Final grades in CHEM 4582 will be determined based on the following scheme:

- 25% Laboratory Reports
- 25% Laboratory Performance
- 20% Project Presentation
- 10% Examinations (Sep 26 and Nov 7, 2005)
- 10% Lab Notebook Maintenance
- 10% Homework

LAB REPORTS

Laboratory reports should be in the form of a research article. Look at articles in journals such as Biochemistry or Journal of Biological Chemistry for the general format for lab write-ups.

Laboratory reports should be submitted to the TA in hard-copy form and are due one week after scheduled completion of lab work. The report must be given directly to the TA or the instructor and dated. Do NOT e-mail laboratory reports to the instructor and/or TA under any circumstances.

Delinquent laboratory reports will be penalized according to the following schedule:

- 1 day late: deduct 5% of total possible points
- 2 days late: deduct 10% of total possible points
- 3 days late: deduct 20% of total possible points
- 4+ days late: a grade of “0” will be given for that assignment

Saturdays and Sundays each count for one day.

If you leave your laboratory reports in the instructor’s or TA’s mailbox, on his/her desk, or on/under his/her office door, the report will be graded based on the date that the instructor or TA finds the report. For example, suppose a student has a report that is due on September 1. If that student leaves it under the instructor’s door after she has left on September 1 and the instructor is out of the office on September 2, so she does not find the report until September 3, then the report will be graded as if it were 2 days late!

Laboratory reports must be printed clearly and legibly. Graphical data should also be neatly and clearly presented. Follow standard usage regarding spelling, punctuation, and grammar. Sloppiness may result in point deduction.

Laboratory reports should not exceed 10 pages, excluding the title page, but including all data and references. The final project lab report should not exceed 15 pages.
Laboratory report text should be double-spaced, in a clear font of size 12, with margins of 1 cm on all sides. Font size 10 is acceptable for figure legends and table headings only.

Laboratory reports must include the following:

1. **A Title Page.** Include the experiment title, author, partner name (if applicable), date(s) experiment performed, date due, date handed in, and the author's signature.

2. **Introduction** (two pages maximum). Include concepts and hypotheses relevant to the experiment, summarize the objectives of the experiment, and describe the general principles of any techniques employed. Cite references as appropriate at the end of the report.

3. **Experimental Procedure.** Describes the experimental details of what you did, including mistakes, accidents, etc. to the level of detail found in a typical research article. In most cases, volumes are **not** appropriate. Seek assistance from the TA or instructor, if necessary.

4. **Results.** Describe the data generated from the experiment. Tabulate or otherwise present (neatly and appropriately) your raw data. Include examples of all calculations, and tabulate the results. If graphical presentation of data is desirable, present the graphs here. (Be sure to include both graphs and tabulated data.) Explain your interpretation of the data. The results section will probably be the longest section of your paper.

5. **Discussion.** Describe the overall conclusions from the paper in light of what your data tells you and what you have read about the subject from other sources. Some suggestions for the discussion are:
   - Discuss any shortcomings of the experimental procedure.
   - State and critically evaluate any assumptions that were made.
   - Estimate the accuracy of your results.
   - Discuss any observations that you found unusual or unexpected, and why they may have occurred.
   - Note and discuss inconsistencies in your data that make drawing firm conclusions difficult.
   - Discuss improvements that could be made in the laboratory hardware and apparatus that could potentially improve your results.
   - Discuss alternative methods that could be used to address the problem of the experiment.

For planned experiments, look for guidance on specific points to address in the results and/or discussion in each laboratory protocol.

Students are expected to also include references and an appendix of calculations relevant to the data analysis that should be reported in the laboratory report.

**LAB PERFORMANCE**

Each student will be evaluated during each class period on laboratory performance based on the following criteria:

- Promptness in arriving to class
- Preparedness - is the student ready to work upon arrival to class?
- Attitude - how enthusiastic, energetic, zealous, perseverant is the student? Does the student exhibit a strong work ethic?
- Intellect - does the student demonstrate knowledge about biochemistry? Does the student demonstrate the ability to think critically in the laboratory?
- Reliability - does the student demonstrate the ability to work effectively alone? Where applicable, does the student work effectively with his/her peers? Does the student display
wisdom in judgment regarding the experimentation? Does the student exhibit honesty? Does the student work meticulously, carefully, and accurately?

