

JON W. CARNAHAN - INSTRUCTOR

| Week | Date | Chapters | Topics |
|------|------|---------------------|--|
| 1 | 1/12 | 1 - 5 Appendix 1 | Electronics, Signals, and Noise Statistics |
| 2 | 1/19 | 6 - 7 | Electromagnetic Radiation/Spectrometric Components |
| 3 | 1/26 | 8 - 10 | Atomic Spectrometry |
| 4 | 2/2 | 8 - 10 | Atomic Spectrometry |
| 5 | 2/9 | 13 - 18 | Molecular Spectrometry |
| 6 | 2/16 | 13 - 18 | Molecular Spectrometry |
| 7 | 2/23 | 13 - 18 | Molecular Spectrometry |
| 8 | 3/2 | 11 & 20 | Mass Spectrometry |
| 8 | 3/9 | | No classes - spring break |
| 9 | 3/16 | 11 & 20 | Mass Spectrometry |
| 10 | 3/23 | 12 & 21 | X-Ray Spectrometry and Surface Characterization |
| 11 | 3/30 | 22 - 25 | Electrochemistry |
| 12 | 4/6 | 22 - 25 | Electrochemistry |
| 13 | 4/13 | 22 - 25 | Electrochemistry |
| 14 | 4/20 | 22 - 25 | Electrochemistry |
| 15 | 4/27 | 22 - 25 | Electrochemistry |

Text *Principles of Instrumental Analysis*, 6th edition, Skoog, Holler and Crouch, Saunders College Publishing, 2007.

Tentative Exams 2/12, 3/19, 4/23
Final Exam Tuesday, May 5, 8:00-9:50 AM
Quizzes: To be announced. As need arises.

Grading: 85% A, 75% B, 65% C, 55% D, <55% F

Total Points Possible

| | |
|--------------------|-----|
| Highest exam score | 100 |
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|---------------------------|-----|
| Second highest exam score | 100 |
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| Lowest exam score (score divided by 2) | 50 |
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| Final exam | 150 |
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Attendance (4 points/complete lecture - **108** possible !) 100

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| Laboratory (see laboratory schedule) | 210 |
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| Quizzes and homework (announced - to be determined) | + |
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| Total | 710 + |
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CHEMISTRY 425
SPRING 2015
TENTATIVE LABORATORY SCHEDULE
Updated January 6, 2015
JON W. CARNAHAN - INSTRUCTOR
X, Y and Z - TEACHING ASSISTANTS

Sections 1 (Tuesdays 5:30-9:20 PM), 2 (Wednesday 5:30-9:20 PM) and 3 (Thursdays 2:00-5:50 PM)

| Expt # | Dates | Points | TA | Title |
|--------|-----------------|--------|-----|---|
| 1 | 1/13, 14 & 15 | 10 | All | Data Presentation and Laboratory Formats - Due 1/22 |
| 2 | 1/20, 21 & 22 | 20 | TBA | Basic Electronics & Operational Amplifiers - Due 1/29 |
| 3 | 1/27, 28 & 29 | 20 | TBA | Flame Atomic Absorption Spectrometry - Due 2/12 |
| 4 | 2/3, 4 & 5 | 20 | TBA | UV-VIS Spectrophotometry - Due 2/19 |
| 5 | 2/10, 11 & 12 | 20 | TBA | Fluorescence Spectrometry - Due 2/26 |
| 6 | 2/17, 18 & 19 | 20 | TBA | Infrared Spectrometry - Due 3/5 |
| 7 | 2/24, 25 & 26 | 20 | TBA | Liquid Chromatography - Mass Spectrometry - Due 3/19 |
| 8 | 3/3, 4 & 5 | 20 | TBA | Ion Selective Electrode - Due 3/26 |
| | 3/10, 11 & 12 | | | No Experiment - Spring Break |
| 9 | 3/17, 18 & 19 | 20 | TBA | Amperometric Titration - Due 4/2 |
| 10 | 3/24, 25 & 26 | 20 | TBA | Cyclic Voltammetry - Due 4/9 |
| 11 | 3/31, 4/1 & 4/2 | 20 | TBA | Rotating Disk Electrode - Due 4/16 |
| | 4/7, 8 & 9 | | All | Possible Demonstrations |
| | Total >> | 210 | | |

To pass the course, all labs must be completed and submitted.

Each lab must be turned in to the instructor (not the TA). Laboratories are to be handed in at the beginning of lecture on the specified Thursday due dates. The late penalties are 3 points for lab reports submitted after the beginning of the Thursday class meeting or before 4 PM the following Friday (the next day). After that, the penalty is 9 points if turned in before 4 PM on the following Monday, 12 points before 4 PM the following Tuesday, etc. An "incomplete" will be assigned for the course grade if all reports are not submitted.

Each student must have a bound notebook for data entry. Laboratory attendance is mandatory and you must collect the data presented in your report. Anyone missing a lab **MUST** make it up the following week and must have approval from the instructor (not the TA). Arrangements for these make-ups will be made on a case-by-case basis.

It is possible that some of the labs will be replaced with other labs.

CHEMISTRY 425
SPRING 2015
FORMAT FOR CHEMISTRY 425 LABORATORY REPORTS

Section I. Cover Page

List your name, title of the experiment, the experiment number, date(s) performed, date submitted, identification number of the unknown, and experimental unknown concentration (with proper units).

Section II. Introduction

Give a brief statement of the problem or experiment. State: a) the parameter to be determined; b) the method to be used; and c) the basic principle of the method.

Section III. Experimental

- A. Reference the procedure (contained in the handout) but omit procedural details unless they differ from those given in the handout.
- B. List data. Use tables when appropriate. If data is shared with consent of the instructor, give the name(s) of the lab partner(s) with whom data is shared.
- C. Provide treatment of data, graphs, sample calculations, etc.

Note: In this section, sufficient information should be provided so that the significance, as well as the eventual use, of the data is clear to a knowledgeable reader who has not read the experimental procedure. A good two-step test is: 1) Do the plots and tables stand alone? Are all units included? Do the titles clearly state the data contained? (For useful models, scan issues of *Analytical Chemistry*.) 2) Does the text adequately explain the data and calculations while highlighting the especially important values?

Section IV. Results and Discussion

Report what you have learned (for example, the concentration of the analyte in the unknown sample). Remember to identify the unknown sample by its number or letter.

Provide any necessary interpretations of your results, such as: comparisons with literature values or expected results; factors relating to accuracy and precision; sources of error; unusual aspects encountered and their possible effects on the results; and, the advantages and disadvantages (or limitations) of the general technique (but not the specific instrument). You might also suggest ideas for further work.

Section V. Conclusion

State your final determination(s) reached from your results and discussion. *No new material* should be presented in the conclusion section.

Section VI. Appendix

Include answers to specific questions and exercises posed in the handout and given by the teaching assistant.