



Philadelphia University
Faculty of Science
Department of Basic Sciences
First Semester, 2019/2020

Course syllabus

Course title: Analytical Chemistry	Course code: 0212241
Course level: 2	Course prerequisite (s) and/or corequisite (s): Pass General Chemistry
Lecture time: 11:10-12:10	Credit hours: 3
	Location: 2901 / Science building

Academic Staff Specifics

Name	Rank	Office number and location	Office hours	E-mail address
Khadeejah Al Abrouni	Lecturer	Nursing building 9212	10-11 am Sun., Tue., Thur.	kabrouni@philadelphia.edu.jo
		Science building 1019	12-1 pm Sun., Tue., Thur. 10-11 am Mon.,Wed.	

Course description (According to the University Catalogue)

Introduces the fundamentals of analytical chemistry, such as the concentration expressions and calculations based on chemical stoichiometry. Gravimetric analysis titrations, acid-base titration curves, equilibrium principles, in addition to chromatography, and spectrophotometry.

Course objectives:

- Presents a basic introduction of analytical chemical concepts and development of stoichiometric principles.
- Understand the difference between accuracy and precision and the figures of merit used to
- Teach the proper use and importance of measurement statistics.
- Develop a greater understanding of relevant chemical equilibria (solubility, acid-base, and oxidation/reduction), and to apply this knowledge in solving different types of equilibrium-based problems (pH, principal species, etc.).
- To become adept at problem solving, by learning interpret data, employ valid and efficient methods of analysis.

Course/ resources

- **Text book/ books (title , author (s), publisher, year of publication)**

Title:Fundamentals of Analytical Chemistry, 8th edition

Author: D.Skoog,D.West, F.Holler and S.Crouch.

Publisher:Thomson, Brooks/Cole 2004

ISBN:0-03-035523-0

- **Support material (s) (vcs, acs, etc).**
- **Study guide (s) (when applicable)**
- **Laboratory Handbook/ books (when applicable)**

Teaching methods

Lectures, discussion groups, problem solving, tutorials, , debates, etc.

Learning outcomes:

- Knowledge and understanding

Upon completion of this course students will be able to:

- Understand the difference between qualitative and quantitative chemical analysis.
 - Differentiate between acids and bases and identify their strengths.
 - Use chemical equilibrium theory to design quantitative analyses and interpret results.
 - Solving different types of equilibrium-based problems (pH, principal species, fractional composition, etc.).
 - Understand the different types of titrations and the calculations based on these types.
 - Understand the principles of spectrophotometry, chromatography, and their applications.
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- Cognitive skills (thinking and analysis).
 - Read, evaluate, and interpret numerical, chemical and general scientific information.
 - Identify and solve problems, work with given information and handle analytical calculations based on chemical equations.
 - Apply critical thinking and hypothesis-driven methods of scientific inquiry
 - Use critical thinking and logic in the solution of problems
 - Solve quantitative problems using basic mathematical skills

- Communication skills (personal and academic).
 - Develop, interpret, and express ideas through written communication(home works)
 - Improve general performance for student through the interaction with each other in solving different chemical problems (social media)
 - Encourage the students to be self starters (creativity, decisiveness, initiative) and to finish the chemical problems properly (flexibility, adaptability).
- Transferable Skills.
 - To generalize the analytical and quantitative skills gained in this course and to apply them in more advanced courses and throughout ones career.
 - Employ valid and efficient method of analysis and to assess whether or not the result of calculation are reasonable.
 - possess initiative in problem solving
- Psychomotor Skills (When applicable)

Assessment instruments

- Exams (First, Second and Final Exams)
- Quizzes.
- Homework assignments

<u>Allocation of Marks</u>	
Assessment Instruments	Mark
First examination	20
Second examination	20
Final examination: 40 marks	40
Quizzes, homework.	20
Total	100

Documentation and academic honesty

- Documentation style (with illustrative examples)
Whenever applicable, students should conduct their assignments themselves whether individually or in a group work referencing all information, data, figures and diagrams taken from literature. The references should be given according to the acceptable format.
- Protection by copyright
Students should realize that some published information or data are the property of their authors and they are not allowed to use it without asking permission from the originators.
- Avoiding plagiarism.
Plagiarism is the unauthorized use or close imitation of the language and thoughts of another author and the representation of them as one's own original work, without proper acknowledgment of the author or the source. Students must pursue their studies honestly and ethically in accordance with the academic regulations. Cheating in exams and plagiarism are totally unacceptable and those who, intentionally, commit such acts would be subjected for penalties according to the University regulations.

Course/ academic calendar

week	Basic and support material to be covered	Homework/reports and their due dates
(1)	Course introduction; An introduction to the analytical chemistry, Language of analytical chemistry.	
(2)	Methods of expressing the concentrations, Applications involving molarity, normality and weight percent calculations	
(3)	Gravimetical Analysis	Quiz
(4)	Calibration methods	
(5)	(Principle of and application of equilibria: Equilibria, Acid-base Equilibria in aqueous solution	
	First examination	
(6)	Titration volumetric calculations. Standard solution titration curves	
(7)	Gravimetical Analysis	
(8)	Acid base Titrations: Strong acid Vs strong base, weak acid Vs strong base, weak base Vs strong acid.	Homework Quiz
(9)	pH calculations (Curves and pH electrode) and some applications	
(10)	Buffer solutions and physiological buffers	
	Second examination	
(11)	Fundamentals of spectrophotometry	
(12)	Applications of spectrophotometry	Quiz
(13)	Analytical Separation and Chromatography	
(14)	Electrochemistry	
(16)	Final Examination	

Expected workload:

On average students need to spend 2 hours of study and preparation for each 50-minute lecture/tutorial.

Attendance policy:

Absence from lectures and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse acceptable to and approved by the Dean of the relevant college/faculty shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.

Other Education Resources

Books

References

1. Title: *Analytical Chemistry*, 6th edition
Author : **Gary D. Christian**
Publisher: Wiley, 2004
ISBN: 9780471214724

Journals

Websites

Analytical Chemistry:

- www.acs-analytical.duq.edu
- www.chem.uni-potsdam.de/linkcenter/analchem.html
- www.cstl.nist.gov/nist839
- www.rsc.org/lap/rsccom/dab/analdiv.htm
- <http://analytical.chemweb.com/home>
- www.aoac.org (AOAC International)
- www.apha.org (APHA)