2014

227 Quantitative Analysis Lab

Supaporn Kradtrap-Hartwell

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Instructor : Dr. Supaporn Kradtap Hartwell
Contact : Logan Hall, Room 304 A, email: kradtaps@xavier.edu Phone: 745-3397
Office hours: M W F 11.00 AM-12.00 N and T R 2.15-3.00 PM
Class meetings: W 1.30– 5.20 PM Room 301 Logan Hall

Course description: The course dealing with practical works in analytical chemistry emphasizing on the quantitative analysis via the methods of titrimetry and gravimetry. Proper calibration of glassware and statistical analysis of data are also introduced.

Prerequisites: Chem 162 (Gen. Chem. II)
Please bring calculator to class

Tentative Schedule

<table>
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<tr>
<th>Week</th>
<th>Experiment</th>
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| Jan 15 | Lab check in and clean glassware  
Knowing lab apparatus and glassware  
Material safety data sheet |
| Jan 22 | Calibration of balance and volumetric glassware |
| Jan 29 | Coin statistics |
| Feb 5  | Understand calibration curves |
| Feb 12 | Gravimetric determination of phosphorus in plant food |
| Feb 19 | Determination of neutralization power of antacid by back titration |
| Feb 26 | Complexometric titration for finding water hardness |
| Mar 5  | -Spring break- |
| Mar 12 | Determination of dissociation constant (Ka) of weak acid with potentiometric titration |
| Mar 19 | Conductometric titration of mixed acids |
| Mar 26 | Green analytical chemistry: Quantitative analysis of iron in supplement tablet with Vis-spectrometry using tea drink as chromogenic agent |
| April 2 | -snow day/prepare oral presentation- |
| April 9 | Oral presentation |
| April 16 | Oral presentation |
| April 23 | Final Exam |

NOTE: This syllabus is subject to change depending on class progress and extenuating circumstances. Any changes to this syllabus will be announced to the class in as timely a manner as possible.

Grading:

Lab notebook, attention and work efficiency: 10%
Lab reports: 75%
Quiz: 5%
Final exam: 10%

Attendance: Attendance is required to complete the assigned laboratory experiments. Only documented illness and emergencies will be considered excused absences.

Grading scale: A 94-100  A- 91-93,  B+ 88-90  B 84-87  B- 80-83  C+ 77-79  C 73-76  C- 70-72  D+ 67-69  D 60-66  F 59 and below

Upon review at the end of the semester, this scale may be adjusted downward.

Missing more than 2 experiments will result in Grade F
NOTE:

1) According to the Xavier University Catalog, a grade A is earned for exceptional performance. This is also the grading policy of the faculty in the Chemistry Department. (Department Grading Policies can be found at http://www.xavier.edu/chemistry/dept_policies_grading.cfm)

2) Academic Honesty: Cheating on any test or examination will result in a grade of “F” for the course. The student may appeal according to normal procedures stated in the university catalog.

3) It is the responsibility of the student to inform the instructor at the beginning of the semester of any individual conditions that may require special attention. Appropriate consideration will be given in these situations.

4) Test/Exam absence: In case of sickness, bring letter from doctor and contact the instructor as soon as possible to schedule for test/exam. In case of necessary business e.g. sport meet, family issue, contact instructor in advance with letter from your academic advisor or sport director/coach to schedule for test/exam. Missed test/exam cannot be made up without evidence/document of reasonable excuses.

Lab Notebook: Students are required to read the lab manual, summarize lab procedure (flow chart is acceptable), make necessary calculations, and prepare tables for recording data ahead of time. Each student must have a lab notebook dedicated to this laboratory only.

Safety glasses: Students will not be allowed to work in the lab without lab goggles.

Lab Reports: A lab report must be turned in the week following every completed experiment.

Lab Report Format:

- Introduction: Describe background information on technique, instrument, chemical structure/reaction/principles used in the experiment. Cite references appropriately using numerical indication. Add opinion at the end why the particular analysis is useful/important

- Chemicals/materials/apparatus: List all the chemicals, materials, and instruments used. Also include concentrations used, source company (if possible), and model No. of the instrument.

- Experimental Procedures: Describe the experimental procedures in your own words/flow chart.

- Results and Discussion: Summarize results in Table or graph format (include printout of spectra or chromatogram), make sure to give the appropriate Table/Figure/Graph Titles and assigned the suitable labels and units. Refer to these Tables/Figures in text. Discuss the results including all calculation for final answer.

- Conclusions: Short comment on the results, possible errors, and future plan to improve the analysis

- References: List all references used, corresponding to the number cited. References should contain all authors’ names, topic of article or book, name of the Journal or book, page No., Year published. In case of Book references, publisher and city where the books were published should be included. In case of web site, only the reputable web sites should be cited and web site addresses and accessed date should be included.

- Supplemental data/Appendix: At the end of the report, please show all detailed calculations for chemical/reagent/sample preparation. This part should also include safety information of the chemicals used in the experiment. You can find MSDS online, note any safety precaution that should be taken when handling certain chemicals.

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

- Properly calibrate balance and volumetric glassware
- Properly clean, use, read scale of various glassware
- Understand the analysis process based on titrimetric and gravimetric methods
- Interpret data obtained from each experiment by carrying out suitable statistic calculation as well as report important analytical parameters
- Properly prepare standard and sample solutions using appropriate glassware and technique
- Write a scientific report with suitable discussion using appropriate writing format
- Read and extract important information from scientific articles
- Deliver oral presentation to the audience