

BIMM101 Summer Session II 2017

Recombinant DNA Techniques

Lecture: MTuThF 11:00 AM -12:20 PM York 2622
Labs: MTuThF 1 PM - 4:50 PM York 4318 / 4332

Instructor: Monica Chu, PhD
Email: mwchu@ucsd.edu
Office: H&SS 1145LA
Office hours: 9:30-10:30 AM, Thursday
At the Fairbanks Coffee Cart outside of York Hall
(if you can't make it during this time, feel free to contact me to schedule an appointment)

Instructional Assistants:

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Lauren Sitts lsitts@ucsd.edu

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 draw 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

Course Website:

All materials for the class will be uploaded on TritonEd (<https://tritoned.ucsd.edu/>).

The syllabus, lecture notes, announcements, pre-class reading assignments and pre-class quizzes will be posted here, so please make sure to check the website regularly for important information.

Required Text: BIMM101 Manual with carbon copy pages (Available at the UCSD Bookstore)

Optional Text: *From Genes to Genome by Dale* (1st, 2nd, or 3rd edition) Available on reserve at the library, or electronic version are available online at roger.ucsd.edu

Required Lab Safety Training: Enrolled and waitlisted students *MUST* successfully complete the Biology Lab Safety Training and Assessment before the first lab session:

<https://dbportal3.ucsd.edu:3443/safety-training/>. Please note that courses offered by other departments (Chemistry, for example) may have additional safety training requirements.

Required Materials:

You need to bring these materials to *every* lab.

(all materials are required by the second day of lab)

- ☐ Labcoat – must go to knees (available at bookstore)
- ☐ UV blocking safety glasses (bookstore)
- ☐ Printout of BIMM101 manual
- ☐ Lab notebook with carbon copies (available at bookstore)
- ☐ Fine point Sharpie for labeling (dark ink)
- ☐ Calculator (for lab and quizzes; no cell phones allowed)
- ☐ iClicker (available at bookstore, version 2 preferred)
- ☐ Long pants and closed-toed shoes are always required in lab (everything should be covered from the waist down)

Course Components:

Lecture: Attend lecture to engage in class discussion with peers/using iClickers

Lab: Work with your team to perform experiments, gather data, interpret results, and make logical conclusions.

Outside of the scheduled course time:

Complete the following in your own words:

- Pre-class reading assignments
- Pre-class online reading quizzes
- Writing assignments (mini lab reports)

Lab Attendance Policy:

You are required to attend every lab. If you miss a lab, you must have a documented medical excuse. Failure to provide proper medical documentation will result in a 5% deduction from your final grade. If you miss two labs for undocumented reasons, then you will be asked to drop the course. Two late attendances will equal one undocumented absence.

Late assignments and quizzes:

No credit will be given for pre-class online reading quizzes that are submitted past the deadline.

No credit will be given for missed quizzes or clicker questions.

Lab reports that are submitted late (more than 10 minutes after lab has started) will have 10% deducted per day, and 10% for each additional day after that.

Grading

Professionalism: 2%

iClicker participation: 5%

You will not be graded for correctness on the clicker questions. If you participate in more than 85% of the lectures, then you will receive full iClicker participation credit. There are no makeups for clicker participation credit if you miss a lecture.

Pre-class online reading quizzes/online assignments: 10%

Lab Notebooks and in lab assignments: 10%

- *Before every lab*, you will be asked to prepare and think about the experiment you are performing for the day. This preparation includes writing the goals for the day, your plan, and your predictions for the results that you will get that day in your lab manual.
- Refer to Pages 18 and 19 in the lab notebook for guidance on what to write in your notebook as you are conducting the labs. This includes your notes, your critique of your results, and an outline of the next steps (if your lab continues to the next day). *Carbon copies will be collected at the end of the lab.*
- *Your lab notes (carbon copies) will be collected for almost every lab, and select labs will be graded.*
- *There will also be lab assignments (computer lab) in lab that are submitted through TED*

In-lab quizzes: 21%

There will be 4 short in-lab quizzes that will be worth a total of 21%. The quizzes will require a calculator (no cell phones allowed) and will be closed book (no notes, textbooks, or laptops out in the open). These will be given at the beginning of lab. If you show up more than 5 minutes late, you will not be allowed to take the test. There are no makeups for the in-lab quizzes.

Writing assignments: 22%

There will be 4 writing assignments worth a total of 24% of the points. Each writing assignment must be written in your own words

Writing in your own voice assignment – 2%

PCR variations mini report – 6%

Ligation efficiency mini report – 7%

Promoter mutants mini report – 7%

Final Quiz: 30%

There will be an in-class cumulative quiz during your last lab section of the quarter, worth 30% of the final grade.

%		%		%		%		%	
A+	97-100	B+	87-100	C+	77-80	D+	67-70	F	<60
A	93-97	B	83-87	C	73-77	D	63-67		
A-	90-93	B-	80-83	C-	70-73	D-	60-63		

Academic Integrity:

We hold you, as students in UCSD community, to the highest standards of academic integrity. Whether you are writing a lab report, taking an online reading quiz or an in-class exam, we expect you to demonstrate trust in your own intellect and respect for yourself and your fellow students. This means that you will not engage in academically dishonest activities, such as plagiarizing, fabrication of data, cheating, or copying work you should be completing on your own. We also expect that you do not facilitate other students in engaging in academically dishonest activities.

