

Bimm101 C00 Wi21 Course Syllabus

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Teaching Staff:

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Lecture: MWF 10-10:50am All lectures will be recorded and posted in the Media Gallery and embedded into the weekly course pages.

Zoom-Lab: Tu/Th

C01 : 9-11 am Meeting ID# TBA

C02 : 10:50-12:50pm Meeting ID# TBA

C03 : 2-4 pm Meeting ID# TBA

C04 : 3:50-5:50pm Meeting ID# TBA

Office Hours: TBA

Learning goals:

- Apply knowledge of the theory behind molecular techniques, and the applications of the methodologies in biological research, to explain experimental steps and troubleshoot results
- Apply knowledge of molecular biology concepts relevant to our work to explain and troubleshoot results
- Demonstrate proficiency at basic molecular biology techniques
- Explain the importance of proper controls in designing experiments and interpreting results

- Perform basic lab math skills, statistical analysis, and graphing
- Draw logical conclusions from experimental data and justify conclusions
- Use basic bioinformatics databases and applications
- Learn to find, read, and evaluate primary literature

Learning in this course

This course is designed to be a collaborative environment for everyone to learn together and construct a shared understanding of the material. Active participation both in class and lab is expected. Being able to communicate understanding, and confusion, is critical to success in any discipline, and is very useful for learning¹ ([Links to an external site.](#)). To encourage communication and collaboration, we will frequently use Zoom-lab time to work on problems in groups.

We like to use class time to work on applying knowledge, troubleshooting difficult topics, and practice solving problems. Hence, it is expected that you will prepare before coming to class, reviewing basic background information about the lab and/or relevant content. This will be encouraged through targeted readings and in-class quizzes. The more prepared you are for Zoom-lab, the more fruitful our discussions can be.

Instead of memorization, we will focus on developing an understanding of fundamental concepts and as they apply to the experiments. Therefore, tests will include questions that are based on solving problems in new contexts or data interpretation and not necessarily on memorizing facts.

Smith et al., 2009. <http://www.sciencemag.org/content/323/5910/122.short> ([Links to an external site.](#))

Grading

BIMM101 has multiple grading components:

Weekly Review Quizzes	10
Lab notebooks	22
Molecular Biology Review Quiz	2
Take-home problem sets	20

CRISPR 'Lab' report	25
Technique Report & Presentation	15
Professionalism	6
Total	100

Weekly quizzes: The quizzes posted on Canvas are meant to reinforce importance concepts covered in the lectures. Because mastery is not necessarily expected, scoring 85% or higher will result in full points. **It is very important to follow-up in office hours on concepts you were unclear on.**

Lab notebooks: Each student will be assigned an individual digital lab notebook (Google Doc) that you will use for the quarter. These will be made available through the Canvas Site. Compete and organized lab notebook entries are a critical part of effective work in a research lab. As such, we expect students to practice good lab notebook entry habits. Please consult the lab manual for what we expect in the lab notebooks, and use the template provided in the Google Doc. **Lab notebook entries will be regularly checked** and scored for various components: pre-lab work which often includes a summaries and predictions, in-lab work such as data analysis and discussion of data, and drawing conclusions in the form of an argument: claims, data to support claims, and explanations in the form of a biological or procedural mechanism, troubleshooting results when necessary. A grading rubric will be provided on Canvas.

Molecular Biology Review Quiz: A quiz about some background molecular biology and experimental design concepts. Quizzes will be scored for 1 point for completion, and 1 point for correctness (85% correct gets full correctness points). Instructions to take and submit the quiz will be posted on Canvas.

Take-home problem sets: You will be uploaded these to GradeScope (instructions provided on Canvas). These homework questions will be cumulative but will focus on the most recent material. There will be 4 quizzes, the lowest score will be dropped.

