**BIMM 101 - Recombinant DNA Techniques, Fall 2016**

**Welcome!**

**Time and Place:**
Lecture: Tues/Thurs 12:30 - 1:50p, York 4080A (C01/C02)
Mon/Wed/Fri 2:00 – 2:50p, WLH 2205 (E01/E02)
Lab: Tues/Thurs 2:00 – 5:50p, York 4318/4332 (C01/C02)
Wed/Fri 3:00 – 6:50p, York 3306/3406 (E01/E02)

**Instructor:**
Emily Grossman, PhD
Office: H&SS 1145C
Office Hours: Mondays 10 – 11a, and Thursdays, 11 – 12p, H&SS 1145L, or by appointment
egrossma@ucsd.edu

**Instructional Assistants:**
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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. The text is also on reserve in the library.
2. BIMM 101 Lab manual (includes notebook carbon copies) (available at bookstore)
3. Course website on TritonEd: 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. BIMM 101 Lab manual (includes notebook carbon copies) (available at bookstore)
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)

**Lab Safety Training**: Enrolled and waitlisted students MUST successfully complete the Biology Lab Safety Training and Assessment before the first lab session: https://dbsportal3.ucsd.edu:3443/safety-training/. Please note that courses offered by other departments (Chemistry, for example) may have additional safety training requirements.

**Attendance:** Enrolled and waitlisted students MUST attend the first lab session. Additional details: http://biology.ucsd.edu/go/ug-labs. **Remember that lab attendance is required – if you miss more than 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 more than 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.

**Add/Drop Deadlines** are different for lab courses than lecture courses. Students who drop a Biology lab class after the end of the second class meeting will be assigned a "W". Additional details: http://biology.ucsd.edu/go/ug-labs.

**Makeup Quizzes:**
The lowest quiz score will be dropped, so if you miss one quiz for any reason, this will count for your dropped quiz. If another quiz is missed, this will only be excused for medical reasons where documentation can be provided. At Dr. Grossman's discretion, this missed quiz will either be dropped from the student's point total for the class, or quiz score will be averaged from other quizzes taken.

**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 (email) http://disabilities.ucsd.edu (website)

**A Culture of Respect:** The Office for the Prevention of Harassment & Discrimination (OPHD) provides assistance to students, faculty, and staff regarding reports of bias, harassment, and discrimination. OPHD is the UC San Diego Title IX office. Title IX of the Education Amendments of 1972 is the federal law that prohibits sex discrimination in educational institutions that are recipients of federal funds. UCSD students have the right to an educational environment that is free from harassment and discrimination.

Students have options for reporting incidents of sexual violence and sexual harassment. Sexual violence includes sexual assault, dating violence, domestic violence, and stalking. Information about reporting options may be obtained at OPHD at (858) 534-8298, ophd@ucsd.edu, or http://ophd.ucsd.edu. Students may receive confidential assistance at the Sexual Assault Resource Center at (858) 534-5793, sarc@ucsd.edu, or http://care.ucsd.edu, or through Counseling and Psychological Services (CAPS) at (858) 534-3755 or http://caps.ucsd.edu

Students may feel more comfortable discussing their particular concern with a trusted employee. This may be a UCSD student affairs staff member, a department Chair, a faculty member or other University official. These individuals have an obligation to report incidents of sexual violence and sexual harassment to OPHD. This does not necessarily mean that a formal complaint will be filed.

If you find yourself in an uncomfortable situation, ask for help. UCSD is committed to upholding policies regarding nondiscrimination, sexual violence and sexual harassment.

**Class Web Site:**
The class web site is on TritonEd (https://tritoned.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 Sept 26th, there will be a quiz once a week (usually on Thursdays or Fridays) at the beginning of lab every week for weeks 1, 2, 3, 4, 5, 6, 8, and 9 (see calendar on TritonEd). Each quiz is worth 5% of your final grade. The quizzes will cover the lectures, readings, and lab experiments from the previous week. **Your lowest quiz score will be dropped. 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 TritionEd and due dates will be on the TritonEd calendar. Homework missions must be submitted to Turnitin on TritionEd 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, December 1st or 2nd, in lab during your regular lab class time. If you are unable to take the final for medical reasons where documentation can be provided, an incomplete will be given, and the final will be made up with me the following quarter.