All course materials are the property of the instructor, the course, and the University of California, San Diego and may not be posted online, submitted to private or public repositories, or distributed to unauthorized people outside of the course. Any suspected instances of a breach of academic integrity will be reported to the Academic Integrity Office for review.

Regrades: If you believe that an error in grading has been made, please contact Dr. Chu (mwchu@ucsd.edu) for a regrade request within 48 hours of when you first received the graded exam, and be specific about the possible error.

Regrades are not possible for exams that are written in pencil or erasable ink. Exams submitted for regrades will be compared with a scanned copy of the original exam and/or the entire exam may be graded again.

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.

Contact the OSD for further information:

858.534.4382 (phone)

osd@ucsd.edu(email)

<http://disabilities.ucsd.edu>(website)

Professionalism:

In this lab course, you will be working on a team on your experiments. We expect that you be respectful to yourself and your peers, and to come to lab with a professional attitude and effort. Your actions in the class will be taken into consideration by the IAs and instructor when calculating the final grade. If you behave unprofessionally, points can be reduced in steps of 0.5%.

Letters of Recommendation:

For recommendation letters, I require that you have an A in the course, and that you have spoken to me either in lab, or during my office hours.

Tentative Lab Schedule:

Date	Lab (M/Tu/Th/F)	Lab Manual Section
7-Aug	Pipetting Dilutions Calibration of a pipetmen	Lab 1, page 21 Additional info "working in the lab" s
8-Aug	Agarose gel electrophoresis on two DNA samples of unknown size and concentration (estimating using standard curve)	Experiment 1, 1A-1D
10-Aug	Image Studio Lite analysis Graphing Set-up liquid cultures of RFP and control promoter Writing in Your Own Voice Assignment (Computer Lab)	Appendix A Appendix B, C Starting Experiment 2, 2A
11-Aug	Extract plasmids Check plasmids with AGE & nanodrop	2B
14-Aug	Design and set up RFP PCR experiment Quiz 1	Sub-experiment 2-1. 2C
15-Aug	Run gel of PCRs, repeat if needed Clean up PCR Set up digest of Pro1 plasmid and RFP PCR product Computer lab - plasmid map, restriction enzymes, designing primers	Finish 2C 2D 2E Appendix D
17-Aug	Clean stuffer from Pro1 - heat inactivate PCR digest Run gel of digest	2F 2F

	Plan and set-up ligation	Sub-experiment 2-2: 2G
18-Aug	Transform bacteria with ligations Computer Lab: Design mutagenesis primer Present RFP PCR results	2H 2K
21-Aug	Count colonies Computer lab: analyze ligation data Pick red colony from plate and start liquid culture	2I 2I 2I
22-Aug	Purify recombinant Pro1-RFP plasmid and run gel Set up mutagenesis PCR Quiz 2	2J 2L Quiz 1
24-Aug	Gel of PCR mutagenesis, repeat PCR Kinase/ligase/dpn treatment Transform cells	2M 2N 2N
25-Aug	Check repeat PCRs, KLD and transformation if needed Analyze transformations Computer lab: Bioinformatics Intro to GenBank	2O Appendix F
28-Aug	Set-up liquid cultures: three colonies from mutagenesis Observe <i>C.elegans</i> and induce RNAi Work on ligation report	2O Experiment 3. 3A
29-Aug	Streak cultures to maintain Purify plasmids from 3 cultures and send for sequencing Check plasmids using AGE Quiz 3	2P 2Q 2Q
31-Aug	Computer lab: analyze sequencing results Use streaked bacteria to measure RFP	2R 2S
1-Sep	Observe worms and extract RNA set up RT-qPCR gel of RNA Start analysis of RFP	3B 3B There are no instructions, 4 groups RNA. 2T

Mon Sept 4 - Holiday

5-Sep	Computer Lab: Analyze <i>C. elegans</i> qPCR data PTC extraction & PCR	3D Experiment 4. 4A
7-Sep	Digest PTC PCRs, AGE, PTC taste-test Pool genotype/phenotype data Analyze data	4B
8-Sep	Clean-up & final quiz	

Writing Support for Students:

If you are interested in improving your writing, I encourage you to make an appointment with The Writing Hub at UCSD. Just register for an account, and they will put you in touch with an undergraduate writing mentor. <https://ucsd.mywconline.com/>

These mentors can help you out with any part of the writing process that you want to improve upon or find yourself struggling with. For more information, read about their services here <http://commons.ucsd.edu/students/writing/index.html>

Tutoring is available at OASIS (Office of Academic Support and Instructional Services)

From the OASIS website (<https://students.ucsd.edu/sponsor/oasis/>): We are the learning center at UC San Diego and provide most of the free tutoring on campus in a collaborative, supportive environment. All UC San Diego students are eligible to receive OASIS services. Each year, OASIS serves 3,000 students in language, math, science, study skills, and writing as well as peer counseling and peer mentoring. They are located on the third floor of Center Hall, (858) 534-3760 (phone), oasis@ucsd.edu

Student Support Offices and Programs:

There are many resources at UCSD which support and celebrate our diverse community on the UCSD campus. I encourage you to explore the available resources here:

<https://students.ucsd.edu/student-life/diversity/>