Division of Biological Sciences
BIMM101 Recombinant DNA (Sections C01 895305 – C04 895308)
Course Information for Winter 2017

Instructor:	**Phone:**	**Email:**
Dr. Jenny Herndon	**(858) 246-0752**	**jherndon@ucsd.edu**
Lectures:		
MWF: 1:00 PM – 1:50 PM in CENTER 212		
Laboratory:		
Section C01: TTh 11:00 AM- 2:50 PM YORK 3306		
Section C02: TTh 11:00 AM- 2:50 PM YORK 3406		
Section C03: WF 9:00 AM- 12:50 PM YORK 3306		
Section C04: WF 9:00 AM- 12:50 PM YORK 3406		
Office Hours:	**Office Location:**	
T: 10:00AM–11:00 AM	**YORK LABS or HSS1145C (email me first)**	

REQUIRED TEXTS:
1) BIMM 101 Lab Manual from Soft Reserves (available from the Bookstore)

REQUIRED MATERIALS needed by the second day of class:
1) UV blocking safety glasses (available at bookstore)
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 four multi-day projects. We will begin by cloning and expressing a bacterial enzyme that exhibits luminescence, and then explore the efficiency of different promoter sequences in a synthetic biology project. 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.

ATTENDANCE: Enrolled and waitlisted students MUST attend the first lab session. Additional details: http://biology.ucsd.edu/go/ug-labs.

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.

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

5 Quizzes (50pts each)	250
Pre-Lab Quizzes (8 total @ 5 pts each)	40
5 Written Assignments (50 or 70 pts each)	310
7 Classwork Assignments (5-15 pts each)	90
Participation/Lab Responsibility	10
Final Exam	300
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/Friday'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/webapps/login/). 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.

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.

LAB NOTEBOOKS (pp 18-19 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 five written assignments required during the quarter. 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 often begin precisely at the scheduled lab start time (so be ready to go when you come in) and will take 30 minutes. 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 last exam is cumulative and will be held on the last lab meeting of the last week.

PRE-LAB QUIZZES

These will be short, five question quizzes that are provided on the TritionEd website. Generally these quizzes will be posted every week on **Monday at 11am**, and will remain open for 24 hours. They are designed to assess your understanding of the procedures for the week and the underlying concepts of the experiment.

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, usually by attending another section that week. **Only the instructor can excuse an absence.**

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 or exam 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 exam or 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 exam or quiz.

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.

BIMM 101 – Tentative Schedule –Winter Quarter 2017 - Dr. Jenny Herndon

	Dates	**Experiment**	**Assignments/ Quizzes**	**Lab Manual**
Wk 1	Jan 10/11	**Experiment 1: Determining amount and size of two unknown DNA samples** Pipetting and Dilutions Calibration of a Pipetman **Molecular Biology "Quiz"**		pp 21-23
	Jan 12/13	Agarose Gel Electrophoresis **Dilution/Concentration WS in Lab (page 1)**		1A-1D
Wk 2	**NO LECTURE MONDAY JAN 16: MLK HOLIDAY**			
	Jan 17/18	**Computer Lab #1 (instructions in manual):** Image Analysis & Graphing	**QUIZ#1**	1E-1G
	Jan 19/20	**Experiment #2: Quantification of genomic DNA and PCR of *luxAB* genes** Isolation of chromosomal DNA Part I	**Write-up #1:** Agarose Gel Analysis	2A
Wk 3	Jan 24/25	Isolation of DNA Part II Spectrophometric Quantification of DNA **Computer Lab #2 (back of manual):** Bioinformatics Part 1		2B, 2D
	Jan 26/27	Plan PCR Experiment Set up PCR: Amplification of luxAB gene from *V. Fischeri* DNA using PCR		2E
Wk 4	Jan 31/Feb 1	Checking PCR products on gel (Repeat if necessary) Studio Lite Analysis in computer lab	**QUIZ#2**	2F-2I
	Feb 2/3	(Run Gel if Repeat was necessary) **Experiment #3: Cloning luxAB genes** Clean up PCR product Set up digest		3A-3B
Wk 5	Feb 7/8	Clean up Xba1 and EcoR1 digests Quantification of Digests on Gel Ligation **Computer Lab #3 (back of manual):** Bioinformatics Part 2 **PCR Presentations**		3C-3E
	Feb 9/10	Transform cells	**QUIZ#3**	3F

Wk 6	Feb 14/15	Aldehyde/screen luminescence Pool data for whole class to do statistical analysis of results **Computer Lab #4 (instructions on TritonEd):** Statistical Analysis **Experiment #4: Using synthetic biology approaches to investigate promoter mutants** Plan synthetic bio project Start overnights of Biobrick plasmids		3G 4A-4C
	Feb 16/17	Alkaline lysis mp of Biobrick plasmids Digests of Biobrick plasmid	**QUIZ#4**	4D-4E
Wk 7	**NO LECTURE MONDAY FEB 20: PRESIDENT'S DAY HOLIDAY**			
	Feb 21/22	Remove Stuffer Fragment from promoter plasmids Gel purification of RFP fragment Ligation	**Write-up #2:** luxAB/PCR Project	4F-4H
	Feb 23/24	Transformation with RFP ligation product **Experiment #6: RNAi of unc-22 in *C.elegans*** Begin RNAi project: Set up *C. Elegans* plates		4I 6A
Wk 8	Feb 28/Mar 1	Pick RFP colonies to measure RFP Choose single RFP colony for sequencing Observe worm phenotypes and extract RNA for RT-PCR		4J-4K 6B-6D
	Mar 2/3	Purify plasmid and send for sequencing	**QUIZ#5**	4L-4M
Wk9	Mar 7/8	**Experiment #5: PTC Analysis** PTC extraction and PCR **Computer Lab #5:** Analyze RT-PCR data **(in manual 6E)** Analyze RFP sequence data **(on TritonEd)**		5A
	Mar 9/10	Check PTC PCR using gel electrophoresis PTC Taste Test Research Article Presentation	**Write-up #3:** RFP Project	5B-5C
Wk10	Mar 14/15	Check out Practice Final Exam	**Write-up #4:** RT-PCR *C. Elegans* Project **Write-up #5:** PTC Project	
	Mar 16/17	**Final Exam in Lab**		