BIMM 101 Recombinant DNA Techniques Fall 2012

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Office hours: by appointment

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Lectures: Wed, Fri 10 – 11 AM York 4406
Labs: Wed, Fri 11-3 York 4406

Course Website: http:// ted.ucsd.edu

- Lectures will cover the theory behind the experiments performed in lab. The quizzes and exam will have questions on the material that will be covered during lectures.

Learning objectives:

- Learn the theory behind molecular techniques, and the applications of the methodologies in biological research
- Become proficient at basic molecular biology techniques
- Learn the importance of proper controls in designing experiments and interpreting results
- Improve lab math skills and ability to graph data correctly
- Learn to make logical conclusions from experimental data
- Become familiar with bioinformatics databases and applications
- Learn to find, read, and evaluate primary literature
- Become aware of the implications of the technology for society

Required texts:
BIMM 101 Lab Manual from University Readers
From Genes to Genomes by Dale (1st or 2cd edition) on reserve at BML and electronic version available from UCSD computer
http://onlinelibrary.wiley.com/book/10.1002/0470856912
Readings on TED (ted.ucsd.edu)

Required Materials – needed by second day of class:
Labcoat (the bookstore has cheap ones)
UV blocking safety glasses (also at bookstore)
Lab notebook with carbon copies (bookstore or Grove general store)
Fine point Sharpie for labeling – get a dark color
A calculator

Remember that lab attendance is required – if you miss two labs, you will be asked to drop the course. If you are ill, you must leave a message with your instructor, not your TA, and make up the lab in a way that we will determine. You must be on time for lab; the TAs go over the experiments at the beginning of lab, and quizzes are administered then.

Course Requirements

1. Lab Notebook: It is mandatory that you keep a complete lab notebook. The notebook must contain everything that you did in the lab, including:
• Any changes in the protocol
• All data/results
• All calculations done during experiments
• Observations

2. Take home assignments: there will be two take-home assignments
- dilutions - 10 pts
- DNA quantification – 20 pts

3. Quizzes: There will be 4 scheduled quizzes during class periods staring week 3, each worth 10 points. They will be given at the beginning of class, and collected 15 minutes later. If you arrive after the quiz has been handed out, you will not be able to make it up.

4. Lab Reports: 3 lab reports throughout the quarter are worth 100 points each. While you will be collecting and sharing data with a lab partner, and you are welcome to discuss your results with your classmates, you must hand in your own lab report, written in your own words. You will be penalized for copying another lab report or for handing in the same (or very similar, such as just a few words changed here and there) lab reports as your partner.

All lab reports should include:
1. Purpose of the experiment: this section should be BRIEF – no more than a few sentences: simply state why you are doing the experiment.
*2. Result*s should include the following:
- data or data analysis
- figures, gels (or representations thereof)
- any sample calculations
- a brief statement about what each result means
3. Discussion:
- Note any unusual observations
- Discuss success or failure of the experiment – if there was a problem, discuss probable source.

Lab reports should have no more than 5 pages of text – figures can go on separate pages. More specific description of the lab report can be found in the course TED page. Although the lab report will be submitted electronically, all carbons from the labs associated with a lab report must be handed in class the day the lab is due.

Lab report Late policy.
Lab reports are due at the beginning of lecture on the assigned due date (must be electronically submitted before 11 AM of the due date).
Penalty for turning lab reports late:
- 10 points if handed in later on the same date;
After the first late day, you lose **5 points/day**, so
-15 points if handed in anytime the next day
- 20 points if handed in the 3rd day etc.

Lab report due dates:

Labs to be included in the Lab Report	Due date	
Labs 3-8A,	Fri, Oct 24	Lab Report #1
Labs 9-14A	Fri, Nov 14	Lab Report #2
Labs 14B, 15, 16A; 18, 19	Wed, Dec 5	Lab report #3

5. Lab attendance: Attendance is taken within the first 15 minutes of every lecture session. If you are ill, please notify me (gbozinovic@ucsd.edu).

6. Lab performance: There are no points for lab performance per se. However, your effort, attitude, and the success of your experiments will be considered when assigning the final grade, especially if you are on the borderline between two grades. If you miss one lab with no excuse, you will lose 5% from your final grade. If you miss two labs, you will receive an F for the course.

7. Exam: There will be one cumulative exam worth 100 points. Depending on the performance of the class, the exam scores might be adjusted.

- The exam adjustment policy:
1) If any student receives a 100% on the exam it will NOT be curved;
2) If any student receives a score between 95 and 100%, that will be the new maximum score (for example if the highest grade is 96, everyone's score will increase by 4 points);
3) If the highest score is less that 95% then that student's score will be the new 95% (for example if the highest grade is 89, everyone's score will increase by 6 points).

Grading:

Dilution assignment	10 pts
Lab 2 (DNA quantification) assignment	20 pts
4 Quizzes (10 points each)	40 pts
3 Lab reports (100 points each)	300 pts
Comprehensive Final Exam	100 pts
Total possible points:	**470**

Please make sure you regularly check your scores in WebCT to make sure no errors have occurred.

Letter grades will be assigned as follows:
Grade Overall class percentage
A, A- >92, 90
B+, B, B- 88, 82, 80
C+, C, C- 78, 72, 70
D+, D, D- 68, 62, 60
F Below 60

Note: Just coming to lab does not ensure that you will get a passing grade in the class. You must hand in all assignments and get passing scores on those assignments (an average of 70) to get a C- in the class.

Policy on cheating: Anyone caught cheating (which includes, but it is not limited to plagiarizing lab reports, cheating on a test or quiz, or changing an answer for a regrade) will be reported to the Academic Integrity Office.