CRISPR Write-up: Guidelines, rubrics, and due dates for the write-up and assignments will be posted on Canvas. The goal of the write-up is to practice presenting and summarizing results, as well as constructing scientific arguments (what you can conclude, evidence to support, and providing reasoning biological/molecular/experimental explanations or hypotheses) in the form of a short journal article. A draft will be submitted for peer-review, and then a final version. Check course schedule on Canvas for due-dates.

Technique Report & Presentation: Toward the end of the course everyone will choose a recombinant DNA/molecular biology technique to research, summarize, and present. The purpose is to explore other techniques that are typically used in molecular biology research, understand how the technique works and can be used, and communicate your understanding in the form of a short-written report and an oral presentation (delivered by video conferencing). Rubrics and guidelines will be posted on the course site.

Professionalism: This portion of the course grade is intended to motivate students to consider the impact of their actions on their own learning and the learning of others in the course. Unprofessional interactions consume time, yet have no meaningful benefits to you, your fellow students, and/or the teaching team. This is even more important in the workplace where being unprofessional to colleagues or supervisors will only discount you. When you are discounted, you will not be invited for new opportunities; be very aware and protective of your network.

Late and missed assignments and quizzes

Assignments must be submitted on time to be eligible for full credit. Except in the case of medical or family emergencies, late assignments will be subjected to a 10% deduction per day if submitted within 48 hours after the posted due date. Assignments not submitted within 48 hours of the due date will receive a score of 0.

Grades will be based on your percentage in the course:

97+ = A+	94 up to 97 = A	90 up to 93= A-
87 up to 89 = B+	83 up to 86 = B	80 up to 82 = B-
76 up to 79 = C+	72 up to 75 = C	67 up to 71= C-
60 up to 66= D	Below 60 = F	

This course is not graded on a curve (i.e. 20% of students getting A, B, C, and such), and the ability to do well in the course is not dependent on others doing poorly.

Zoom-Lab Protocol

Zoom-Lab attendance is required – Missing a laboratory session without a reasonable excuse (e.g. medical or family emergency) will automatically result in a 2% deduction in your final course grade. Please be on time for laboratory sessions. Multiple late attendances will result in additional lost course points.

Children and video sessions

You are welcome to have children with you during video sessions as we fully understand that childcare situations may be complicated for some of you at this time. Do your best to participate and engage, but also please get in touch with me if you have any questions or concerns.

Technical Support

For help with accounts, network, and technical issues: <https://acms.ucsd.edu/contact/index.html> [Links to an external site.](#)

For help connecting to electronic library resources such as eReserves and e-journals:

<https://library.ucsd.edu/computing-and-technology/connect-from-off-campus/> [Links to an external site.](#)

Academic integrity (<https://students.ucsd.edu/academics/academic-integrity/index.html> [Links to an external site.](#))

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(s) to whom it is assigned, without unauthorized aid of any kind. Anyone caught cheating (includes plagiarizing lab reports, cheating on a test, or changing an answer for a re-grade) will be reported to the Academic Integrity Office.

Inclusion and Accessibility

Any student with a disability is welcome to contact us early in the quarter to work out reasonable accommodations to support your 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), which is located in University Center 202 behind Center Hall. 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.

For further information

Contact the OSD:

858-534-4382 [Links to an external site.](#) | <http://disabilities.ucsd.edu> [Links to an external site.](#) | osd@ucsd.edu |

Office of Equity, Diversity, and Inclusion:

858.822.3542 | diversity@ucsd.edu | <https://diversity.ucsd.edu/> [Links to an external site.](#)
<https://students.ucsd.edu/student-life/diversity/index.html> [Links to an external site.](#)

Student Resources for Support and Learning

There are many **resources on campus** that are directed to supporting your intellectual development. Do not be shy to make the most of these resources.

DISCRIMINATION AND HARASSMENT

The University of California, in accordance with applicable federal and state laws and university policies, does not discriminate on the basis of race, color, national origin, religion, sex, gender, gender identity, gender expression, pregnancy (including pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition, genetic information, ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services (including membership, application for membership, performance of service, application for service, or obligation for service in the uniformed services). The university also prohibits harassment based on these protected categories, including sexual harassment, as well as sexual assault, domestic violence, dating violence, and stalking. The nondiscrimination policy covers admission, access, and treatment in university programs and activities.

