

Course Syllabus

Welcome to BIMM 101: Recombinant DNA Laboratory! In BIMM101 we aim to function as an inclusive learning community to develop an understanding of experimental design, common molecular biology lab techniques, critical analysis of data and literature, and experimentation. We will do most of our exploration by working through a CRISPR editing experiment.

Teaching Team and lab sections:


Instructor:	Dr. Jessica Rusert	jrusert@ucsd.edu (mailto:jrusert@ucsd.edu)		
IA for D01	Manan Chopra	m1chopra@ucsd.edu (mailto:m1chopra@ucsd.edu)	York 2310	TuTh: 9:30a-1:20p
IA for D02	Xena Singapan	asingapa@ucsd.edu (mailto:asingapa@ucsd.edu)	York 2332	TuTh: 9:30a-1:20p
IA for D03	Nathan Stutzman	nbstutzman@ucsd.edu (mailto:nbstutzman@ucsd.edu)	York 4318	WF: 9:30a-1:20p
IA for D04	Celeste Yang	yuy030@ucsd.edu (mailto:yuy030@ucsd.edu)	York 4332	WF: 9:30a-1:20p

Learning goals:

- **Design experiments** to address specific research questions, including choosing appropriate controls and explaining the purpose of controls.
- **Apply knowledge** of molecular biology concepts and lab techniques to plan experiments, explain and troubleshoot results (troubleshoot refers to hypothesizing reasons for unexpected results, and proposing reasonable follow-up work to explore hypotheses).
- **Conduct experiments** using various recombinant DNA/molecular biology techniques.
- **Draw conclusions** based on evidence and reasoning.
- Perform basic **lab math skills, statistical analysis, and graphing**.
- Use basic bioinformatics databases and applications.
- Find, read, and evaluate **primary literature**.
- **Critically evaluate** scientific writing (your own, and that of peers).
- Connect small experimental steps to larger experimental goals.

- Keep an organized and detailed **lab notebook** that is helpful for tracking progress, detailing results, and troubleshooting.
- **Be reflective** about progress in the course: monitor if you are achieving the experimental goals, and any personal learning goals that you set for yourself.

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  (<http://www.sciencemag.org/content/323/5910/122.short>). Evidence-based teaching and learning practices will be used to help you be successful.

Lecture and lab time will be used to teach the concepts behind the lab work, work on applying knowledge, and troubleshooting your data. Hence, it is expected that you will prepare for lab **before arriving** by watching the recorded lectures, engaging with the material during recording lectures, and completing all pre lab work and reading so you are ready to do the lab.

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> 
(<http://www.sciencemag.org/content/323/5910/122.short>)

Lecture: Will be video recordings to watch asynchronously BEFORE the upcoming lab

Recordings will be posted at least 24hrs in advance of the scheduled lecture time (8am T/Th) to give you ample time to view them before the upcoming lab. These will also help you complete the before-lab tasks in addition to reading the required background material and protocols.

Labs: Please see this [schedule](#) 

(<https://docs.google.com/spreadsheets/d/1orYQESZ9QSF5kbpNPYq74wpifwJIZBPLNyDnFPCXBoY/edit?usp=sharing>) for our weekly lab activities, lectures, exams, and what will be due each week.

Laboratory Attendance

Attendance in the laboratory is required. Attending the first lab is required to maintain your seat in the course. For anyone not present who is enrolled, your spot will be given to a waitlisted student who is

present in the order they are listed for the class. Additional policies are available online

(<https://biology.ucsd.edu/education/undergrad/course/ug-labs/index.html>

(<https://biology.ucsd.edu/education/undergrad/course/ug-labs/index.html>)._)

If you must miss a lab for an unexpected emergency or illness, **only the instructor can approve an absence**. Please get in touch with Dr. Rusert as soon as possible, cc'ing your IA, if you are unable to attend lab (at that time the instructor will determine if documentation is required). In excused cases, please see below. An **unapproved absence will result in a 2% drop in course grade**, and two unapproved absences will result in a failing course grade. **Showing up late repeatedly will also result in a loss of professionalism points**, reflective of how often and many minutes late you are each time_(see below).

