Week	Date	Class or Lab	Section of Lab Manual
1	**Jan 10/11**	**LAB 1** A. Pipetting B. Dilutions C. Calibration of a pipettemen D. Mol. Bio. Review	Dilutions and Calibration, Page 19-21
	Jan 12/13	**LAB 2 *Computer labs available for anyone who wants them*** A. Agarose gel electrophoresis on two DNA samples of unknown size and concentration (estimating using standard curve)	Experiment 1A-D
2	**Jan 17/18**	**LAB 3 *Computer Lab* All rooms available** A. Image analysis of gel electrophoresis results & graphing	Experiment 1E-G
	Jan 19/20	**Lab 4** Part 1 : Isolation of chromosomal DNA from *Vibrio fischeri*	Experiment 2A
3	**Jan 24/25**	**LAB 5 *Computer Labs available*** DNA Extraction Part 2 B. Spectrophotometric analysis of *Vibrio* DNA A. **Computer Lab -** Bioinformatics Part I: exploring the Lux operon and identifying primers	2B, 2D (THERE IS NO 2C); Bioinformatics Lab A
	Jan 26/27	**LAB 6 *Computer labs available*** B. Plan PCR experiment A. Set up PCRs (amplifying *V. fischeri luxAB* genes) Optional: Bioinformatics part I: Lux operon and identifying primers	2E; Bioinformatics Lab A
4	**Jan 31/Feb 1**	**Lab 7 *Computer Labs available*** A. Checking the success of the PCR reaction by gel electrophoresis B. **Computer Lab:** Using Image J to analyze PCR results + make graph C. Repeat PCRs as needed	2F; 2G; 2H
	Feb 2/3	**Lab 8** A. Run gel of repeats (if necessary) and use Image J to analyze B. Clean up best *lux*AB PCR product from lab 6 C. Restriction digest of *lux*AB PCR products and pGEM with *Xba*I and *Eco*RI	2I; 3A; 3B
5	**Feb 7/8**	**LAB 9 *Computers available*** A. Clean up *Xba*I and *Eco*RI digest of pGEM B. Quantification of digests from gel C. Ligation of pGEM and *lux*AB inserts D. **Computer Lab:** Bioinformatics Part II: Restriction digestion and primer design	3C; 3D; 3E; BIOINFORMATICS B
	Feb 9/10	**Lab 10** A. Transformation of competent cells with ligation products	3F

6	**Feb 14/15**	**Lab 11 *Computer Labs available*** Counting blue/white colonies & screening for clones containing *luxAB* by adding exogenous aldehyde Pool data and do statistical analysis (ligation efficiency). Plan promoter mutants project (synthetic biology) Set up promoter mutant cultures	3G; ADDITIONAL INSTRUCTIONS; Experiment 4 Introduction: 4A & B; 4C
	Feb 16/17	**Lab 12** C. Alkaline lysis miniprep: purification of plasmid DNA from overnight cultures (promoter mutants project) A. Setting up digests of Biobrick plasmids	4E
7	**Feb 21/22**	**Lab 13** A. Removing the stuffer fragment from the plasmids containing the promoter sequences B. Gel purification of the DNA fragment containing the RFP sequence C. Ligating plasmids with promoter sequences and RFP sequence	4F; 4G; 4H
	Feb 23/24	**Lab 14** A. Transformation of competent cells with RFP ligation products Start RNAi	4I; 6A
8	**Feb 28, March 1**	**Lab 15** Pick RFP colonies to measure RFP Choose RFP colony to grow up and send for sequencing Observe worms and extract RNA (IAs can set up RT-qPCR today or next lab)	4J; 4K; 6B; 6C
	March 2/3	**Lab 16 *Computer labs available*** Purify plasmid, run gel to check concentration and send for sequencing Analyze RFP Data	4L, 4M; ADDITIONAL INSTRUCTIONS
9	**March 7/8**	**Lab 17 *Computer labs available*** A. Computer Lab: Analyze results of RT-qPCR measurement of *unc*-22 mRNA PTC extraction & PCR Check plasmid sequences	6E; 5A; ADDITIONAL INSTRUCTIONS
	March 9/10	Check PTC PCRs using gel electrophoresis	Exp 5A gel
10	**March 14/15**	Lab clean-up & Review	
	March 16/17	**Final Quiz during lab time *Computers**	

