor: Dr. Shatha ALomari
Lecture's time: Sun., Tues., Thurs.
9:00 – 10:00
12:00- 1:00
Mond.,Wed.
9 :30-11 :00
11:00 – 12:30

Department: Pharmaceutical Sciences
Course title: Instrumental Analysis
Course number: 1101313

Semester: 2nd 2018/2019
Office number:
Office hours: Sun., Tues., Thurs.
10:00 – 11:00
The, wed.
12 :30 – 1:30

Course description:

This course provides the student with the principles of instrumental analysis upon which modern measuring devices are based. This includes the exploration of the instrumental methods of analysis used to check the purity of raw material and quality control of pharmaceutical preparation; using chromatographic methods, spectroscopic methods; UV-Visible, IR, NMR and Mass spectroscopy.

Aims of the course:

1. To understand the principle of the instrumental methods of analysis including spectroscopic methods; UV-Visible, IR, NMR and Mass spectroscopy.
2. To learn how to interpret the result obtained from the different spectroscopic methods.

Intended Learning Outcomes: (ILOs)

A. KnowledgeandUnderstanding

A1.ConceptsandTheories:

Be introduced to a wide range of techniques of modern analytical chemistry.

A2.Contemporary Trends, Problems and Research:

Identification of chemical structures using IR, NMR and MS.

B. Subject-specific skills

B1. Problem solving skills:

To study the UV, Visible and to solve problems using Beer's-Lambert's law.
Identification of unknown chemical structures using IR, NMR and MS.

B2.ApplicationofMethodsandTools:

To apply instrumental methods in drugs identification and quantification.

C. Critical-Thinking Skills

C1.Analytic skills: Assess

To analyze wide range of drugs qualitatively and quantitatively.

C2.Strategic Thinking:

To design plans and strategies to analyze different compounds within a mixture.

C3.Creative thinking and innovation:

Students should correlate instruments with drug analysis, dose preparation, pharmacokinetic calculations, and plants extracts analysis.

D. General and Transferable Skills (other skills relevant to employability and personaldevelopment)

D1. Communication:

Student should work in groups and gain communication skills to solve different problems.

D2.Teamwork and Leadership:

Group work and tasks division between group members especially when NMR data need to be analyzed.

Teaching strategies in course outline:

Teaching strategies in course outline	
✓ Lectures	□ Field visits
□ Online Lectures	□ Role play
□ Practical training / laboratory	□ Presentation
□ Seminar / Workshop	✓Quizzes
✓Moodle	□ Online resources (Kahoot., etc)
□ Case study	✓Team based learning
□ Flipped classroom	□ Social related activities (chat)
□ Simulation	✓ Other assignments and homework
□ Others :	

Competencies:

Competencies
(Learner)
3.1 (problem solver)
4.1 (Self- aware)

Course structures:

Week	ILOs	Topics	Teaching	Assessment

			Procedure	methods
1	A1,B1	Introduction to Instrumental analysis		
2+3+4	A1,B1,C1,D1	UV-Visible Spectroscopy	Lectures + Classroom discussions	Quiz
5+6+7	A1,A2,B1,D1,D2	Infrared Spectroscopy (IR)	Brain storming exercises + Classroom discussions	Classroom worksheets
8+9+10	A1,A2,B1,D1,D2	ProtonNuclear Magnetic Resonance (^{1}HNMR) + ^{13}C NMR	Lectures + Brain storming exercises	Classroom worksheets
11+12	A1,B2,C1,C2,C3,D1	Chromatographic Theory and High Performance Liquid Chromatography (HPLC)	Animation + Lectures + Classroom discussions	Classroom worksheets
13+14	A1,B2,C1,C2,C3,D1	Gas Chromatography (GC)	Lectures	Classroom worksheets
15		Final Exam		

References:

A. Main Textbook:

Principles of Instrumental Analysis - 6th Edition by Douglas A. Skoog, F. James Holler, and Stanley Crouch

B. Supplementary Textbook(s):

Pharmaceutical Analysis, A Textbook for Pharmacy Students and Pharmaceutical Chemists, David G. Watson; 2nd edition (2005).

Undergraduate Instrumental Analysis, James W. Robinson, Eileen M. Skelly Frame; 6 edition (2004)

Assessment Methods:

Assessment	Grade
- First Exam	20%
- Second Exam	20%
- Assignments (reports, quizzes, homeworks, participation)	10%
- Final Examination	50%