

CHEMICAL INFORMATION
Chemistry 396

Fall 2005 (first module)

Instructors: Ms. Ricker, Mr. Thompson

Goals: The course is designed to familiarize you with the major sources of chemical information, to help you to learn how to assess the information that you obtain, and to develop skills in presenting information in chemistry.

The class will meet each Wednesday evening from 7:30 pm – 8:45 pm. It will be assumed that you are familiar with Apple OSX, the local network, OBIS, e-mail, and Internet browsers (e.g. Safari).

Schedule:

<u>Date</u>	<u>Topic</u>
7 September	Introduction ChemDraw: molecular drawing Equation Editor: chemical formulas and equations Print reference collection in the Science Library
14 September	Overview of bibliographic databases General search strategies
21 September	Science bibliographic databases Electronic journals Chemistry Web resources
28 September	Chemical Abstracts in print SciFinder Scholar – research topic and author searching
5 October	SciFinder Scholar – structure searching
12 October	SciFinder Scholar – reaction searching Guidelines for presentations
19 October	Class Presentations

Course Grade:

The final course grade will be CREDIT or NO ENTRY. The various assignments will factor into the grade as follows: weekly problem sets (60%), report on chemical compound (15%), and research presentation (25%). An overall average of 70 % is required to pass the course.

WEEKLY PROBLEM SETS

Problem sets will be distributed weekly. You are encouraged to consult with your classmates, but the answers should be written individually, unless specifically instructed otherwise. The problems are designed to provide experience with the topic described in that week's lecture and should take ≤ 3 hours to finish. Do not spend much more than 3 hours on any problem set, and report any concerns immediately to one of the instructors. The answers will be graded on a 12-point scale, and late reports will be assessed a 2-point penalty. Neatness and clarity of the report will factor into the score. Due: at the Science Library each Tuesday before 8:30 am.

CHEMICAL COMPOUND: FROM CRADLE TO GRAVE

At the first class meeting you will choose a chemical compound to study. Several of the weekly assignments will ask you to find information about this compound. Collect as much of the data listed below as possible and summarize it in a report prepared using Microsoft Word. Provide a reference to the source of each piece of information; number the sources consecutively, using superscripts, and list the set of references in ACS style at the end of the report. At least a third of the references must be to print sources that can be found in the Science Library. If you wish, you may provide more than one reference for a piece of information. If you cannot find a piece of information, provide a list of the sources consulted. The report will be graded on a 15-point scale, and late reports will be assessed a 3-point penalty. Due: at class on 12 October 2005.

Required Data

3 common names	1 systematic name
structure (draw it using ChemDraw)	CAS Registry number
molecular weight	melting point
boiling point	price for 1 gram
ΔG°_f or ΔH°_f	uses
IR spectrum	mass spectrum
NMR spectrum	UV/Vis spectrum
MSDS	disposal

RESEARCH TOPIC & PRESENTATION

With a partner choose one of the topics on the list below to research. At the end of the course each team will make a 15-minute presentation to the class describing what they learned about the topic and how they found the information. Explore your topic both narrowly and broadly. Answer the specific question, but also learn about the general techniques and concepts that are involved. As part of your presentation you should explain why the topic is important and give some historical perspective on it.

Meet with one of the instructors to discuss your plans for the presentation no later than the week of October 3. Specific required features of the presentation will be discussed in the meeting with the instructor. Presentations should use PowerPoint. Handouts from PowerPoint should be prepared and distributed to each member of the class prior to the presentation. The presentation together with the handout will be graded on a 25-point scale. Due: at last class

