

Syllabus
CHEM.425 Inorganic Chemistry Lab.
Spring 2011-2012.
This is a draft syllabus - not a final one.

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Course Materials: There will be three lab texts in Hagerty Reserve. We'll hand out lab experiment materials, and there will be things posted on Bb/Vista.

General:

CHEM.422 is pre- or co-requisite for 425 (the inverse does not apply).

The CHEM.425 lab-lecture is Mon., 10 AM in Disqué-307. The lab activities are in Disqué-409; there are currently two lab sections scheduled, but some scheduling may get changed between now and April 4.

Eye protection must be used during the lab periods. Fume hoods and gloves should be utilized for manipulations involving any potentially hazardous, dusty or volatile compounds. You're seniors now, so you should know the drill. A new requirement is that you have to wear a lab coat, which you can get from the student ACS group.

The lab sequence involves (a) regularly scheduled experiments performed by everybody in the class, plus (b) an "individual project", chosen and performed by one pair of students. Your grade for the course will be determined according to your laboratory reports. Keep in mind that a lab report should communicate not only the quantitative results of the experiment but also the quality of your data and your understanding of the experiment. Reports should be done using the appropriate software and are due 2 weeks after the completion of the experiment. If a report is submitted late, then for each Drexel class day by which a report is overdue, 5% of the marks are deducted. In any case, any and all lab reports for a grade must be submitted no later than 5:00 PM, Mon. June 11th. Your 425 grade is also dependent on timely attendance at the lab-lecture, and participation in the attendant discussion. In general, by far the major part of your grade is derived from doing the experiments and writing good lab reports that are submitted on time.

You may choose to perform experiments in "teams" of two people. However, the lab reports for the experiment must be written independently of the other team member, even though the data would be utilized in common.

The format of the reports should be that of a research paper in ACS *Inorganic Chemistry*. Be sure to include the following elements: (1) Title Page; (2) *Introduction* (be concise); (3) *Experimental Procedure*; (4) *Experimental Data* (tabular format, with proper units); (5) *Results & Conclusions*; (6) References.

In (7) an *Appendix*: show the calculations used in obtaining intermediate and final results, including any equations used in proceeding from data to results. In case of duplicate, triplicate, or other multiple sets of data, only one set of calculations need be shown, but all results should be listed in tabular form. When averaging or data-fitting is called for, a standard deviation should be listed as well as a mean. Also include any graphs, charts, and spectra from the experiment.

Broad statement of the goals of 425; development of abilities to:

write scientific reports, with graphical presentation of data (technical writing skills)

document scientific information and experimental data (keeping a lab notebook or other written record)

use theory to understand/predict experimental observations

make quantitative/structural measurements and interpret results (data collection and analysis)

identify and handle hazardous materials (includes ability to access this information and to apply reasonable cautionary measures)

plan and execute chemical transformations (experimental skills)

select and use chemical instrumentation and spectroscopy
 work in teams and develop collaborations
 use the physical principles upon which chemical instrumentation is based
 understand and use reaction chemistry
 find and evaluate the validity and usefulness of information (*e.g.*, library or reputable online resources)
 discern and practice good scientific ethics (*e.g.*, avoiding plagiarism)
 discern causes of experimental error
 use statistics to judge limitations of data
 use math and logic to understand data and results

Regularly Scheduled Experiments:

<i>Experiment</i>	<i>Days Needed</i>
Crystal Field Properties of Ni ²⁺ /Cu ²⁺ Compounds.	2
Synthesis and Excited-State Chemistry of Ru(Bipy) ₃ ²⁺	2
Transport across a Model Liquid Membrane	1
Assembly and Properties of a Macrocyclic Complex.	2
Synthesis of a Silicone Polymer	1
An Inorganic Dye-Based Thin-film Photovoltaic Cell.	2
(Arene)Mo(CO) ₃ π-Complexes	1.5
A Ruthenium Nitrosyl Complex from Diazald [®]	1.5
Ligation Equilibrium of a Metalloprotein	1

Individual/Custom Projects:

You and your lab partner should choose one of these from the instructor's sign-up sheet, and initial that experiment to claim it. The list of experiments will be available in week-2. The schedule to be followed is:

- By April 13th: sign up for your choice of project.
- By April 20th: submit your written proposal for performing the project. You will need to outline: (1) Apparatus and (amounts of) reagents required; (2) The experimental procedure; (3) A description of the methods to be used for appropriately characterizing the product(s), indicating what measurements will be made; (4) your planned timetable for performing the work; (5) References. The Instructors will review and critique your proposal. It's obviously necessary to allow some lead time for purchasing any required reagents.
- You will have your second lab period of week-7 plus both your lab periods of week-8 (May 21-25) to perform the experimental work. There is also free time (*e.g.*, while refluxing a reaction) during earlier experimental periods, when you can get started on your project.
- June 4 - June 11: write up your experiment. The written report should again be in the format of a research paper in *ACS Inorganic Chemistry*.

Graduating Seniors might wish to review the university policies on Final Examinations and Senior Privilege: (<http://www.drexel.edu/provost/policies/examinations.html>)

Other university policies include:

Academic integrity: www.drexel.edu/provost/policies/academic_dishonesty.asp

Disability accommodations: <http://www.drexel.edu/oed/disabilityResources/>

Dropping courses: http://www.drexel.edu/provost/policies/course_drop.asp