The Hashemite University
Faculty of Science
Course Outline

Department: Chemistry.	
Year : 2018/2019	**Semester :** *Summer Semester*

Course Information	
Course Title	**Instrumental Analysis 1**
Course Number	110103311.
Pre-requisite	110103211
Course Credits	3.
Designation	Compulsory.
Course Time	9.10 – 10.10
Instructor	***Dr. Ayman A. Issa.***
Office Location	Chem. 208.
Office Hours	10.20 – 11.00 Daily
E-mail	**aymani@hu.edu.jo**
Webpage	**http://staff.hu.edu.jo/aymani**

Course Description (Catalog):

This course covers basic principles of instrumentation such as: instrument components, calibration methods, and signal-to-noise ratio. It covers the theoretical principles, detailed instrument components, and analytical applications of the following spectral methods of analysis: atomic absorption, atomic emission, uv-visible molecular absorption, infrared absorption, as well as molecular luminescence.

Text Book and References	
Text Book	Skoog, Holler, and Nieman; Principles of Instrumental Analysis, Thomson Brooks, 2007, 6th Edition. (5th or 7th Editions can also be used).
References	Any library book related to Instrumental Analysis or one of the discussed topics in this course; including Atomic Spectroscopy and UV-Vis spectroscopy.

Grading Plan		
Assessment Type	**Expected Date**	**Weight**
1st Hour Exam	July 4, 2019	25%
2nd Hour Exam	August 1, 2019	25%
Homeworks and Quizzes	Every Lecture	10%
Final Exam	August 4 - 9, 2018	40%

Notes:

- *All **homeworks** **MUST** be submitted via **e-mail** within a maximum of **FOUR DAYS** after finishing the concerned chapter/topic, unless you have been told otherwise.*
- *Absence from mid-term exam must be followed by an acceptable excuse; where a **Make-up exam** will be held. Otherwise, the grade of **ZERO** will be given.*

Teaching and Learning Methods
Lectures using an LCD projector (data show). **Discussion** lectures will be given after each chapter/topic. **Quizzes** (oral and written) will be given during lectures and after each chapter. **Homeworks** are required from each student and will be submitted and graded via *e-mail,* unless told otherwise. Subject in email should contain student's name, number, and homework number.
All material and references will be available on Moodle Website http://mlms.hu.edu.jo

Course Contents	
Topics	**Text-Book Homework questions from 6th Ed.**
Introduction	
Chapters 1 and 5: Introduction to instrumental methods, calibration techniques, and signals and noise.	➔Solve: chapter 1: 1-11. ➔ *Submit the following*: **HW 1:** *Chapter 1*: 9, 11 a,b,d (*Excel*) **HW 2:** *Chapter 5*: 8, 11
Chapter 6: Introduction to spectrometric methods, and electromagnetic radiation.	**HW 3** 4, 5, 14b, 15b, 19.
Atomic Spectroscopy	
Chapter 7: Components and types of optical instruments.	**HW 4** 10, 12, 18
Chapters 8: An Introduction to optical atomic emission and absorption spectroscopic techniques.	**HW 5** 9a, 11
Chapters 9: Atomic absorption spectroscopy based upon flame and electrothermal atomization.	**HW 6** 6, 12, 20, 21 A (Excel)
Molecular Spectroscopy	
Chapter 13: An introduction to molecular UV/Vis absorption spectroscopy.	**HW 7** 8, 9, 24 (Excel)
Chapter 14: Applications of molecular UV/Vis absorption spectroscopy.	**HW 8 (optional)** 7, 8, 10 (Excel)
Chapter 15: An introduction to molecular luminescence spectrometric techniques.	**HW 7 (optional)** 9, 12, 13

❖ **Course Objectives:**

This course aims at studying basic principles of instrumentation such as: instrument components, calibration methods, and signal-to-noise ratio. It aims to understand the theoretical principles, detailed instrument components, and analytical applications of some atomic and molecular spectroscopic methods.

❖ **Specific Outcomes of Instruction (Course Learning Outcomes):**

After completing this course, the students will be able to:

	Course Learning Outcomes (CLO)	(SO*)
CLO1	Discuss general ideas about analytical methods and their figures of merits.	a
CLO2	Discuss general ideas about calibration techniques and their applications.	a
CLO3	Discuss ideas about signal and noise.	a
CLO4	Learn about the basic instrumental methods based on optical spectrometry.	a, b
CLO5	Learn about the different components of optical instruments.	a, b
CLO6	Discuss basic ideas about atomic absorption and emission spectrometric techniques	a, b, e
CLO7	Discuss basic ideas about molecular absorption spectrometric techniques	a, b, e
CLO8	Discuss the applications of atomic and molecular spectroscopy.	a, b, e
CLO9	Perform and discuss home-works, questions, and assignments on various topics during the semester.	a, b, d, f

*(SO) = Student Outcomes Addressed by the Course.

❖ **Student Outcomes (SO) Addressed by the Program:**

#	Outcomes Description Chemistry Student Outcomes	Contribution
(a)	An ability to identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.	H
(b)	An ability to formulate or design a system, process, procedure or program to meet desired needs.	H
(c)	An ability to develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.	--
(d)	An ability to communicate effectively with a range of audiences.	L
(e)	An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.	M
(f)	An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.	L
H = High, **M** = Medium, **L** = Low		

General Notes: (Attendance Policy) students are expected to attend every class and arrive on time in compliance with HU regulations. In case you find yourself in a situation that prevents you from attending class or exam, you have to inform your instructor. If you miss more than 5 classes, you cannot pass the course. Makeup excuses will be accepted only for very limited justified cases, such as illness and emergencies. Missing a quiz or an exam without an acceptable excuse will result in a grade of zero. Changing your section without informing your instructor is not accepted at all.

Good Luck !

Dr. Ayman Issa