Letters of recommendation: If you think you need a letter of recommendation at some point in the future, please save our lab reports and tests, as I will ask for some of them to review. Also, I will write letters only for those who receive an A in the course. Finally, even if you have an A, if you have never spoken to me or come to my office hours, I may not agree to write a letter for you.

BIMM 101 Fall 2012 Student contract:

1. I understand that if I am late for lab on a day a quiz is given, I will not be allowed to take the quiz and will receive a 0 score for that quiz.

_____ _____
Name Date

All lab reports for the class must be independently written, i.e., **your own work in your own words**. While discussion of data among lab partners is encouraged, each student on their own must complete all text, references, figures, graphs, and tables. The submission of reports by lab partners that contain shared work is forbidden, and will result in points being deducted from both reports. The exception to this is when a figure is the raw data that is supplied to each member of the group (specifically absorption spectra and gel photographs). In this case the labeling of that figure must be done independently. If you have questions about the difference between discussing your work with others and unauthorized collaboration, please ask your instructor or T.A. for clarification.

Because lab reports are to be your own work in your own words, you may not copy to any extent current or past laboratory reports that were written by other students. This is known as plagiarism**,** which is a direct attempt by the student to present the work of others as his/her own, and is no different than cheating on an exam. Directly copying material from other sources without putting it in your own words is also plagiarism, even if the source is cited as a reference. Plagiarism in lab reports is rigorously sought out and penalized. Students are required to upload an electronic version of each lab report to Turnitin.com, where the report is screened with a plagiarism checker against all reports in the Turnitin database. All incidents of plagiarism will automatically be turned in to the Academic Integrity Coordinator. Following UCSD's Policy on Integrity of Scholarship (www-senate.ucsd.edu/manual/appendices/app2.htm), students found to have committed plagiarism or other academic misconduct will receive both an administrative (decided by the Council of Deans) and academic penalty (decided by the instructor). Furthermore, all submitted reports are retained in the Turnitin database. Similarity hits by the plagiarism checker will also reveal the name of the student who provided the plagiarized material. Giving one's own lab report to other students to allow them to copy material from that report is also academic dishonesty, and will be pursued and penalized as rigorously as for the student committing the plagiarism.

2. **I understand that if I plagiarize a lab report and it is detected by Turnitin.com, the matter will go to the Academic Integrity Office on campus. I also understand that if I give a lab report to a student who takes the lab in a subsequent quarter, and he or she plagiarizes my lab report, I will also be subject to disciplining by the Academic Integrity Office**.

_____ _____
Name **Date**

Tentative Schedule

Date

Sept 28	**Lab 1**	**A.** Pipetting **B**. Dilutions **C**. Bacteriological Techniques **D.** Calibration of a pipettemen
Oct 3	**Lab 2**	**A.** Agarose Gel Electrophoresis
Oct 5	**Lab 3**	**A.** Introduction to bioluminescence **B**. Course Objectives **C.** P1: Isolation of chromosomal DNA from *Vibrio fischeri*
Oct 10	**Lab 4**	**A.** P2: Isolation of chromosomal DNA from *Vibrio fischeri*
Oct 10	**Lab 5**	**A.** Spectrophotometric Analysis of *Vibrio* DNA **B**. *Sal* I restriction digestion of *Vibrio fischeri* and pGEM DNA
Oct 12	**Lab 6**	**A.** Agarose gel electrophoresis of SalI restriction digest and estimate of DNA quantities from gel **B.** Ligation of *Vibrio fischeri* DNA with pGEM DNA
Oct 17	**Lab 7**	**A**. Ligation assessment by gel electrophoresis **B.** Transformation of competent E. coli DH5α cells
Oct 19	**Lab 8**	**A.** Count colonies and re-streak glowing colonies from original transformation **B**. Isolation of DNA from bees
Oct 24	**Lab 9**	**A**. Amplification of *lux*AB gene by PCR **B**. Start overnights for experiment to size and seq. *V. fischeri Sal* I inserts **C.** Bioinformatics computer Lab 1
Oct 26	**Lab 10**	**A.** PCR success assessment by gel electrophoresis **B.** Alkaline lysis miniprep: purification of plasmid DNA **C.** Restriction Digest with *Sal* I **D.** Clean up PRR Products
Nov 30	**Lab 11**	**A.** Run gel on *Sal* I restriction digest products **B**. Restriction digest of *lux* plasmids, PCR products

		and pGEM with *XbaI* and EcoRI
Nov 2	**Lab 12**	**A**. Clean Up xbaI and EcoRI digest of pGEM **B**. Quantification of digests from gel **C.** Ligation of pGEM and luxAB inserts D. Bioinformatics Lab 2: Analysis of non-glowing colony inserts
Nov 7	**Lab 13**	**A**. Making competent DH5α cells **B**. Transformation of ligation products into DH5α cells
Nov 9	**Lab 14**	**A**. Screening for colonies containing *lux*AB by adding exogenous aldehyde **B.** Set up *C. elegans* plates for RNAi experiment
Nov 14	**Lab 15**	**A.** Observe worm phenotypes and isolate RNA **B.** Quantitate RNA and set up quantitative RTPCR
Nov 16	**Lab 16**	**A.** Analyze RTPCR results **B.** PCR amplification and sequencing of the COI gene
Nov 21	**Lab 17**	**A.** Gel purification of barcode PCR products
Nov 28	**Lab 18**	**A.** Isolate cheek cell DNA and set up PCR for PTC
Nov 30	**Lab 19**	**A.** PTC taste test and PCR product digest **B.** Run Gel to PTC PCR product and analyze results **C.** Review

FINAL EXAM: Friday, Dec 5th 10 -12