BIMM101 Recombinant DNA Techniques
Course Information for Winter 2018

Instructors:	**Phone:**	**Email:**
Dr. Jenny Herndon	**(858) 246-0752**	**jherndon@ucsd.edu**
Lectures:		
TuTh: 2:00 PM – 3:20 PM in YORK 3010		
Laboratory:		
TTh: 9:30 AM –1:20 PM YORK 4318/4338		
Office Hours:	**Office Location:**	
TTh 1:30 PM- 2:00PM in YORK lab	**YORK 2300**	

REQUIRED TEXTS:
1) BIMM 101 Lab Manual

REQUIRED MATERIALS needed by the second day of class:
1) UV blocking safety glasses
2) Lab coat (must be to the knees)
3) Fine point Sharpie for labeling – get a dark color
4) Scientific calculator – graphing calculators and cell phones can not be used during quizzes
5) Long pants and closed toed shoes are required in lab at all times – no skin on feet or legs should be showing

COURSE OBJECTIVES:
BIMM 101 will introduce several key methods that are used in a typical molecular biology laboratory, focusing on the techniques and concepts that involve cloning DNA plasmid constructs and the analysis of DNA/RNA samples. The laboratory work will consist of three multi-day projects, all of which explore various aspects of gene expression. We will begin by investigating the efficiency of different promoters or RBS (ribosome binding sequences) in a synthetic biology project and will use site-directed mutagenesis to design and test your own promoter sequence. Next, we will use an RNA interference (RNAi) technique in *C. Elegans* to induce knock-down of a particular gene, and finally, a sample of our own DNA will be analyzed to determine our particular genotype for the "PTC tasting trait" or ability to taste phenylthiocarbamide (PTC).

Since this is an introductory lab course, all lab work will emphasize the learning of basic lab skills and good lab technique. By performing these experiments, you will have the opportunity to practice the basic principles of quality scientific methodology. These include using proper controls in designing experiments/interpreting results, keeping an accurate and complete record of all experiments in a lab notebook, and the ability to troubleshoot a procedure when the expected results are not forthcoming.

GRADE ASSIGNMENTS:
Your grade will be determined from the following :

Quizzes (5 at 100 pts each, lowest dropped)	400
Lab Reports (2 at 100/150pts each)	250
PTC Write-up (mini-report)	50
Classwork Assignments (various pts each)	75
Participation/Lab Responsibility	25
Final Exam	200
Class Point Total	**1000**

GRADE CUTOFFS: (may be lowered at the instructor's discretion)

990-1000	A+	790-799	C+
910-989	A	710-789	C
900-909	A-	700-709	C-
890-899	B+	600-699	D
810-889	B	0-599	F
800-809	B-		

LAB SAFETY:
In any undergraduate laboratory course, student safety is the first and foremost priority. Throughout the quarter, you will be using reagents and equipment that can be harmful if used improperly. Therefore, students enrolled or waitlisted in Biological Sciences lab courses must complete an online Lab Safety tutorial and pass a safety assessment **prior to the second day of lab**. It is expected that you will need between 60 to 90 minutes to complete the tutorial and assessment. Students must correctly answer 18 out of the 22 questions to pass and may take the assessment as many times as necessary to "pass". The link to the tutorial and assessment is found at the following website: https://dbsportal3.ucsd.edu:3443/safety-training/ Please note that you will not be allowed to participate in Thursday's lab (and hence will likely be asked to drop the class) if you have not completed this on-line requirement.

TritonEd (formerly TED)
Many of the course materials are available only through the course website on Triton Education (https://tritoned.ucsd.edu). All students will need to be able to access this site. Once you are enrolled in the class, you will have access to the site using your ACS username and password. Be sure to check the course website frequently for announcements and updates on assignments.

LAB NOTEBOOKS (pp 8-9 in lab manual):

You will need to keep a formal lab notebook in which you collect your data from the laboratory experiment. You are strongly encouraged to update your notebook following each lab session. The notebook should have numbered pages with a table of contents (it is okay to write these in). **You will need to hand in either photocopies or carbon copies of your notebook pages for the experiments that are written up as lab reports.** Your lab notebook does not require a standard format, but should contain the following:

1) Any numerical data you collect (such as spectrophotometer readings) neatly written in well-labeled spaces (**Data tables can be written into the notebook before lab**)
2) Printouts of any gel or film images taped into the notebook with all lanes labeled
3) Notes on any changes to the procedure for that experiment or other deviations from the lab manual
4) Notes on any mistakes, problems, or ways to improve the experiment—what would you do differently?
5) Any calculations and analysis that is specifically called for in the lab manual, as well as the response to any lab manual questions.

Be sure that each page has the experiment date and a title. A well-kept lab notebook serves as a portfolio of your work in the class that can be useful when interviewing for research internships and laboratory jobs.

WRITTEN ASSIGNMENTS:

There will be a total of three written assignments required during the course. The guidelines for each will be slightly different and can be found on the TritonEd website. These assignments are due **at the beginning of lab** on the due date listed in the lab schedule. Please have them stapled or in a report binder prior to the start of class. For every day the assignment is late, 10% will be deducted for up to five days. After five days, the assignment will not be graded.