Dr. Keefe Reuther
kdreuther@ucsd.edu
Office hours: WF 11:30am-12:30pm
Office: HSS 1145D

Lecture: MWF 1pm-1:50pm CSB 005

Schedule of Laboratory Meetings:

Section #	Day	Time	Building	Room	IA
B01	WF	2:30p-6:20p	YORK	3306	Ye
B02	WF	2:30p-6:20p	YORK	3406	Tiffany

Instructional Assistants:

Name	email
Zhang, Ye	yez024@ucsd.edu
Ho, Tiffany	twho@ucsd.edu

Learning goals:

- Collaborate with one another to learn foundation biological concepts and laboratory skills
- Apply knowledge of molecular biology concepts and molecular techniques to plan experiments, explain and troubleshoot results.
- Demonstrate proficiency at the basic molecular biology techniques used in the lab.
- Explain the importance of proper controls in designing experiments and interpreting results.
- Perform basic lab math skills, statistical analysis, and graphing.
- Draw conclusions based on evidence and reasoning.
- Use basic bioinformatics databases and applications.
- Find, read, and evaluate primary literature.
- Collaborate with one another to learn foundation biological concepts and laboratory skills.

Required texts:

1. BIMM 101 Lab Manual from University Readers
2. From Genes to Genomes by Dale (1st, 2cd, or 3rd edition)
electronic version of 3rd and 1st edition available on Roger
3. Readings on posted on TritonEd

Required Materials – needed by second day of class:

Lab coat – must be to knees
UV blocking safety glasses (also at bookstore)
Lab notebook with carbon copies (bookstore or Grove general store)
Fine point Sharpie for labeling – get a dark color
Basic calculator – you cannot use a cell phone during quizzes!
Long pants, close-toed shoes, and socks

REMEMBER: NO SKIN MAY SHOW BELOW THE BOTTOM OF YOUR LAB COAT!

Remember that lab attendance is required – if you miss two labs, you will be asked to drop the course. If you are ill, you must leave a message with your instructor, not your IA, and make up the lab in a way that we will determine. You must be on time for lab; the IAs go over the experiments at the beginning of lab, and also quizzes are administered then.

CONTACT: Your IA's and fellow students are your best resource for information and you should first attempt to answer your questions through them. Contact Dr. Reuther first only for specific issues unrelated to course content. The best way to contact him is by email: kdreuther@ucsd.edu. On all emails PLEASE put BIMM 101 in the subject line to indicate that the email pertains to this course. Also, if you email a question the evening before an exam please send it before 5 PM. If you email about anything regarding your status in the course, please include your UCSD username, and PID.

iCLICKERS: Required. You must register your clicker on TritonEd during week 1. Beginning Tuesday, Week 2, you must answer at least 50% of the questions in a single lecture to receive participation points for that lecture. You may miss two lectures during the quarter and receive full participation credit. Forgotten remotes or dead batteries or any other similar issue will not be considered excuses for missed participation. It is the students' responsibility to make sure they have a working iClicker remote for all classes.

VIDEOCASTING:
Whenever possible, class meetings will be recorded and made available online as a resource for learning (http://podcast.ucsd.edu/). However, participation and contribution are highly encouraged, as substantial portions of class meetings will be interactive. Many important concepts and ideas that are the result of collaborative learning cannot be easily captured on video. Therefore, podcasts are provided for the purpose of review and should not be used solely to substitute for active engagement in class meetings.

