CHEM 443: Biochemistry Lab **Spring 2009**

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Meeting Times: Tu/Th 9:00am – 11:50 am, HU 112 (and other places around the building as necessary)
Office Hours: By appointment

Course Objectives

This course is meant to be an advanced, project-based laboratory experience, requiring a certain degree of independence in designing and executing experiments and critically analyzing results. Students will work in groups to research, design and carry out seven laboratory experiments over the course of the semester, all of which will require multiple lab periods to accomplish. A major emphasis of the course is scientific writing and communication. As such, students are required to follow guidelines set forth in the Write Like a Chemist textbook used for CHEM 471 (Bibliography) and additional, discipline-specific instructions as provided by the instructor.

It is extremely important that you read the provided handouts and literature, perform your own background research as necessary, and develop an experimental plan before the first scheduled lab period for each experiment. There will be three "tracks", or suggested order of experiments, with each group assigned one track. In some cases, background research for a particular experiment will be necessary while another lab is ongoing. On a few occasions, we will have lectures at the beginning of Tuesday lab meetings. These will cover general topics that are of use to everyone, practical items, concepts and techniques that we wouldn't have covered in Biochemistry lecture.

Required Course Materials

- Splash-protective goggles or glasses with guards on the sides
- A bound laboratory notebook with numbered pages
- Write Like a Chemist, A Guide and Resource (WLAC). Marin Robinson, Fredricka Stoller, Molly Costanza-Robinson and James K Jones. You'll want to get this book online – it won't be at the bookstore.
- A free student subscription to PyMOL (a molecular graphics tool for Mac, Windows and Linux). Visit http://www.pymol.org/educational.html for more information. If you do not have easy access to a personal computer that you can install software on, let me know. While other molecular graphics tools are available, this will be the official tool of the course.

Other Useful References

- SciFinder (http://scifinder.cas.org) – register for an account if you have not done so previously
- Protein Data Bank (http://www.rcsb.org/pdb/) – repository for atomic coordinates for proteins and other macromolecules
- ACS Style Guide – A Manual for Authors and Editors, Dodd, J. S., Editor; Brogan, M. C., Advisory Editor; American Chemical Society, Washington, D.C., 1986
- ACS Journals available at Foley and online, especially the journal *Biochemistry*. All lab reports unless stated otherwise should follow the Instructions to Authors for the journal *Biochemistry*
- The CRC Handbook of Chemistry and Physics
- The Merck Index
- Sigma/Aldrich catalog or http://sigmaaldrich.com
- Writing in Chemistry at Gonzaga University (WiCaGU), a "Cliff's Notes" version of Write Like a Chemist for GU students pertaining to writing mechanics
- Other databases and indexes as necessary. See http://www.foley.gonzaga.edu.

Grading Policy

Laboratory Reports

Each of the seven laboratory experiments will require a complete lab report. While you will work in groups to complete the experiments and collect results, ***each student must write their own lab report***. The number of points available will scale to the number of weeks allotted for that experiment, based on 25 points per lab period. Notebooks will also be checked twice during the semester, with 50 points per check.

Oral Presentation

Each group will select one of their experiments on which to develop a 30-minute oral presentation, to be delivered to the whole class during the last week of class meeting time (prep week). This presentation should utilize Powerpoint or other presentation software, complete with figures. This presentation will be worth 50 points total.

About Laboratory Reports

If you have done an appropriately thorough job writing in your laboratory notebook, the formal report should be relatively straightforward. Remember that your report should, in general, follow the Instructions to Authors for the journal *Biochemistry*. However, some experiments may require you to include additional information that might not be included in a journal article, reflecting that these are lab reports, rather than formal articles.

Refer to WLAC for details of each section of the report and read journal references related to the project to get familiar with the precise and succinct language expected in the report. A key aspect to writing like a chemist is knowing the appropriate target audience. We'll target a *general scientific audience* for our reports. Materials and Methods sections, however, are always written for an expert scientific audience.

All figures, tables and chemical structures, where appropriate, must be prepared and generated electronically. No handwritten information is to be included. For drawing chemical structures, glassware and equipment, you can download free chemical drawing software. A university license for ChemDraw is available by locating Gonzaga University on http://scistore.cambridgesoft.com/sitelicense_gallery.cfm. A login and password will be e-mailed to you that will allow you to install the software. You must use your GU e-mail address to do this. ChemSketch for Windows is also available from http://www.acdlabs.com/download/chemsk.html.

Lab reports will not be returned until the end of the semester, to allow for consistency in grading and independent work to be done from group to group. You are asked to maintain a strict honesty policy and not share your lab reports with other students. The GU academic honesty policy will be strictly enforced. You will, however, be able to view your graded reports in order to make improvements on future reports.