Daily performance grades will be made on a scale of 0-3:
0 = did not exhibit the quality at all
1 = exhibited the quality infrequently or attempted to but needs improvement
2 = exhibited the quality well and frequently
3 = consistently exhibits the quality in an outstanding manner

The TA and instructor will also make additional observations about student performance in part to offer as constructive feedback for students in their training. Examples of the kinds of observations include creativity (finding interesting solutions to experimental problems), leadership (displaying a strong responsibility for people and offering clear and wise guidance to others), and poise (handling challenges in the laboratory with grace).

**PROJECT PRESENTATION**

Each student will give a presentation on his/her independent project at the end of the term. Attendance at the project presentation period is mandatory. Presenters are expected to use visual aids as necessary in their presentation.

Do not exceed 60 minutes for your talk. Prepare an ~45-min presentation and leave ~15 min for questions.

Each talk should include:
- important background information for understanding the project goals
- an explanation of the goal of the project
- description of the methods used in the project and how these methods will address the specific question of interest
- description of the results in detail
- conclusions based on the data presented
- a description of the path forward; what additional experiments would you do if you had more time to devote to this project?

A multimedia projector has been reserved for Nov 30 and the instructor will provide a Dell laptop for student use. Students must save their presentations on a CD or on a Smartdisk. Presentations using transparencies on an overhead projector are also acceptable.

Project presentations will be evaluated based on the following:
- whether or not sufficient background information was provided in order to understand the premise of the project
- clear goals and hypothesis
- accuracy and comprehensiveness in the description(s) of results
- appropriateness of conclusions drawn
- reasonableness of the path forward
- effective use of visual aids
- ability to address questions raised

**EXAMINATIONS**

There will be two exams given over the course of this term on the lecture and laboratory topics. Examinations will be administered during the lecture periods. Attendance at examinations is
mandatory. Students will be given 50 minutes to complete each examination. Examples of past examination questions are provided in the link from the course home page.

<table>
<thead>
<tr>
<th>Exam</th>
<th>Date</th>
<th>Coverage</th>
</tr>
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<tbody>
<tr>
<td>Exam #1</td>
<td>Sep 26</td>
<td>covering lectures 1-5</td>
</tr>
<tr>
<td>Exam #2</td>
<td>Nov 7</td>
<td>covering lectures 1-12</td>
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</tbody>
</table>

There will be no final examination for this course.

LABORATORY NOTEBOOK MAINTENANCE

The recording and organization of a permanent record of laboratory observations is as important a technique to master as any of the experimental methods you learn. The research notebook is a day-by-day record of the progress of experimental work. It should reflect the integrity and honesty of the experimenter as well as the clarity of his or her thought.

The following guidelines apply to laboratory notebook maintenance:

- All experimental data, except instrument output, should be recorded in indelible ink in a bound laboratory notebook with pre-printed sequential page numbers. Appropriate lab notebooks are available at the bookstore. Loose-leaf or spiral-bound notebooks and loose pieces of paper are not acceptable. Students should sign each page at the end of each laboratory period. Do not leave blank pages in a laboratory notebook.

- The laboratory notebook should include protocols, identification of samples, observations, data, and a summary of the conclusions.

- Record data and observations as you obtain or make them; do not write on scraps of paper with the intention of transferring information to the lab notebook later. Do not worry if your notebook is a little messy.

- All notebooks will be graded at the end of each class period by the TA or instructor.

Laboratory notebooks will be graded by the instructor/TA based on the following criteria:

- Comprehensiveness - is all of the required information present in the notebook record?
- Clarity - can the experimental procedure that was performed be understood (and potentially repeated) based on record?
- Accuracy - is the information listed in the notebook record reasonable?
- Administration - were the guidelines above followed?

HOMEWORK  *NEW*

Homework assignments will be administered periodically throughout the term and should be conducted individually. Students should submit the completed homework assignment to the TA or instructor by the beginning of the laboratory period for the respective due date.