Quantitative Analysis Lab
Chem 222

Course Date:  Tues. Aug., 21, 2017 through Thursday, Dec., 6, 2018
Location:    Fulmer 207
Meeting day/Time: Section 1 (Tuesday):  2:50- 5:40 PM
            Section 2 (Thursday): 2:50-5:40 PM
Prerequisite: Chem 220 with a C or better or concurrent enrollment

Instructor Information
Prof. Jeremy Lessmann
Email: jlessman@wsu.edu
Office: Fulmer 311
Office Hours: By Appointment or Tues/Thurs 9:30-10:30
Phone: 509-335-2098

TA:  TBA

Highly Recommended textbook: Quantitative Analysis, Daniel Harris, 8th ed or 9th ed.

Blackboard usage: learn.wsu.edu
Here you will find the lab manual and any common course data files that will be generated over the semester. All course communication will occur via blackboard.

Course Requirements and attendance:
Chem 222 is an intensive, hands on laboratory course. Your ability to obtain accurate and/or precise results is a key factor in measuring your success in the course. In cases where group work is required, the effort of each individual will be considered when assigning grades. Students with legitimate WSU approved absences or medical excuses will be allowed to make up one missed lab.

Required Materials
1. Scientific Calculator
2. Approved Safely Goggles
3. Lab coat
4. Duplicating Notebook (You can reuse ones from other courses)
5. Access to a Personal Computer and printer. (You have access to the computers in Fulmer 401)
6. USB thumb drive
Student Learning Outcomes: (Chemistry Dept. Outcomes in () as given at https://undergrad.chem.wsu.edu/majoring-in-chemistry/)

At the end of this course student will be able to:

1. Perform the most common forms of chemical analysis to quantify properties of an unknown chemical compound, gravimetric analysis, titrimetric analysis, atomic and molecular optical spectroscopy, gas chromatography, and potentiometric measurements. (2,7) (Assessed in at least one experiment each)
2. Perform basic statistical analysis of data including the proper use of averages, standard deviations, propagation of error and errors in calibration curves. (2,5,7) (Assessed in all Experiments and Lab Practical)
3. Setup and use of calibration curves, standard addition curves and internal standard methods to quantify unknowns. (5) (Assessed in Experiments, 7 or 11, or 12, and Lab Practical)
4. Prepare solutions for chemical analysis especially the preparation of solutions with accurately known concentrations and the dilution of solutions to useful concentration ranges. This includes the use of commonly encountered laboratory equipment (analytical balance, pipettes and pipettors, volumetric glassware…). (1,5) (Assessed in every Experiment)
5. Apply the theory of chemical equilibrium and solve practical chemical problems. (1,2,7) (Assessed in Experiments 2,3,4,5,6 and Lab Practical)
6. Keep a laboratory notebook (4,7) (Assessed in every Experiment)
7. Write formal laboratory reports. (4,7) (Assessed in Experiments 5 and ,11)

Assessment of Learning Outcomes:

Assessments of the above learning outcomes are provided for in the student prepared laboratory reports as indicated.

Lab Reports:

Lab reports have 2 parts a pre-lab and a post-lab. Part of the lab report grade will be assessment of the duplicate pages of your lab notebook that you turn in with each report. Further details are found in the Lab Manual on Blackboard. Regular weekly Lab Reports are due one week after the lab is completed. The Lab Practical Report is turned in at the end of the period you do it. Points will be deducted from late work at a rate of 10% per weekday late unless prior arrangements are made. Last minute emergencies will be considered. Reports more than 1 week late will not be accepted unless prior arrangements are made. It’s better to turn in something rather than nothing.

Grading Policy

Accuracy: Approximately 10 points of your Lab report grade for certain experiments (indicated in the lab manual) will be based on the accuracy of your results. Specific ranges are in a table in the lab manual introduction

Evaluation:
Statistics Assignment 150 pts
Pre-labs (11 @ 30 points) 330 pts
Post-Lab report (11 @ 70 points) 770 pts
Formal Reports (2 of above) @50 pts extra 100 pts
<table>
<thead>
<tr>
<th>Lab Practical</th>
<th>200 pts</th>
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<tr>
<td>Total Possible</td>
<td>1550 pts</td>
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Grade Cutoffs (minimum required to achieve a certain grade)

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<tr>
<th>Grade Cutoffs</th>
<th>Minimum Required</th>
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<tbody>
<tr>
<td>1600-1440 (A)</td>
<td>1439-1364 (A-)</td>
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<tr>
<td>1249-1191 (B-)</td>
<td>1190-1143 (C+)</td>
</tr>
<tr>
<td>1035-988 (D+)</td>
<td>987-930 (D)</td>
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<tr>
<td>Below 930 (F)</td>
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The instructor may lower the cutoffs but will never raise them.

**Academic Integrity:** I encourage you to work with classmates on assignments and you will be working with partners for some experiments. However, each student must turn in original work. No copying or sharing of spreadsheets will be accepted. Students who violate WSU's Standards of Conduct for Students may receive an F as a final grade in this course, will not have the option to withdraw from the course and will be reported to the Office Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions.

**Students with Disabilities:** Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center. For more information contact a Disability Specialist [http://accesscenter.wsu.edu](http://accesscenter.wsu.edu) or Access.Center@wsu.edu

**Classroom Safety Information:** Classroom and campus safety are of paramount importance at Washington State University, and are the shared responsibility of the entire campus population. WSU urges students to follow the “Alert, Assess, Act,” protocol for all types of emergencies and the “Run, Hide, Fight” response for an active shooter incident. Remain **ALERT** (through direct observation or emergency notification), **ASSESS** your specific situation, and **ACT** in the most appropriate way to assure your own safety (and the safety of others if you are able).

Please sign up for emergency alerts on your account at MyWSU. For more information on this subject, campus safety, and related topics, please view the [FBI's Run, Hide, Fight video](http://www.fbi.gov) and visit the [WSU safety portal](http://safety.wsu.edu).