Dr. A. Kocak   **Tel:** 212-484-1382
Room: 5.66.13   **Email:**akocak@jjay.cuny.edu
Lecture: Monday & Wednesday 2:50-4:08 pm   Room NB/L2.82
Office Hours: 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 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.

Course Outline:

Session	Dates	Topics	Readings
1	28-Jan	Introduction	Ch. 1
2	30- Jan	Introduction/ Laboratory Techniques	Ch. 2 (parts)
3, 4	Feb 4, 6	Lab techniques/ Error and Data Handling	Ch. 3, 5, 6, 7,8 (parts)
5	11	Error and Data Handling	Ch. 3, 5, 6, 7,8 (parts)
6	13	Method validation, Stoichiometry Review	Ch. 4
7	20	Gravimetric Analysis	Ch.12
8	25	Gravimetric Analysis	Ch.12
9	27	Volumetric Analysis	Ch. 13 (P.337 -349)
10	March 4	Volumetric Analysis	Ch. 13 (P.337 -349)
11	6	Acid - Base Equilibrium	Ch. 9 (228 – 229, 242 – 260)
12	11	Other Equilibria	Ch. 9(P.238-242) Ch. 17 (P.449-454)
13	13	**Midterm Examination**	
14, 15	18, 20	Activity Coefficients	Ch. 10
16	April 3	Multiple Equilibria and Solubility	Ch. 11 (parts)
17, 18	8, 10	Precipitation Titrations	Ch. 13 (P. 349 -363)
19	15	Acid Base Titration Curves	Ch. 14
20	17	Polyprotic acids	Ch. 15
21	**22**	Applications of Acid Base Titration	Ch. 16
22, 23	24, 29	Introduction to Electrochemistry	Ch. 17 (P. 455-482)
24	May 1	Introduction to Electrochemistry	Ch. 19 (Parts)
25	6	Introduction to Spectroscopic techniques	Ch. 24-28 (Parts)
26	8	Introduction to Spectroscopic techniques	Ch. 24-28 (Parts)
27	13	Introduction to Seperation techniques	Ch. 30-33 (Parts)
28	15	Introduction to Seperation techniques	Ch. 30-33 (Parts)

NOTE:
(1) Reading list and the sequence are subject to minor changes. New reading materials may be added during lectures.
(2) The final exam is scheduled during the last week of the semester. If you plan to travel, please arrange in advance and make sure that you can attend the final exam. No extra exam will be offered except every special situation.

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(3) In addition to laboratory work and attending lecture, students are expected to spend considerable amount of time on studying this course.
(4) During exams, other than a scientific calculator, no electronic devices will be allowed.

POLICY ON ATTENDANCE, ETIQUETTE, AND PARTICIPATION

- You are responsible for attending all sessions of the course. A medical note from a doctor or nurse must be provided for an absence to be excused. A student is not regarded in attendance if he or she has been absence for the part of the class period. In accordance with the attendance policy of John Jay, if you are absent from class more than four times without excuse, you will fail the course. Each student has a responsibility to learn the policy on attendance of John Jay: www.jjay.cuny.edu/academics/763.php
- During the lectures no cell phones or texting allowed.
- No food allowed during the lecture, be sure you complete your breakfast prior to the class. Do not bring food to the class.
- Communication and participations in the class is strongly suggested.
- During the exams, students may not be admitted after 10 minutes from the start of the exam.

GRADING:

The final course grade is contributed by lab (40%) and the lecture (60%).

1-*Lecture:*
There will be two exams including the final (optional extra exam may also be given).
The grades will be calculated as follows:
First exam: 20%
Second (final) cumulative exam: 30%.
Your preparation for the lecture and participations in the class, quizzes, and overall assessment of your learning: 10%
This will add to total of 60%.

2- *Lab:*
The lab total grade will count 40% of the class. The breakdown of the grading will be given to you in the lab. The handouts for lab are provided separately.

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.

Grade	Value	%Equivalent	
A	4	93-100	Excellent
A-	3.7	90.0- 92.9	Excellent
B+	3.3	87.1- 89.9	Very Good
B	3	83.0- 87.0	Very Good
B-	2.7	80.0- 82.9	Very Good
C+	2.3	77.1- 79.9	Satisfactory
C	2	73.0- 77.0	Satisfactory
C-	1.7	70.0- 72.9	Passing
D+	1.3	67.1- 69.9	Passing
D	1	63.0- 67.0	Passing
D-	0.7	60.0- 62.9	Passing
F	0	Below 60.0	Failure

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

BEST WISHES FOR A SUCCESSFUL SEMESTER

Quantitative Analysis Chemistry/Lab Grading

Last, First Name	Semester:

Analysis of FIVE (5) Unknowns, each worth FIVE (5) points

	Result	True Value	RE	Grade	
Gravimetric Determination of Chloride					
Determination of Chloride with Silver Nitrate					
Titration of KHP with Standardized NaOH					
Determination of Magnesium by Complex-Formation Titration					
Determining the Percentage of Iron in an Irom Ore Sample					
					TOTAL

Analysis of FOUR (4) Samples, each worth ONE (1) point

	Grade	
Determination of Hardnes sof Water (Percentage of $CaCO_3$ in water sample)		
Titration of Vinegar with Standardized NaOH (Percentage of acetic acid in vinegar)		
Determination of the Percentage of Iron in a Razor Blade		
Determination of the Percentage of Copper in a Sample of Brass (Bullet casing)		
		TOTAL

	Grade	
Research paper (10 pts)		
Notebook Presentation (5 pts)		
Performance in Lab (5 pts)		
		TOTAL

Relatve Error = (True Value - x)/True Value * 100

RE	Grade
0-5.0	5
5.0-10.0	4.5
10.0-15.0	4
15.0-20.0	2
+/- 20.0	1