

Division of Biological Sciences
BIMM101 Recombinant DNA (Sections C01 871656 and C02 871657)
Course Information for Spring 2016

Instructor: Dr. Jenny Herndon	Phone: (858) 246-0752	Email: jherndon@ucsd.edu
Lectures: MWF: 1:00 PM – 1:50 PM in YORK 4080A		
Laboratory: WF: 2:00 PM – 6:00 PM fourth floor York Hall Section C01: Room 4318 Section C02: Room 4332		
Office Hours: W: 11:00 AM–12:00 PM	Office Location: H&SS 1145C	

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) Lab notebook, preferably with carbon copies (bookstore or Grove general store)
- 4) Fine point Sharpie for labeling – get a dark color
- 5) Scientific calculator – graphing calculators and cell phones can not be used during quizzes
- 6) 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 promotor sequences in a synthetic biology project. Next, we will analyze a sample of our own DNA to determine our particular genotype for the “PTC tasting trait” or ability to taste phenylthiocarbamide (PTC). Finally, we will use an RNA interference (RNAi) technique in *C. Elegans* to induce knock-down of a particular gene.

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 :

5 Quizzes (50pts each)	250
9 Pre-lab Quizzes (5pts each)	45
5 Written Assignments (50 or 70pts each)	310
Classwork (10 or 15pts each)	85
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://dbportal.ucsd.edu/protectedinfo/safety_training. Please note that you will not be allowed to participate in 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:

You will need to keep a formal lab notebook in which you collect your data from the laboratory experiments (see Appendix A in lab manual). You are strongly encouraged to update your notebook following each lab session. The notebook should be bound (spiral bound or composition book style are both okay), and 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 for this course 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?

Your notebook should also include 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? Are you prepared for that day's lab? 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 TritonEd website. Generally these quizzes will be posted every week on **Tuesday at 2pm**, 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 worksheets, 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 –Spring Quarter 2016 - Dr. Jenny Herndon

	Dates	Experiment	Assignments/ Quizzes	Lab Manual
Wk 1	Mar 30	Pipetting and Dilutions		Lab 1
	Apr 1	Agarose Gel		Lab 2
Wk 2	Apr 6	Computer Lab #1(instructions on TED): Intro to Gel Quantification using Image J Intro to basic statistics	QUIZ#1	Lab 3
	Apr 8	Isolation of chromosomal DNA		Lab 4
Wk 3	Apr 13	Finish chromosomal DNA prep Mock PCR experiment Bacteriological Techniques Computer Lab #2: Bioinformatics I	Write-up #1: Agarose Gel Analysis	Lab 5
	Apr 15	Spectrophometric Quantification of DNA PCR: Amplification of luxAB gene from <i>V. Fischeri</i> DNA using PCR/optimizing PCR conditions		Lab 6
Wk 4	Apr 20	Check PCR products on gel /Repeat if necessary Image J Analysis in computer lab	QUIZ#2	Lab 7
	Apr 22	Run Gel if Repeat was necessary Clean up PCR product Set up digest Computer Lab #3: Bioinformatics II, III, IV		Lab 8
Wk 5	Apr 27	Clean up Xba1 and EcoR1 digests Quantification of Digests on Gel Ligation		Lab 9
	Apr 29	Transform cells Computer Lab #4 (instructions on TED): Statistical Analysis PCR Presentations		Lab 10
Wk 6	May 4	Add aldehyde and screen for luminescence Plan synthetic bio project Start overnights of Biobrick plasmids	QUIZ#3	Lab 11
	May 6	Alkaline lysis miniprep of Biobrick plasmids Set up Biobrick digests Computer Lab #5 (instructions on TED and BRING LAPTOPS): Analysis of luxAB results ANOVA and post-hoc analysis to analyze pooled ligation data (from Lab 11)		Lab 12

Wk 7	Mar 11	Gel purification of digests Ligation of RFP plasmids	Write-up #2: luxAB/PCR Project	Lab 13
	Mar 13	Transformation with RFP ligation product Begin PTC project: taste test, isolation of cheek cell DNA, PCR set-up	QUIZ#4	Lab 14
Wk 8	May 18	Use fluorimeter to measure RFP expression Pick one plasmid and set up overnight culture Digest cheek cell PCR product and run gel		Lab 15
	May 20	Alkaline lysis miniprep of RFP plasmid/send plasmid for sequencing Begin RNAi project: Set up <i>C. Elegans</i> plates	Write-up #3: PTC Project	Lab 16
Wk 9	MEMORIAL DAY HOLIDAY: NO LECTURE MONDAY MAY 23rd			
	May 25	Observe worm phenotypes Isolate RNA Set up RT-PCR experiment Computer Lab #6: Analyze RFP plasmid sequence	QUIZ#5	Lab 17
	May 27	Analyze RT-PCR data	Write-up #4: RFP Project	Lab 18
Wk10	Jun 1	Check out Research Article Presentation	Write-up #5: RT-PCR <i>C. Elegans</i> Project	
	Jun 3	No Lecture Final Exam in Lab: FRIDAY JUN 3rd 2-5pm		