

## ***CHEM-491W. Research/Independent Study ..... Spring 2006***

***Catalog Description:*** Independent laboratory and library investigation in chemistry. Instruction in oral and written technical communication will be given. A variety of written exercises will be required. Oral presentations and a final research paper will be presented to the department faculty. At the time of registration, written consent of the research adviser and the department is required. Prerequisites (or concurrently): CHEM-205a, 206aQ, and 309a or 314a. One hour of lecture and nine hours of laboratory per week. *Four semester hours.*

According to the Spring 2006 Roster of Courses, Mondays and Fridays, 12:30 – 1:20 PM must be set aside for CHEM-491W/492W classes.

***Instructor(s):*** R.E. Hess on behalf of the Chemistry Staff  
Office: Pfahler 313C; e-mail: rhess; telephone extension 2345

### ***Course Objectives:***

to become proficient in using the vast chemical literature and to understand the differences among primary, secondary, and tertiary sources  
to add scientific knowledge to your area of research interest  
to communicate your results effectively, by both the spoken and the written word

***Text:*** *The ACS Style Guide: A Manual for Authors and Editors*, J.S. Dodd, editor, American Chemical Society: Washington, D.C., latest edition

***Highly Recommended*** (for anyone who takes pride in her or his writing and/or anyone who is now or will be required to write effectively; does that exclude anyone?): any edition of *The Elements of Style*, by Strunk and White. A new hardback edition has just been published by Penguin Press (2005)—still written in the same classic Strunk and White style, but with timely, up-to-date illustrations by Maira Kalman. This is an incredibly good book, one that is actually fun to read. Check out the Amazon.com website for reviews. Amazon's price—a bargain at \$16.47. (free shipping if your order totals at least \$25.00)

***Class Meetings:*** The class will meet for student research presentations, speakers in the Beardwood Chemical Society Lecture Series, and at the discretion of the instructor. You will receive advance notification of class meetings in a timely fashion. Please note that attendance at these class meetings will be a significant factor in your final course grade.

### ***Grading Factors:***

	<u>% of grade</u>
quality and quantity of your research work; efficiency; lab technique; laboratory notebook, compliance with all appropriate safety protocols, maintaining a clean and safe work environment .....	65 %
oral presentations .....	10 %
final research paper .....	20 %
class participation; attendance; engagement in project...	5%

*Grades are determined by consensus of the Chemistry Faculty.*

**Course Requirements:** No examinations will be given.

- Every week, you need devote **at least nine (9) hours** of work **in the laboratory** to your research project. Library work, when necessary, and conferences with your research advisor are **NOT** included in the required nine hours of laboratory work.
- A complete and accurate scientific notebook must be kept, employing the generally accepted rules for recording laboratory work. The laboratory notebook remains the property of your faculty advisor.
- When chemicals are moved, removed, or added to the inventory, an “inventory form” must be completed and given to Mr. Robinson, Stockroom Manager.
- Peer-evaluations and self-evaluations of oral presentations will be done.
- At least three oral presentations will be done during the semester: an initial report on your semester plans, a mid-course progress report, and a final report on the subject of your research paper.
- Written work, which should adhere to *ACS Style Guide* rules, is an important component of this course. Included in this work are (1) the early submission of the “Introduction” section of your paper, (2) a preliminary draft of your final report, and (3) the final report.
- Additional work may be assigned at the discretion of the instructor and/or your research advisor.

Please note that your grade can be adversely affected by not taking the oral presentations seriously, by poor attendance at class meetings, and by writing a research paper of poor quality.

Oral presentations should be treated in a formal fashion. You should carefully plan your talks, make certain they are well organized and clearly presented, and “know your stuff.” If you use an acronym, know what it represents. If you mention a compound by name, know its formula or, at the very least, its general type. If you mention a laboratory technique, have some knowledge of what it can do for you. ***Finally, the instructor believes that a formal presentation requires that the speaker be dressed appropriate to the occasion. It is not necessary to come attired in a tuxedo or an evening dress, but you should dress “a cut above.”***

The Chemistry Faculty wants to see you engaged with your project and your department. We expect you to show up when your fellow students are making an oral presentation, when a guest speaker appears during class time, and when a special class is called.

Your paper should be of high quality (and on time); otherwise, your grade can and will be significantly lowered. Papers should always contain background information that you obtained from the chemical literature, especially in peer-reviewed journals. The veracity of internet information is often questioned (consider the last presidential election) and is not as impressive as a source as are peer-reviewed journal articles. You may have used a procedure, a reaction, or cited an observation from the literature, and that information must be cited in the proper way. ***Failure to cite in an appropriate fashion is considered academic dishonesty and is sufficient reason for a failing grade in this course.***

Here are some interesting comments on citations, which suggest that great care should be taken to ensure the accuracy of your references and that the credibility of your work may rest on the sources you cite.

“Take no reference for granted. Verify the reference that your best friend gives you. Verify the reference that your revered chief gives you. Verify, most of all, the reference you yourself found and jotted down. To err is human, to verify is necessary: Verification is vexation, but it is the price of safety:” Frank Place, Jr., in an article entitled “Verify Your References,” published in *New York Medical Journal*, Volume **104**, 07 October 1916 (pp. 607-699) as advise given to medical writers. (from *The Chronicle* article cited below.)

“Many scholars look first at the bibliography of a publication to assess the intellectual legwork of the author:” “Point of View” section of *The Chronicle of Higher Education*, 11 April 1990, by Janell Rudolph and Deborah Brackstone, librarians at Memphis State University.

“Studies have shown that many errors exist in citations in the literature. These errors, of course, are only a problem when they affect our work:” Anonymous (from *The Chronicle* article cited above.)

The reports will be graded with many factors considered: appropriateness and amount of background information, completeness, accuracy, data analysis, presentation of your work, and discussion of your results. Also, the mechanics of writing—grammar, punctuation, spelling, and syntax—are taken into account.

### ***Timeline for the Spring 2006 Semester.***

<u>Date</u>	<u>Assignment Due (by 12:00 Noon to Research Advisor)</u>
Friday, 27 January 2006	Submit five (5) research goals for this semester; Oral presentation of your research goals
Friday, 03 February 2006	SciFinder Scholar results submitted
Friday, 17 February 2006	First draft of “Introduction” section of research paper due
Monday, 06 March 2006	Oral progress report (12-minute chalk-talk)
Friday, 24 March 2006	First draft of “Experimental” section of research paper due
Friday, 07 April 2006	First draft of “Abstract” section of research paper due

Friday, 14 April 2006	Preliminary draft of full research paper due
Tuesday, 18 April 2006	Student Achievement Day (SAD)—details of this event have not been worked out yet, but this may present an opportunity for you to practice your talk in front of an audience
Saturday, 22 April 2006	ISC Convention at Ursinus College; those who choose to speak at ISC will not need to make another oral presentation—the ISC presentation will be counted as your final presentation.
Monday 24 April 2006	Final draft of full research paper due
Monday, 24 April 2006	Those CHEM-491 students who did not present a paper at ISCC will give their final oral presentation.

***An item of note:***

The Intercollegiate Student Chemists Convention (ISCC) will be held on the Ursinus campus this year on Saturday, 22 April 2006. We encourage you to present your research work at this meeting. Also, we hope that you will become actively involved your Department's preparation for this event.