Possible Topics

1. What methods are and have been used to detect NO and NO₂ in the stratosphere and troposphere?
2. What methods are available to synthesize the non-CFC refrigerants used in automobiles?
3. How do viruses utilize osmotic pressure for DNA or RNA delivery?
4. What methods can be used to assess the exposure of children to lead (Pb)?
5. What are some of the ways dendrimers have been used as synthetic enzymes/catalysts?
6. Why is it of interest to synthesize molecules that contain crown ethers linked through an azo group?
7. What are some of the methods that have been used to prepare proteins with non-naturally occurring amino acids?
8. What evidence has been given supporting the claim that NH bonds are not hydrogen donors?
9. What laboratory syntheses are known for taxol, a potent anti-cancer agent? What is its mode of action?
10. What approaches are possible for replacing chlorine as a bleaching agent in the manufacture of paper?
11. What is the most effective analytical method for boswellic acid?
12. How do quantum dots function as part of an immunosensor?
13. How have chemists synthesized molecular knots, catenanes, and Borromean rings?
14. What is the role of G-coupled protein receptors in the human olfactory system?

ACS Format for References

Given below are the American Chemical Society (ACS) recommended formats to be used for the various reference types.

Journals: Author 1; Author 2. *Journal Abbreviation* **year**, *volume*, pages. For example: Smith, J. A.; Jones, B. R. *Org. Lett.* **1999**, *1*, 1.

Books with Editors: Author 1; Author 2. Article Title. In *Book Title*; Editor 1, Editor 2, Eds.; Publisher: Place of Publication, year; volume, pages. For example: Busch, M. A. Halogen Chemistry. In *Encyclopedia of Physical Science and Technology*, 3rd ed.; Meyers, R. A., Ed.; Academic Press: New York, 2002; Vol. 7, pp 197-222.

Books without Editors: Author 1; Author 2. *Book Title*; Publisher: Place of Publication, year; volume, chapter, pages. For example: Stothers, J. B. *Carbon-13 NMR Spectroscopy*; Academic: New York, 1972; Chapter 2.

U.S. Government Publications: Author 1; Author 2. *Document Title*; Government Publication Number; Publisher: Place of Publication, year; pages. For example: *National Handbook of Recommended Methods for Water Data Acquisition*; Office of Water Data Coordination, U.S. Geological Survey: Reston, VA, 1977; Chapter 5.

Technical Reports: Author 1; Author 2. Title. Technical Report Number; Publisher: Place of Publication, year; volume, pages. For example: Schneider, A. B. Technical Report No. 1234-56, 1985; ABC Company, New York.

Works by an Organization or Committee: Organization. *Title*, edition.; Place of Publication, year, pages. For example: The Sigma-Aldrich Co. *Aldrich Handbook of Fine Chemicals and Laboratory Equipment*, 2003-2004; Milwaukee, WI; p 1775.

Patents: Author. Patent number, year. (Patent number with reference to country granting the patent.) For example: Lyle, F. R. U.S. Patent 5 973 257, 1985; *Chem. Abstr.* **1985**, *65*, 2870.

Thesis: Author. Level of Thesis, Degree-Granting University, Location of University, date. For example: Fleissner, W. Ph.D. Dissertation, University of Tennessee, Knoxville, TN, 1984.

Series: Author 1; Author 2. In *Title*; Editor 1, Editor 2, Eds.; Series Title and Number; Publisher: Place of Publication, year; volume, pages. For example: *Nonlinear Optical Properties of Organic Polymeric Materials*; Williams, D. J., Ed.; ACS Symposium Series 233; American Chemical Society: Washington, DC, 1983.

Citation to Meetings: Author 1; Author 2. Title of Presentation. *Published Title of Collected Work*, Proceedings of the Name of the Meeting, Location of the Meeting, Date of the Meeting; Editor 1, Editor 2, Eds.; Publisher: Place of Publication, year; abstract number, pages. For example: Baisden, P. A. *Abstracts of Papers*, 188th National Meeting of the American Chemical Society, Philadelphia, PA; American Chemical Society: Washington, DC, 1984; NUCL 9.

Internet Resources: Author. Agency. Title. URL. Last Update Date. (date accessed). For example: National Cancer Institute. Chemfinder.com: NCI Database @ Chemfinder. <http://nci.chemfinder.com/nci99/index.asp>. (accessed Sep 3, 2001).