Make-up for missed in-person labs because of an excused absence:

Please note that a make-up as a result of absence is not meant to be a punishment - we are making sure that everyone has the same amount of engagement and learning in the course, even if they can't make it into the lab itself for the hands-on activities.

Complete the following steps:

1. Let Dr. Rusert and your IA know that you can't come to campus today and why.
2. Get in touch with your group mates to get any information you missed that you will need to complete your lab notebook entry. The easiest way to do this is to create a zoom with your group, during the actual lab session if you are able. We have computers available in the lab, and we usually spend the first and last portion of class discussing the pre-lab or interpreting results.
3. Make sure your regular notebook entry for the lab is complete by the due date (extensions may be granted by Dr. Rusert depending on the circumstance).
4. Add a section to your lab notebook entry for that day, called 'Attendance Make-up.' In this section, you should include the following. Make sure this is complete before the start of the next lab.
 1. In ~200 words (about 6-7 sentences), explain what we did in lab today and why we did it, as if you were explaining it to a friend or relative who didn't study biology (avoid scientific jargon and make it accessible). ***This is not a repeat of the goals and purpose we typically ask for!***
 2. Find one scientific journal article (hint: use google scholar) that relates to what we did in lab today, or uses the technique we used in lab, and write a brief paragraph about it, again as if you were explaining it to a friend or relative who didn't study biology. Include the full article citation. Choose one figure from the paper and put it in your entry. Be prepared to have a 5 minute conversation with me the next time you come to lab about what the paper was about and what can be claimed based on the results in the figure.

Your entire attendance make-up section should not take up more than a page.

Asking Questions and Getting Help

Dr. Rusert's Office Hours: Thursdays during part of our scheduled lecture time in TATA hall 3210 8:15-9:20am unless otherwise posted (be sure to get announcements!)

Being proactive and asking questions during office hours is something I value and appreciate – please ask whatever questions you may have about course material. You can also come and passively listen.

In addition, I'm more than happy to chat about other topics (e.g., career goals (or confusions!), hobbies, other projects, research, getting into research, etc.). Lastly, please make use of time in the lab to talk to me and the IAs as we can often help you better when talking with you directly. During a face-to-face conversation we are more likely to identify areas of confusion and correct misconceptions.

IAs will not have office hours as there is generally time during lab to ask questions (considering doing this while incubating something or waiting for gel to set or after you've completed the lab instead of leaving early). I strongly suggest staying after you have completed the lab to work on your lab notebook so you can ask questions when needed. Please take advantage of this time to ask questions about anything in the class and discuss lab notebook entries.

Emails directed to me, Dr. Rusert, should focus on personal, tech (but not tech support), or course-related issues ONLY (a course-related issue could be different deadlines listed in the syllabus versus that on the assignment, you cannot access the homework, etc.). I will respond to emails usually within 24 hours, but on weekends you may not hear back from me until Monday.

For ALL OTHER questions (such as concept questions), **you should use office hours or lab time first and foremost**, but we will also be using **Piazza for simple, asynchronous help**. Complex and Lab notebook-related questions should be asked during your lab time. The system is highly catered to getting you help fast and efficiently from classmates, IAs, and myself. I encourage you to answer each other's questions or contribute to a conversation! Rather than emailing content or logistics questions to someone from the teaching team, including your IA, please post your questions on Piazza – which you can even do anonymously. The teaching team does not know who posts a question when you do so anonymously. Click the **Piazza** link in the menu to the left to get started. Piazza will be checked at least once a day by the teaching team. **For logistics questions, please ensure you have carefully reviewed the syllabus and searched the posts in Piazza before making a new post.**

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> (<https://biology.ucsd.edu/education/undergrad/course/ug-labs.html>)) must be completed by the **beginning of the second lab** in week 1. Appropriate laboratory attire and personal protective equipment (PPE) are required, including laboratory coats that cover to the knees, safety glasses (recommended) or goggles, long pants or equivalent, and closed-toe and closed-heel shoes.