LAB QUIZZES AND EXAM:

The purpose of the lab quizzes is to address the following: Are you keeping up with the material? Have you been attending lecture? The quiz dates are given in the lab schedule. They will sometimes begin precisely at the scheduled lab start time (so be ready to go when you come in) and will take 45 minutes, or they will be held during lecture. They can contain any class material that is found in the lab manual or covered in lecture. Be sure to focus on understanding the purpose of the current lab project and how each experiment fits into this, **the basic concepts underlying the procedures**, and simple mathematical and analytical skills based on what you have actually done in lab. The quiz may also contain questions that pertain to the experiment that is scheduled for that day. **The lowest quiz score will be dropped from your point total.** The final exam is cumulative and will be held the last day of the last week.

CLASSWORK
Periodically throughout the quarter, you will be given points for work performed during class time, such as class assignments, computer labs, etc. Points are earned either by participation (awarded to your lab group by your IA) or by turning in completed assignments.

LAB ATTENDENCE POLICIES:
Attendance at each lab session is **mandatory**. If you miss two labs, **you will be asked to drop the course**. If you are ill, you must send an email to the instructor as soon as possible and cc your IA. We will have you make-up the lab in a way that we will determine. **Only the instructor can excuse an absence.**
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.

MAKING UP QUIZZES AND EXAMS:
Please note that it is extremely burdensome for the instructor and IAs to have to prepare and proctor make-up exams. Missing a scheduled quiz will only be excused for medical reasons where documentation can be provided. **If you are late the day of a scheduled quiz and miss the quiz, you will receive a zero for the grade.** At the instructor's discretion, a missed quiz that is excused 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 quiz date. There are no make-up opportunities for the final exam on Thursday, March 15th.

PARTICIPATION/LAB RESPONSIBILITY:
These points are rewarded for general lab responsibility, which involves paying attention to the protocols, contributing equally to the work and staying on task.

STUDENTS WITH DISABILITIES:
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.

ACADEMIC INTEGRITY:
Integrity of scholarship is essential for an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the individual to whom it is assigned, without unauthorized aid of any kind. Any student who is caught cheating on a quiz or the final exam will automatically receive a zero and will be reported to the Office of Academic Integrity.

BIMM101 Schedule – Winter QUARTER 2017 - Dr. Jenny Herndon

	Dates	Experiment/Activity	Experiment
Wk 1	Tues Jan 9	Calibration of a pipettemen/Pipetting/Dilutions	Lab 1
	Thurs Jan 11	Agarose gel electrophoresis on two DNA samples of unknown size and concentration (estimating using standard curve)	Exp 1 (1A-1D)
Wk 2	Tues Jan 16	**COMPUTER LAB:** Image Studio Lite analysis and Graphing Set-up liquid cultures of RFP and control promoter **QUIZ#1 IN LAB**	Appendix A Appendix B, C 2A
	Thurs Jan 18	Extract plasmids Check plasmids with AGE & nanodrop	2B
Wk 3	Tues Jan 23	Design and set up RFP PCR experiment **COMPUTER LAB:** Plasmid maps, restriction enzymes, designing primers (Appendix D)	Sub-exp 2-1 and 2C
	Thurs Jan 25	Run gel of PCRs, repeat if needed Clean up PCR Set up digest of Pro1 plasmid and RFP PCR product	Finish 2C 2D 2E Appendix D
Wk 4	Tues Jan 30	Clean stuffer from Pro1 - heat inactivate PCR digest Run gel of digest Plan ligation	2F 2F Sub-exp 2-2 and 2G
	Thurs Feb 1	Set-up ligation Transform bacteria with ligations **COMPUTER LAB:** Design mutagenesis primer Present RFP PCR results **QUIZ#2 IN LECTURE**	2H 2K
Wk 5	Tues Feb 6	Count colonies Pick red colony from plate and start liquid culture	2I
	Thurs Feb 8	Purify recombinant Pro1-RFP plasmid and run gel Set up mutagenesis PCR **COMPUTER LAB:** Analyze ligation data	2J 2L
Wk 6	Tues Feb 13	Gel of PCR mutagenesis, repeat PCR Kinase/ligase/dpn treatment Transform cells **QUIZ#3 IN LECTURE**	2M 2N
	Thurs Feb 15	Check repeat PCRs, KLD and transformation if needed Analyze transformations **COMPUTER LAB:** Bioinformatics Intro to GenBank	2O Appendix F

Wk 7	Tues Feb 20	Set-up liquid cultures: three colonies from mutagenesis **QUIZ#4 IN LECTURE**	2O
	Thurs Feb 22	Streak cultures to maintain Purify plasmids from 3 cultures and send for sequencing Check plasmids using AGE	2P 2Q
Wk 8	Tues Feb 27	**COMPUTER LAB:** Analyze sequencing results FIRST Use streaked bacteria to measure RFP Plan how to analyze RFP data and set up 96 well plate	2R 2S 2T
	Thurs Mar 1	Observe *C.Elegans* and induce RNAi **COMPUTER LAB:** Analyze RFP Data	3A 2T
Wk 9	Tues Mar 6	Observe worms and extract RNA Set up RT-qPCR **RFP Lab Report DUE**	3B-3C
	Thurs Mar 8	**COMPUTER LAB:** Analyze C. elegans qPCR data PTC extraction & PCR **QUIZ#5 IN LECTURE**	3D 4A
Wk 10	Tues Mar 13	Digest PTC PCRs, AGE, PTC taste-test Pool genotype/phenotype data and analyze **RNAi Lab Report DUE**	4B
	Thurs Mar 15	**PTC Write-up DUE** **Final Exam in Lab 9:30am-12:30pm**	