TECHNOLOGY:
Students are welcome to bring laptop computers, tablets, or similar technology to class meetings and discussion sections for note-taking purposes. Please see this research study, which shows that multi-tasking on computers in class is likely to decrease not only your own grade but also the grades of people around you who can see your screen! For this reason, we ask that you do not flip between relevant course materials and irrelevant activities on the internet. The use of cell phones, computers, or other personal devices is not permitted in the laboratory for safety reasons.

Sana et al (2013) Computers and Education 62: 24-31
http://www.sciencedirect.com/science/article/pii/S0360131512002254

WEBSITE: Everything related to the class is kept on the TritonEd site (https://tritoned.ucsd.edu/webapps/login/). **Announcements** of exam room changes and many other important matters will be posted on the TritonEd site. Check the site often! **Grades** for the midterm exams will all be posted on the website.

GRADING:

Participation 20%:

- Pre-class targeted reading + quiz, 5%
- In-class activities and iClicker, 5%
- Lab notebooks, 8%
- Professionalism, 2%

Quizzes* 35%:

- 4 X 5% quizzes ~biweekly
- Final exam, 15%

Writing* 35%

- Writing in your own voice assignment, 4%
- RNAi assignment, 5%
- PCR variations mini-report, 6%
- Promoter mutants mini-report, 8%
- Gel electrophoresis mini-report, 5%
- Ligation efficiency mini-report, 7%

***quizzes or writing are scaled to 45% depending on what is best for each student.**

Absences: If you miss one lab with no excuse, you will lose 5% from your final grade. If you miss two labs, you will receive an F for the course.

These guidelines will be used to assign grades:
> (90%) A (A-, A or A+)
> (80%) B (B-, B or B+)
> (70%) C (C-, C or C+)
> (60%) D
There is NO rounding of grades. The ONLY recourse to receive a higher grade is to successfully submit a regrade request on an exam.

RE-GRADES: It is your responsibility to check your exam/quizzes for clerical errors in grading. If a grading error has been made, you should submit a re-grade request to Dr. Reuther at the end of a lecture within one week of return of the exam. The time and date of closing down the appeal process will be announced in class. Simply write "please re-grade Q #" or "arithmetic error on p. #" on the cover of your paper. Write a concise description of the alleged error on a separate, attached piece of paper. No re-grades are possible for exams written in pencil or non-permanent ink. Students who submit exams for re-grading understand that we may (1) re-grade the entire exam, and (2) compare the submitted paper to a scanned copy of the original exam.

Laboratory safety:
Safety precautions are crucial in the laboratory setting. Biology lab safety training and assessment (https://biology.ucsd.edu/education/undergrad/course/ug-labs.html) must be completed by the beginning of the first laboratory meeting. Students will not be allowed to participate in any laboratory section without completing this online training and assessment.

From the beginning of the first lab, appropriate laboratory attire is always required. Appropriate laboratory attire includes long pants or equivalent, long socks or equivalent, and closed-toe and closed-heel shoes. No skin should be exposed from the waist down at all times. Starting at the beginning of the second lab, personal protective equipment (PPE) is required. PPE includes laboratory coats that cover to the knees and UV-blocking safety glasses or goggles, both of which are available at the bookstore.

Library guide:
http://ucsd.libguides.com/bild4
A specific library guide has been designed for BILD 4. This website serves as the starting point for navigating campus library resources that support our needs in completing major assignments, such as the research proposal. Please feel free to schedule a consultation with Bethany Harris (bethany@ucsd.edu), our biomedical librarian, for further assistance.

Writing and Critical Expression Hub:
http://commons.ucsd.edu/students/writing/index.html
The Writing and Critical Expression Hub provides support for undergraduates working on course papers, i.e. laboratory reports and the research proposal, as well as other independent writing projects. Writing mentors can help at any stage of the writing process, from brainstorming to final polishing. The Writing and Critical Expression Hub offers: one-on-one writing tutoring by appointment; supportive and in-depth conversations about writing, the writing process, and writing skills; help with every stage in the writing process, walk-in tutoring; and workshops on writing.

