The Final Exam will be a Research Article describing the work done during this course. The title may be something like: “Investigation of structure/function relationships in *Escherichia coli* alkaline phosphatase by site-specific mutagenesis”

**Manuscripts should be submitted either electronically or as hard copy and are due by 5pm Wednesday, April 28, 2010.**

**INSTRUCTIONS:**
- Work independently, without collaboration from any other member of the current class. Some MINIMAL consultation with your partner is permissible. Questions from any source not a class member are permissible to clarify specific points of information.
- You must cite, in the body of the text, all sources for specific information and any direct quotations. Instructions for formatting each section are supplied following this page. Use the reference format required by *Biochemistry*, or *Journal of Biological Chemistry* which you can find on the Journal’s web pages. Always include the titles of the articles.

- The lab notebook should be turned in by Wednesday, April 28.
- Use Times 12 pt and double space for the research article

**Title page:**

Title  
Author's name  
Authors’ Department  
Montana State University, Bozeman, MT 59717, USA  
Author's e-mail address

**Abstract or Summary:**

Write a **200-300 word** summary of the contents of the paper, covering the following information.  
What was the reason for doing the experiments?  
What was the source of gene?  
What did you do to the protein (a few words will suffice in the abstract)?  
What type of biochemical activity did you test, and what was the result?

PLEASE NUMBER EACH PAGE AT THE BOTTOM In-text citations MUST follow rules. References must be cited as described in the journal’s *Instructions to Authors*. Tables, Figure Legends, and Figures should be placed on separate pages after References. Alternatively, they can be placed in text and each must include a figure legend. WHEN IN DOUBT CONSULT A PUBLISHED ARTICLE FOR GUIDANCE. See Instructions to Authors for the journal.

**Introduction** (2 double-spaced pages, no more) Use headings as described in Instructions to Authors and/or in an example paper from the journal. Make sure all quotes, paraphrases and specific data from other sources are properly cited as per the Instructions to Authors. Write in essay style. Never use "I" (although “we” is acceptable). Pay attention to
The Introduction should address the following questions briefly but completely (a few sentences, see the posted articles for guidance):

1. Describe the protein you cloned: name, abbreviation
2. Describe its source—what is the name of the bacterium, where can it be found, what does it do? Why is it important?
3. Describe previously published work that characterized the native AP. Summarize from at least 4 papers using paraphrases, quotes where relevant. Be sure to cite the papers!
4. Briefly summarize previously published information on mutant APs. Cite references to support the information you write about.
5. Has the crystal structure been done? Who did the work? and briefly describe the main components of the structure. Cite references.
6. Why was your work done? What questions did you hope to answer?
7. In 2-3 sentences summarize the purpose of the research (what parts of the protein are your mutating?)

Materials and Methods

*Italicize each procedure title* and write a SHORT paragraph to describe each procedure (look at some examples). Describe Plasmids and DNA manipulations, Production and purification of enzyme, Protein analyses, Enzyme assays (substrates, conditions), etc.

Results (1-2 paragraphs per heading) Write in a professional style *Italicize each heading* see Instructions and examples
1. Briefly describe generation of mutants and isolation and purification of proteins: what did you isolate and how (1 sentence since the details will be in Experimental Procedures section).
2. Biochemical characterization by SDS-PAGE, showed what?
3. Comparison of mutant and wild-type kinetics showed what?
4. Inhibition and temperature dependence studies showed what?

**If your results were ambiguous, describe the idealized or expected results, noting that they are the expected results compared to the results you actually obtained.**

Discussion (can also be combined with results)
1. Describe any problems you had obtaining results (1-2 sentences). For each problem describe what happened and what should have been done or could have been done
2. Describe how the results fit with what was previously known about the enzyme. Were there any surprises?
3. Describe in detail what you would do to accomplish your proposed application