There is no eating or drinking allowed in lab (for eating and drinking breaks please step outside).

Grading

BIMM101 has multiple grading components:


Course Intro & Syllabus Quiz	0.5
Molecular Biology Review Quiz	2
Lab notebooks	21
Weekly Canvas Quizzes	12
Midterm	18
CRISPR 'Lab' report	21.5
Final Exam	21
Professionalism	4
Total	100

Course Introduction & Syllabus Quiz: A review of the syllabus and course components discussed in the Course Introduction video is an important step in understanding the course organization and what you will be responsible for.


Molecular Biology Review Quiz: This covers background molecular biology and experimental design concepts. It will be scored 50% for effort and completion and 50% for correctness. Instructions to take and submit the quiz are posted on Canvas in the Week 1 page and module. Watch the Lecture

recording on this topic and check out the [Week 1 page](#)

(<https://canvas.ucsd.edu/courses/51874/pages/week-1-page>) to find resources to help you if you're shaky on this material. Understanding these concepts is pertinent to much of the content we cover for the rest of the quarter. Getting a good handle on it now will support your success in this course.

Lab notebooks: Each student will be assigned an individual digital lab/research notebook (Google Doc) that they will use for the quarter. These will be made available through the Canvas Site and via email to you directly. Complete 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. You should complete any **Before-lab tasks before the start of your lab**. You will have until **noon (12pm) the day after** each lab to complete each In-lab entry *with an exception during week 8*. Please consult the [lab notebook guidelines](#) (<https://canvas.ucsd.edu/courses/51874/pages/lab-notebook-guidelines-and-grading>). You can see what we expect in the [following example](#)  (https://docs.google.com/document/d/1ynU43QH13kaho1nW2SEViYFVqJJBtIDwgpfpKPu_miA/edit?usp=sharing).

Lab notebook entries will be regularly and randomly checked for both before-lab work and in-lab work. In total, roughly 8 entries will be checked and scored. The two lowest scores will be dropped. *If you find yourself unable to complete up to two lab notebook entries for any reason, such as illness or family emergency, there are no extensions – those missed entries will count as the two low scores to be dropped. This is an accommodation built into the course to support students in a variety of situations fairly and equitably. Remember that not all notebook entries will be graded, however you are responsible for knowing and understand the concepts and techniques for each lab.*

You will submit your weekly notebook entries at the end of each week to a Canvas assignment to check for plagiarism. Entries that have obvious plagiarism will be given a 0 for that section or a 0 overall. If an entry matches another student's work, that student will lose those same points. If plagiarism is found on an entry that is not graded, points will be lost or no credit given on one that is graded. To prevent an inaccurate Turnitin score, **DO NOT COPY THE QUESTIONS FROM THE LAB TASKS INTO YOUR LAB NOTEBOOK** when creating your entries. You can number and/or title your entries instead within the heading sections described in the Lab Notebook Guidelines. Look through these [examples of plagiarism](#)  (<https://www.turnitin.com/static/plagiarism-spectrum/>). Often number 10 is what we see in lab notebooks between 2 students, which excludes the need for a citation.

Weekly Quizzes: These will cover material from both lectures and lab that week and are meant to reinforce the concepts and help you practice applying them. They are due Sundays by 11:59pm but can be submitted late for a 15% reduction each day. The lowest 2 scores will be dropped.