**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 17-18 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

**Academic Integrity:** 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. 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. If you have questions about the difference between discussing your work with others and unauthorized collaboration, please ask your instructor or IA for clarification. 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 **(including the lab manual for this class! Please put it into your own words!)**.

**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 |
|---|---|---|---|
| **Wk 0** | Thu/Fri 9/22, 9/23 | Organization, dilutions, pipetting | Lab 1 |
| **Wk 1** | Tue/Wed 9/27, 9/28 | Agarose gel electrophoresis | Lab 2 |
| | Thu/Fri 9/29, 9/30 | **Computer lab:** Image J on Lab 2, graphing | Lab 3 |
| **Wk 2** | Tue/Wed 10/4, 10/5 | Bioluminescence, cloning the *lux*A and *lux*B gene into *E. coli*<br>Isolation of chromosomal DNA | Lab 4 |
| | Thu/Fri 10/6, 10/7 | Finish purification of chromosomal DNA<br>**Computer lab:** Bioinformatics Part I: lux operon on NCBI | Lab 5 |
| **Wk 3** | Tue/Wed 10/11, 10/12 | PCR setup, spectrophotometry | Lab 6 |
| | Thu/Fri 10/13, 10/14 | Gel to check to PCR amplification<br>**Computer lab:** Using Image J to analyze PCR results<br>Discuss PCR results; repeat if necessary | Lab 7 |
| **Wk 4** | Tue/Wed 10/18, 10/19 | Gel repeat (if needed), Clean *lux*AB PCR product, restriction digest<br>**Computer lab:** Bioinformatics II, III, IV | Lab 8 |
| | Thu/Fri 10/20, 10/21 | Clean up digest, quantification, ligation of pGEM and *lux*AB insert | Lab 9 |
| **Wk 5** | Tue/Wed 10/25, 10/26 | Transformation of competent cells, plan promoter mutant project<br>Start overnights of cultures (plasmids with different promoters) | Lab 10 |
| | Thu/Fri 10/27, 10/28 | Blue/white colony screening – assessing ligation efficiency<br>Miniprep of plasmids | Lab 11 |
| **Wk 6** | Tue/Wed 11/1, 11/2 | Set up digests of Biobrick plasmids<br>**Computer lab:** Statistical analysis of ligation data | Lab 12 |
| | Thu/Fri 11/3, 11/4 | Clean-up of digest, gel purification, ligation | Lab 13 |
| **Wk 7** | Tue/Wed 11/8, 11/9 | Transformation of competent cells with RFP ligation products | Lab 14 |
| | Thu/Fri 11/10, 11/11 | Friday Nov 11th – Veteran's Day Holiday<br>Thursday and Friday labs cancelled | |
| **Wk 8** | Tue/Wed 11/15, 11/16 | Measure RFP expression under different promoters -fluorometer<br>**Computer lab:** Statistical analysis of results<br>Optional: Pick one plasmid and set up overnight culture<br>Begin RNAi project, set up *C. elegans* | Lab 15 |
| | Thu/Fri 11/17, 11/18 | Observe worm phenotypes and isolate RNA, set up RT-qPCR<br>Optional: Isolate plasmid and run gel (get concentration), send for sequencing | Lab 16 |
| **Wk 9** | Tue/Wed 11/22, 11/23 | Lab cleanup<br>**Computer lab:** Analyze results of RT-qPCR | Lab 17 |

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|---|---|---|---|
| | | Optional: Analyze plasmid sequencing results | |
| | Thu/Fri<br>11/24, 11/25 | Thursday and Friday Thanksgiving Holiday<br>No lab or class | |
| **Wk 10** | Tue/Wed<br>11/29, 11/30 | Review/Paper discussion | |
| | Thu/Fri<br>12/1, 12/2 | **Final Exam in lab** | |