

John Jay College of Criminal Justice/CUNY
524W 59th Street, New York, NY 10019

Department of Sciences

Che 220: Quantitative Analysis (4 credits)

Instructor: Dr. Rodney Versace
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Lecture: M/W 1:40 pm – 4:20 pm

Office Hour: by appointment

Prerequisites: Eng. 101, Che 103-104

Course description:

Quantitative Analysis (Che 220) introduces the theory and application of classical methods of gravimetric and volumetric analysis including acid-base, precipitation, complexometric and redox titrations. Basic calculations and data treatment methods used in quantitative analysis are covered. Ethics in science/forensic science is also discussed. Students learning will be assessed.

Student Learning Goal:

After completing this course students are expected to:

- (1) Acquire basic knowledge in classical analytical chemistry;
- (2) Understand the application of scientific principles in the gathering and interpretation of scientific data;
- (3) Develop advanced critical thinking and analytical reasoning skills, and competence in oral and written form of scientific communication.

Course outline:

Session	Topics	Readings
1	Introduction, Ethics, Laboratory techniques (05/29)	Chapter 1,2,3
2	Basic calculations; Errors and data handling (06/03)	Chapter 4, 5
3	Statistical data treatment; Calibration methods (06/05)	Chapter 6,7D,8
4	Exam 1 (06/10)	
5	Exam review Aqueous solution and chemical	Chapter 9

	equilibra (06/12)	
6	Aqueous solution and chemical equilibra (continue) (06/17)	Chapter 9
7	Ionic strength and activity (06/19)	Chapter 10
8	Exam 2 (06/24)	
9	Exam review Gravimetric Analysis (06/26)	Chapter 12
10	Titrimetric methods, Precipitation titrimetry (07/01)	Chapter 13
11	Neutralization titration (07/03)	Chapter 14
12	Complex acid/base system and application of neutralization titration (07/08)	Chapter 15, 16
13	Exam 3 (07/10)	
14	Exam review; Complexometric titration (07/15)	Chapter 17
15	Redox titration (07/17)	Chapter 19, 20
16	Introduction to Electroanalysis Class review (07/22)	Chapter 18
17	Final Exam (July 24, 2012)	

Grading:

The final course grade is contributed by lab (40%), a research paper (5%), quiz (5%), three hour-exams (two highest grades will be used, and the lowest one will be dropped. 30%, 15% each), and a final exam (20%). During exams, other than a scientific calculator, no other electronic devices are allowed to be used. The grade solely depends on student's performance, rather than any other personal reason, and there is no compromise of the grade. If the student misses the hour-exam because of unexpected reason, for example, sickness, a make-up exam can be requested within seven business days with an official statement to prove that reason; otherwise there will be no make-up exam and the grade will be zero. Missing the final exam will lead to an incomplete grade.

Course objective:

This course mainly focuses on introducing the theory and fundamentals of classical analytical methods, and application of the related knowledge to perform quantitative analysis in a laboratory. The students are expected to gain basic scientific writing skills through completing lab reports and a writing assignment.

Expected Learning outcomes:*Reasoning*

- Collect and properly analyze and interpret data from analytical procedures and information will be used to solve analytical problems.
- Use acquired data to solve appropriate problems related to analysis of various materials.
- Define the principles of optimization of results of variables based on experimental data,

- Use statistical tools to treat and interpret data

Knowledge

- Identify relevant scientific literature for classical analytical chemistry
- Demonstrate ability to search and use library resources.
- Describe the materials by relating them to real life in physical and biological aspects

Practical skills

- Apply different analytical techniques to laboratory experiments.
- Apply statistical methods to their data as a test of accuracy and reliability
- Maintain accurate record and documentations for all procedures carried out in the laboratory

Communication

- Conduct scientific discussion during class; enforce scientific writing skills by assigning comprehensive laboratory report and research paper

Cheating:

The students are expected to complete the laboratory work independently. Submission of identical lab report or sharing data without the permission of the lab instructor is treated as cheating. Cheating on an exam, homework or lab assignment will result in a zero for that particular experience, or lead to a stricter penalty based on college policy.

Statement of College Policy on Plagiarism:

Plagiarism is the presentation of someone else's ideas, words, or artistic, scientific, or technical work as one's own creation. Using the ideas or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source.

Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism.

