

## **BIMM 101 - Recombinant DNA Techniques, Spring 2016**

### **Welcome!**

#### **Time and Place:**

Lecture: Tues/Thurs 8a – 9:20a, Center 214

Lab: Tues/Thurs 9:30a – 1:30p, York 4318/4332 (A01/A02)  
Wed/Fri 9:00a – 1:00p, York 4318/4332 (A03/A04)

#### **Instructor:**

Emily Grossman, PhD

Office: H&SS 1145C

Office Hours: Mon 1 – 2p, Tues 3 – 4p in H&SS 1145C

Virtual Office Hours: TBA

[egrossma@ucsd.edu](mailto:egrossma@ucsd.edu)

#### **Instructional Assistants:**

Chi Ren [c3ren@ucsd.edu](mailto:c3ren@ucsd.edu)

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#### **Learning goals:**

- 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 Reading:**

1. From Genes to Genomes by Dale (1st, 2nd, or 3rd edition). Electronic versions of the 3rd and 1st editions are available on [roger.ucsd.edu](http://roger.ucsd.edu). The text is also on reserve in the library.
2. BIMM 101 Lab Manual from Soft Reserves. Bring this with you to every lab meeting.
3. Course website on TED: Check this before each lab! The syllabus, announcements, lectures, study guides & practice problems, assignments, lab materials, additional required readings, lab schedule, and calendar (with office hours, due dates, etc.) are posted here.

**Required Materials - bring to lab each day, required by second day of lab:**

1. Labcoat – must go to knees (available at bookstore)
2. UV blocking safety glasses (also at bookstore)
3. Lab notebook with carbon copies (bookstore or Grove general store)
4. Fine point Sharpie for labeling – get a dark color
5. Calculator – you cannot use a cell phone for quizzes!
6. iClicker (available at bookstore, version 2 preferred)
7. Long pants and closed-toed shoes are always required in lab (entire legs and feet covered)

**Attendance: 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 me, not your IA, and make up the lab in a way that I will determine. 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. You must be on time for lab; the IAs go over the experiments at the beginning of lab, and quizzes are given then. If you are habitually late to lab, you will lose 5% from your final grade.

**Makeup Exams:**

Missing a scheduled exam or quiz will only be excused for medical reasons where documentation can be provided. At Dr. Grossman's discretion, a missed exam or quiz will either be dropped from the student's point total for the class, or made up by an oral exam scheduled within one week of the original exam or quiz.

**Accommodations:** Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD) which is located in University Center 202 behind Center Hall. Students are required to present their AFA letters to Faculty (please make arrangements to contact me privately) and to the OSD Liaison in the department in advance so that accommodations may be arranged. Be sure to check OSD office hours before going there. Contact the OSD for further information: 858.534.4382 (phone) [osd@ucsd.edu](mailto:osd@ucsd.edu) (email) <http://disabilities.ucsd.edu> (website)

**Class Web Site:**

The class web site is on TED (<http://ted.ucsd.edu>). All class notices, the syllabus, and other important information will be posted here. Please check the web site regularly for updates, since this will be the main form of distribution of information to the class. My lecture notes will be posted to the site.

## Course Requirements and Grading

The class will be out of 500 points, and the grades will be assigned as follows:

Total points earned	Grade	400 – 409	B-
490 – 500	A+	390 – 399	C+
460 - 489	A	360 – 389	C
450 - 459	A-	350 – 359	C-
440 – 449	B+	300 – 349	D
410 – 439	B	0 – 299	F

**1. Quizzes: 35%** Starting the week of April 4<sup>th</sup>, there will be a quiz once a week (usually on Thursdays or Fridays) at the beginning of lab every week for weeks 2, 3, 4, 5, 6, 7, and 8 (see calendar on TED). Each quiz is worth 5% of your final grade. The quizzes will cover the lectures, readings, and lab experiments from the previous week.

**Note:** If you come into lab late and miss the quiz, you will receive a zero for that quiz.

**2. Assignments: 30%** You will turn in both lab notebook carbons and homework missions, varying in worth and format, that will total 30% of your final grade. Guidelines for each assignment will be posted on TED and due dates will be on the TED calendar. Homework missions must be submitted to Turnitin on TED before the start of lab, and all assignments must be handed in within 10 minutes of the start of your lab. Assignments that are handed in late that day will be penalized by deducting 5%, and each additional day an assignment is late another 5% will be deducted. Although you will be doing the experiments and collecting data with a partner, you must hand in your own assignments, written in your own words. **Copying someone else's homework (including past quarters!) is cheating (see below).**

**3. Exam: 30%** There will be a comprehensive exam on the last day of class, June 2<sup>nd</sup> or 3<sup>rd</sup>, in lab during your regular lab class time. There are no make-ups for the final exam.

