



Philadelphia University  
Department of Basic Sciences  
First Semester 2012/2013

Faculty of Science

## Syllabus, Analytical Chemistry, 0212241

### Academic Staff Specifics

Instructor: Dr. Nader Robin Al Bujug

Academic rank: Assistant Professor

Office: Faculty of Science (1018)

My office hours and schedule: 09.00-10.00, Su, Tu, Thu and 11:30-12:30 Mo, Wed

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### Course Syllabus

Course Title: Analytical Chemistry

Course code: 0212241

Course Level: 2

Course prerequisite (s) and/or corequisite (s): pass General chemistry I (0212101)

Credit hours: 3

Lecture Time: 09:45-11:15 (Mo. Wed)

### The required text book

1. Title: *Quantitative chemical Analysis*, 7th edition

Author : **Daniel C. Harris**

Publisher: W.H. Freeman 2006

ISBN: 9780716770411

### **Course module description:**

Introduces the fundamentals of analytical chemistry, such as the concentration expressions and calculations based on chemical stoichiometry. Gravimetric Analysis Titrations and acid base titration curves besides chromatography and spectrophotometry and equilibrium principles.

**Course module objectives:**

This course is devoted to the exploration of principles of qualitative and quantitative analysis, Gravimetric analysis, methods expressing of the concentrations, principles of volumetric analysis, acid-base equilibrium in aqueous solutions, acid-base titration and their applications. In addition to the spectroscopic and chromatographic applications.

**Teaching methods:**

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

**Learning outcomes:**

## Knowledge and understanding

- Have an understanding of chemical calculations (aspects of stoichiometry using the mole unit).
- Understand the different types of titrations and the calculations based on these types.
- Understand the principles of spectrophotometry, chromatography, and their applications.
- Cognitive skills (thinking and analysis). To identify and solve problems. work with given information and handle analytical calculations based on chemical equations. And ability to differentiate between acids and bases and identify their strengths.
- Communication skills (personal and academic).
- Encourage the students to be self starters (creativity, decisiveness, initiative) and to finish the chemical problems properly (flexibility, adaptability). Also to improve general performance of students through the interaction with each other in solving different chemical problems.
- Practical and subject specific skills (Transferable Skills). Gaining knowledge and experience of working with relevant modern laboratory equipment.

**Assessment instruments**

Short reports and/ or presentations, and/ or Short research projects

Quizzes.

Home works

Final examination: 40 marks

<b>Allocation of Marks</b>	
<b>Mark</b>	<b>Assessment Instruments</b>
<b>20</b>	First examination
<b>20</b>	Second examination
<b>40</b>	Final examination
<b>20</b>	3 short Quizzes and Home works
<b>100</b>	Total

Course/module academic calendar

<b>Basic and support material to be covered</b>	<b>Week</b>
Course introduction; An introduction to the analytical chemistry, Language of analytical chemistry.	<b>(1)</b>
Methods of expressing the concentrations	<b>(2)</b>
Applications involving molarity, normality and weight percent calculations	<b>(3)</b>
Calibration methods	<b>(4)</b>
Principle of and application of equilibria: Equilibria, Acid-base Equilibria in aqueous solution.	<b>(5)</b>
Titration volumetric calculations. Standard solution titration curves	<b>(6)</b> <b>First Exam</b>
Gravimetric Analysis	<b>(7)</b>
Acid base Titrations : Strong acid Vs strong base, weak acid Vs strong base, weak base Vs strong acid.	<b>(8)</b>
pH calculations (Curves and pH electrode) and some applications	<b>(9)</b>
Buffer solutions and physiological buffers	<b>(10)</b>
Electrochemistry	<b>(11)</b>
Fundamentals of spectrophotometry	<b>(12)</b> <b>Second Exam</b>
Applications of spectrophotometry	<b>(13) + (14)</b>
Analytical Separation and Chromatography	<b>(15) + (16)</b>

### 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.

### References

1. Title: *Fundamentals of Analytical Chemistry*, 8th edition

Author : **Douglas A. Skoog**

Publisher: Brooks cole 2004

ISBN: 0534417973

2. Title: *Analytical Chemistry*, 6th edition

Author : **Gary D. Christian**

Publisher: Wiley, 2004

ISBN: 9780471214724

### Journals and Websites

*Analytical Chemistry:*

[www.acs-analytical.duq.edu](http://www.acs-analytical.duq.edu)

[www.chem.uni-potsdam.de/linkcenter/analchem.html](http://www.chem.uni-potsdam.de/linkcenter/analchem.html)

[www.cstl.nist.gov/nist839](http://www.cstl.nist.gov/nist839)

[www.rsc.org/lap/rsccom/dab/analdiv.htm](http://www.rsc.org/lap/rsccom/dab/analdiv.htm)

<http://analytical.chemweb.com/home>

[www.aoac.org](http://www.aoac.org) (AOAC International)

[www.apha.org](http://www.apha.org) (APHA)