It is the student's responsibility to recognize the difference between statements that are common knowledge (which do not require documentation) and restatements of the ideas of others. Paraphrase, summary, and direct quotation are acceptable forms of restatement, as long as the source is cited.

Students who are unsure how and when to provide documentation are advised to consult with their instructors. The Library has free guides designed to help students with problems of documentation.

(From the John Jay College of Criminal Justice Undergraduate Bulletin, p. 36)

Textbook:

D.A. Skoog, D.M. West, F.J. Holler, *Fundamentals of Analytical Chemistry*, 8th ed. Thomson/Brooks Cole Publishing, 2004 ISBN: 0-03-035523-0

JOHN JAY COLLEGE OF CRIMINAL JUSTICE
THE CITY UNIVERSITY OF NEW YORK
QUANTITATIVE ANALYSIS
CHE: 220-802
SUMMER 2013
SYLLABUS

Instructor: Elaan Lukasiewicz

Office Hours: Appointments Only

Email: elaanluk@yahoo.com

Laboratory: Tuesday & Thursday 1:15-6:15pm

Grading:

50% - Unknowns (worth 5 points each)

10% - Preparatory samples (worth 1.25 points each)

10% - Notebook Presentation (worth 5 points)

10% - Quiz (worth 5 points)

10% - Formal Lab Report (worth 5 points)

10% - Performance in the Lab (worth 5 points)

Unknowns:

There are a total of 5 unknowns, worth 5 points each.

- Gravimetric Determination of Chloride
- Titration of Chloride with Silver Nitrate
- Determination of Potassium Hydrogen Phthalate (KHP) by Acid/Base Titration
- Determination of Magnesium by Complex-Formation Titration
- Determination of the Percentage of Iron Ore sample

Preparatory Samples:

There are a total of 4 samples, worth 1.25 points each.

- Vinegar
- Determination of Hardness of Water
- Determining the Percentage of Iron in an Iron Ore Sample
- Determination of the % Copper in a Sample of Brass

Notebook:

- You will need a composition notebook.
- Number all the pages of the notebook. Label the left page on the upper left corner & the right page on the upper right corner.
- Tape & sign a copy of the Laboratory Safety Rules on the inside front cover.
- The first page of your notebook will be the table of contents

Experiment #	Experiment Title	Pages	Report Page	Instructor Initials
1	Gravimetric Determination of Water in Barium Chloride	2-6	N/A	N/A

- Report page & Instructor initials will be used for unknowns only.

Format of Lab Notebook:**This part should be completed BEFORE lab**

Experimental # and Title: _____ *top of the page*

Unknown ID: _____ **Lab Tech Initials:** _____

Date Unknown Received: _____

Purpose: (1-2 sentences)

Procedure: (Do not plagiarize from the lab manual)

This should be completed DURING lab

Observations of Known: (All data collected, any color change, mass & volumes)

Calculations for Known

Observations of Unknown: (All data collected, any color change, mass & volumes)

This should be completed AFTER lab

Calculations for Unknown

Discussion: (1-2 paragraph summary of the results and data analysis. Explain standards and unknown data.)

Last page of an unknown should be written on a fresh page

Report Unknown Page – *(Write on the top of the page)*

Unknown ID: _____

My Unknown _____ **has a** _____ **concentration of** _____ **%**

Sign your name and date

Notebook Rules:

- In order to receive your unknowns you must first finish the known portion of the lab. You will run the known sample three times simultaneously.
- Notebook must be handed in to the instructor to record the unknown reports throughout the semester.
- Notebooks will be due the last day of lab. NO EXCEPTIONS
- Notebooks must be written in pen. If you make a mistake, line out with a single line, then initial and date
- Do not use scrap paper. Points will be deducted. Always record your observations in your notebooks.

Quiz:

- July 11th: first 15 minutes of class.
- Maybe a bonus quiz the last day of class

Formal Lab Report:

- The lab report is due the last day of class
- All details of the lab report will be discuss on June 14th

Attendance:

You should try not to be absent because you must complete all labs before the end of the semester. If you miss one lab we can work something out. If you miss more than one lab lab you are at risk of failing the lab portion of the class.

Lab Performance:

- **Always keep your area clean. If you do not you will lose points.**
- **Excessive breaking of glassware you will lose points.**

Lab Safety Rules:

- **You must wear goggles**
- **You must wear gloves**
- **You must wear a lab coat**

There are no exceptions to these rules.