### **4. Clicker participation (not for correctness), 5%**

If you participate in at least 85% of clicker questions in class, you will get full points. Because you only need 85% participation for full points, if you forget your clicker one day do not worry about it.

For participation below 85%, the breakdown is as follows:

75% – 84.9%: 20pts

65% - 74.9%: 17pts

50% - 64.9%: 13pts

25% - 49.9%: 5pts

Below 25%: 0pts

**5. Lab notebook (see pages 105-106 in lab manual):** It is mandatory that you keep a lab notebook, which your IA's will check at the end of every lab for completeness. It should include:

- Purpose: objective of the lab in your own words (why are you doing the experiment?)
- Methods: pages of protocol/procedure and any changes you made to it, relevant charts
- Results: all calculations and data you collect, observations
- Conclusions: summarize and interpret results, labeling & location of samples

**Policy on cheating:** Anyone caught cheating (this includes plagiarizing homework assignments, lab reports, or carbons, cheating on a quiz or exam, or changing an answer for a re-grade) will be reported to the Academic Integrity Office.

**Submitting reports to Turnitin.com:** Students agree that by taking this course all required papers will be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers.

**Tentative Course Schedule:** (subject to change)

	Dates	Experiment/Activity	Lab Manual Chapter
<b>Wk 1</b>	Tue/Wed 3/29, 3/30	Organization, dilutions, pipetting	Lab 1
	Thu/Fri 3/31, 4/1	Agarose gel electrophoresis	Lab 2
<b>Wk 2</b>	Tue/Wed 4/5, 4/6	<b>Computer lab:</b> Image J on Lab 2, graphing	Lab 3
	Thu/Fri 4/7, 4/8	Bioluminescence, cloning the <i>luxA</i> and <i>luxB</i> gene into <i>E. coli</i> Isolation of chromosomal DNA	Lab 4
<b>Wk 3</b>	Tue/Wed 4/12, 4/13	Finish purification of chromosomal DNA <b>Computer lab:</b> Bioinformatics Part I: lux operon on NCBI	Lab 5
	Thu/Fri 4/14, 4/15	PCR setup, spectrophotometry	Lab 6
<b>Wk 4</b>	Tue/Wed 4/19, 4/20	Gel to check to PCR amplification <b>Computer lab:</b> Using Image J to analyze PCR results Discuss PCR results; repeat if necessary	Lab 7
	Thu/Fri 4/21, 4/22	Gel repeat (if needed), Clean <i>luxAB</i> PCR product, restriction digest <b>Computer lab:</b> Bioinformatics II, III, IV – <b>bring own computer</b>	Lab 8
<b>Wk 5</b>	Tue/Wed 4/26, 4/27	Clean up digest, quantification, ligation of pGEM and <i>luxAB</i> insert	Lab 9

	Thu/Fri 4/28, 4/29	Transformation of competent cells <b>Computer lab</b> : Practice ligation data statistics, ANOVA practice	Lab 10
<b>Wk 6</b>	Tue/Wed 5/3, 5/4	Blue/white colony screening – assessing ligation efficiency Start overnights of cultures (plasmids with different promoters)	Lab 11
	Thu/Fri 5/5, 5/6	Miniprep of plasmids, set up digests of Biobrick plasmids	Lab 12
<b>Wk 7</b>	Tue/Wed 5/10, 5/11	Clean-up of digest, gel purification, ligation	Lab 13
	Thu/Fri 5/12, 5/13	Transformation Begin PTC project (isolate cheek cell DNA and set up PCR)	Lab 14
<b>Wk 8</b>	Tue/Wed 5/17, 5/18	Measure RFP expression under different promoters (fluorometer) Pick one plasmid and set up overnight culture, digest and gel of PTC	Lab 15
	Thu/Fri 5/19, 5/20	Begin RNAi project, set up <i>C. elegans</i> Isolate plasmid and run gel (get concentration), send for sequencing	Lab 16
<b>Wk 9</b>	Tue/Wed 5/24, 5/25	Observe worm phenotypes and isolate RNA, set up RT-qPCR <b>Computer lab</b> : Analyze plasmid sequencing results	Lab 17
	Thu/Fri 5/26, 5/27	<b>Computer lab</b> : Analyze results of RT-qPCR - (bring own computer)	Lab 18
<b>Wk 10</b>	Tue/Wed 5/31, 6/1	Review/Paper discussion	
	Thu/Fri 6/2, 6/3	<b>Final Exam in lab</b>	