BME 128L “Protein Engineering Lab”
Spring Quarter 2015
Wednesdays 9:00am-12:00pm
Room: Baskin Engineering 287

Course instructor:
Rebecca DuBois, Assistant Professor, Biomolecular Engineering
Office PSB 320; Office Hrs: Monday 2-3pm
Email: rmdubois@ucsc.edu

Course TA/grader:
Lauren Lui, Ph.D. candidate, Biomolecular Engineering
Office Hrs: Tuesday 9-10am in Biomed 1st floor conference room
Email: llui@ucsc.edu

Course website: http://courses.soe.ucsc.edu/courses/bme128l/Spring15/01/pages/attachments
Syllabus, readings, and pre-lab assignments will be posted here.

Textbooks/readings:
There are no required textbooks for this course. All reading assignments will be uploaded to the course website.

Week| Date| Lab
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1| April 1 | Orientation; safety instructions discussion of assignments, lab notebooks, and reports
2| April 8 | Protein sequence and structure analyses; mutagenesis DNA primer design
3| April 15 | DNA primer concentration determination; Mutagenesis PCR reactions
*Note: put PCR reactions into freezer on April 16
4| April 22 | Agarose gel electrophoresis; DNA purification; DNA ligation; transform DNA into E.coli
REPORT I DUE: Bioinformatics analyses and DNA primer design
5| April 29 | DNA purification; Preparation of DNA sequencing reactions
6| May 6 | DNA sequencing data analysis with ApE software; transform DNA into E.coli
*Note: put petri plates into refrigerator on May 7
7| May 13 | Production/expression of recombinant engineered protein in E.coli
*Note: start E.coli culture on May 12, centrifuge E.coli culture on May 14
REPORT II DUE: DNA mutagenesis and analyses
8| May 20 | Affinity (His-tag) Purification of recombinant engineered protein
9| May 27 | Electrophoresis (PAGE) assessment of protein purity; Dialysis of protein
*Note: remove protein from dialysis and store in refrigerator on May 28
10| June 3 | Protein concentration determination; Protein solubility and purity assessment
REPORT III DUE: Engineered protein production, purification, and analyses
LAB NOTEBOOKS DUE: turn in for grading at end of lab

Grading:
Lab Notebooks: Will be randomly checked by the TA throughout the quarter for review and advice (15%)
Are to be turned in at the end of the quarter and graded

Pre-lab Assignments: There will be a pre-lab assignment each week to prepare for experiments (15%)
to be carried out that week.

Lab Performance: Will be assessed by attendance, participation in experiments, (10%)
and safe laboratory practices.

Reports: 3 Comprehensive Reports (5-7 pages each) are to be turned in at weeks 4, 7, and 10: (60%)
I. Bioinformatics analyses and DNA primer design (20%)
II. DNA mutagenesis and analyses (20%)
III. Engineered protein production, purification, and analyses (20%)
The Laboratory Notebook will be continuously written during each experiment and will be a running log of the experiments performed in the lab. The notebook is expected to be kept organized (Title, Goals, Methods, Results, and Conclusions sections for each experiment) and with enough detail so that another student could use it as a guide to perform the experiment. Very little time should be needed to write in the lab notebook outside of the laboratory itself.

A Post-Laboratory Summary of 1-2 pages should be written each week. This report will describe the weekly experiment, arranged in the following sections: Title, Goals, Methods, Results (including data and images from experiments), and Conclusions. Unlike the lab notebook, this report will be written with full sentences and with less detail than the lab notebook. The student is expected to write this summary weekly, however it will not be turned in and graded until it is part of one of the comprehensive reports.

Comprehensive Reports will be due on weeks 4, 7, and 10. The comprehensive report will have three chapters, corresponding to the three Post-Laboratory Summaries. In addition, the comprehensive report will have an additional 1-page Abstract that summarizes the overall goals, methods, results, and conclusions of the previous three weeks of research.

Homework Turn-In & Late Policy:
Create a Google Drive Folder and share homework documents with Lauren (llui@ucsc.edu). Reports are to be uploaded by 9am on the due date. Reports turned in late will have 20% deducted for every day late. You cannot get credit at all if you submit your homework later than 4 days after the due date. Therefore you have to contact us prior to the due date/time if you have a serious circumstance!

Academic Honesty and Integrity:
Anyone caught cheating in the class will be reported to their college provost and may fail the class. See UCSC Policy on Academic Integrity: http://www.ucsc.edu/academics/academic-integrity/index.html.

How could we violate academic integrity?
- Fabrication: Submitting falsified data including bibliographic resources and experimental data, or altering graded coursework/exams and resubmitting to the instructor for a higher score.
- Facilitating academic dishonesty: Answering questions on someone else’s exam, doing someone else’s homework, or helping another student take a test (allowing them to cheat from you).
- Cheating: Includes any attempt to claim someone else’s work as your own. Plagiarism in any form (including close paraphrasing) will be considered cheating. Use of any source without proper citation will be considered cheating. If you are not certain about citation standards, please ask. Collaboration without explicit written acknowledgment will be considered cheating. Collaboration with explicit written acknowledgment is encouraged.

Classroom Accommodations for Disabilities
If you qualify for classroom accommodations because of a disability, please get an Accommodation Authorization from the Disability Resource Center (DRC) and submit it to me in person outside of class (e.g., office hours) within the first two weeks of the quarter. Contact DRC at 459-2089 (voice), 459-4806 (TTY), or http://drc.ucsc.edu for more information on the requirements and/or process.