Accessibility and inclusion:
http://disabilities.ucsd.edu | osd@ucsd.edu | 858-534-4382
Any student with a disability is welcome to contact us early in the quarter to work out reasonable accommodations to support their success in this course. 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). Students are required to present their AFA letters to faculty and to the OSD Liaison in the Division of Biological Sciences in advance so that accommodations may be arranged.
Whenever possible, we will use universal designs that are inclusive. For example, colors used in this syllabus are distinguishable by most colorblind and non-colorblind people, and this font is designed to be dyslexic friendly. If you have feedback on how to make the class more accessible and inclusive, please get in touch!

Discrimination and harassment: 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. 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 CARE at the Sexual Assault Resource Center at 858-534-5793, sarc@ucsd.edu, or http://care.ucsd.edu, or 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 student affairs staff member, a faculty member, a department chair, 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. The university is committed to upholding policies regarding nondiscrimination, sexual violence, and sexual harassment.

Academic integrity:
https://students.ucsd.edu/academics/academic-integrity/index.html
Integrity of scholarship is essential for an academic learning community. In this course and at the university, we expect that both students and the instructional team 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. Instructors, for their part, will exercise care in planning and collaborating with students on academic work, so that academic integrity is upheld.
When people collaborate to work toward a common goal, shared values must be established so that everyone understands the acceptable ways for working together. In organizations, these are commonly called codes of conduct or ethics. In this course, we are using a statement of values[4] in support of codes of ethics, like the Policy on Integrity of Scholarship, to state explicitly our values and describe the behaviors for maintaining and protecting those values.
The following values are fundamental to academic integrity and are adapted from the International Center for Academic Integrity. In our course, these values are open to discussions and possible alterations based on mutual agreements among all students and the instructional team. In collaborative work, each group should discuss these values and must articulate the expectations for how they are made manifest within the group's work together.

	As students, we will …	As the instructional team, we will …
Honesty	• Honestly demonstrate your knowledge and abilities according to expectations listed in the syllabus or in relation to specific assignments and exams • Communicate openly without using deception, including citing appropriate sources	• Give you honest feedback on your demonstration of knowledge and abilities on assignments and exams • Communicate openly and honestly about the expectations and standards of the course through the syllabus and in relation to assignments and exams
Responsibility	• Complete assignments on time and in full preparation for class • Show up to class on time and be mentally physically present • Participate fully and contribute to team learning and activities	• Give you timely feedback on your assignments and exams • Show up to class on time and be mentally and physically present • Create relevant assessments and class activities
Respect	• Speak openly with one another while respecting diverse viewpoints and perspectives • Provide sufficient space for others to voice their ideas	• Respect your perspectives even while we challenge you to think more deeply and critically • Help facilitate respectful exchange of ideas
Fairness	• Contribute fully and equally to collaborative work, so that we are not freeloading off of others on our teams • Not seek unfair advantage over fellow students in the course	• Create fair assignments and exams and grade them in a fair and timely manner • Treat all students and collaborative teams equally
Trustworthiness	• Not engage in personal affairs while on class time • Be open and transparent about what we are doing in class • Not distribute course materials to others in an unauthorized fashion	• Be available to all students when we say we will be • Follow through on our promises • Not modify the expectations or standards without communicating with everyone in the course
Courage	• Say or do something when we see actions that undermine any of the above values	• Say or do something when we see actions that undermine any of the above values

	• Accept a lower or failing grade or other consequences of upholding and protecting the above values	• Accept the consequences (e.g. lower teaching evaluations) of upholding and protecting the above values

All course materials are the property of the instructor, the course, and 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.

[4] This class statement of values is adapted from Tricia Bertram Gallant Ph.D.