If students have questions about student-related nondiscrimination policies or concerns about possible discrimination or harassment, they should contact the Office for the Prevention of Harassment & Discrimination (OPHD) at (858) 534-8298, <https://ophd.ucsd.edu/Links to an external site.>, or <http://ophd.ucsd.edu/report-bias/index.htmlLinks to an external site.>

Campus policies provide for a prompt and effective response to student complaints. This response may include alternative resolution procedures or formal investigation. Students will be informed about complaint resolution options. A student who chooses not to report may still contact CARE at the Sexual Assault Resource Center for more information, emotional support, individual and group counseling, and/or assistance with obtaining a medical exam. For off-campus support services, a student may contact the Center for Community Solutions. Other confidential resources on campus include Counseling and Psychological Services, Office of the Ombuds, and Student Health Services.

CARE at the Sexual Assault Resource Center: 858.534.5793
| sarc@ucsd.edu | <https://care.ucsd.eduLinks to an external site.>

Counseling and Psychological Services (CAPS): 858.534.3755 | <https://caps.ucsd.edu>Links to an external site.

Week	Lab #	Weekdays	Date	Lab Activities	Relevant Lab Manual Sections
1	1	Tu	5-Jan	No Lab	
1	2	Th	7-Jan	Intro to Lab & breakout groups Work on dilutions plan and analyzing dilution data	Lab Manual: Liquid Measurement Units, Basic Dilutions, Serial Dilutions
2	3	Tu	12-Jan	Molecular Biology Review	
2	4	Th	14-Jan	Journal Article Discussion (part of DiCarlo et al. 2012 paper)	
3	5	Tu	19-Jan	CRISPR-Cas9 Experimental Design	Lab Manual: CRISPR-Cas9 Project Overview
3	6	Th	21-Jan	Bioinformatics - Exploring the ADE2 gene to identify important features and where to mutate	Protocol 1
4	7	Tu	26-Jan	Bioinformatics - Design gRNA & HDR template	CRISPR-Cas9 Project Overview (Example: editing the ADE2 gene + Homology Directed Repair of ADE2); Protocol 2
4	8	Th	28-Jan	Kit unboxing, introduction & streak out yeast. Let yeast grow at room temperature until next lab.	
5	9	Tu	2-Feb	Analyzing results of extracting plasmid and checking with agarose gel electrophoresis Set-up yeast transformation Streak yeast the NEXT DAY (OWN TIME)	Lab Manual: Cultures used in the lab; Plasmids used in the lab; Alkaline Lysis Plasmid Purification; Agarose Gel
5	10	Th	4-Feb	Analyze results of plasmid digestions Plan Ligations	Restriction enzyme cloning; Ligation; Annealed Oligo + Restriction Enzyme Cloning; Protocols 7, 9
6	11	Tu	9-Feb	Analysis of ligation-transformation results	Protocol 10
				Checking Colonies and send for sequencing	
6	12	Th	11-Feb	Analyze gels of HDR copying	Lab Manual: PCR and Making Copies of HDR templates; Protocols 14-15
				Check colonies and send for sequencing (last day)	
				Brainstorm how to analyze transformation results	No protocol - brainstorm how you might analyze the data
7	13	Tu	16-Feb	Analyze yeast transformation data	
7	14	Th	18-Feb	Analyze gels of PCRs Analyze sequencing of ADE2 (from previous classes)	PCR, Protocols 16-18
8	15	Tu	23-Feb	Work on CRISPR Write-up	
8	16	Th	25-Feb	Analyze sequencing of ADE2	
9	17	Tu	2-Mar	Draft 1 Crispr Write-up. Review and Reflection	
9	18	Th	4-Mar	Discuss presentations and Lab Loose Ends	
10	19	Tu	9-Mar	Presentations	
10	20	Th	11-Mar	Presentations	