Midterm: The midterm will be on Feb. 15th during lecture time at 8am in TATA 3201. It is meant to evaluate your understanding of the concepts, protocols, experimental design, analysis, and experiments we cover through week 5 material. If you miss the midterm for any reason, these points will be moved to your final exam (*with the exception of an OSD accommodation*). **It is very important to follow up during office hours or with IAs during lab time on concepts you are unclear on.**

You will be allowed to use ONE page front and back of handwritten notes and your lab manual, including any notes you've written in it, during the **midterm and final exam**. The same note page can be used for both exams, but one total is all that is allowed. I encourage you to get familiar with your manual, add sticker tabs to easily find sections or pertinent pages, and add important information as we move through this class.

Final Exam: A cumulative final exam will be given during your last lab period (March 14/15th) for *likely* 2.5hrs starting at 9:30am. For extenuating circumstances that interfere with your ability to take the final (i.e. hospitalization), please contact me to discuss your circumstances and options. Everyone will take the final exam and this will be a component of everyone's grade. However, if your final exam grade is greater than your midterm exam grade, your final exam will count for all of the exam points (39% of your grade) to reward you for improving your understanding.

CRISPR Lab Report: The goal of the write-up is to write a short scientific article to present the results of our CRISPR experiment, including presenting and summarizing results and constructing scientific arguments (what you can conclude, evidence to support, and providing reasoning biological/molecular/experimental explanations or hypotheses). A draft will be submitted for peer review, and then a final version will be submitted. Consult [course schedule](#) ➞ <https://docs.google.com/spreadsheets/d/1orYQESZ9QSF5kbpNPYq74wpifwJIZBPLNyDnFPCXBoY/edit?usp=sharing>) for due dates. Guidelines/rubrics will be provided later in the course.

Professionalism: This portion of the course grade is intended to motivate students to consider the impact of their actions on their 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. Analogously in the workplace, being unprofessional to your colleagues or supervisors will only discount you. When you are discounted, you will not be invited to new opportunities that you may or may not be aware of. Professionalism can be demonstrated through individually demonstrating meaningful participation in the course (especially during lab time), **which includes showing up on time**, maturity, and respectful behavior toward the teaching team and fellow students.

By default, every student is assumed to be professionally mature. Hence, this component is awarded to every student at the beginning of the quarter. During the quarter, based on observations by and

interactions with the teaching team, which includes but is not limited to **being present and participating in lab sessions, one-on-one interactions, electronic communication, contributing data to class data sets according to deadlines, and follow-up conversations on grades, your professionalism credit may be deducted.**

Example interactions with meaningful benefits:

- Arriving on time to lab sessions and being prepared to work in lab
- Actively participating in lab sessions, which includes being prepared to engage in discussions and ask questions.
- Developing deeper insight into course material, concepts, biology, and/or society in general
- Working collaboratively to improve skill building and future opportunities
- Contributing to an inclusive learning environment
- Learning conceptually and meaningfully why full credit was not awarded for an assignment
- Clarifying course material that facilitates deeper learning
- Reporting errors or problems in class, on assignments, or for other course material
- Talking to peers and the teaching team with respect

Example interactions that have no meaningful benefits and thus should be avoided or you will lose points:

- **Not showing up or being late repeatedly to lab session**
- Contributing inequitably to teamwork
- Harassing and/or bullying or getting overly angry with the instructional team or other students, either in person or online
- Asking questions when the information is already available (such as in the syllabus) or will eventually be known (this does not include asking clarifying questions about content/concepts)
- Ignoring the directions or requests from the instructional team (such as contributing to group presentations of class data)
- Unprofessional behavior in lab (e.g., not respecting the working environment of others, using unprofessional language)

Extra Credit

I have created a non-traditional and, dare I say, *fun* (intriguing, helpful, influential....?) extra credit assignment that is optional, to be completed by Wednesday March 6th at 11:59pm or anytime before then (you can do it now!). Please see the assignment details here: [Happiness Lab Podcast Extra Credit Option \(https://canvas.ucsd.edu/courses/51874/assignments/726075\)](https://canvas.ucsd.edu/courses/51874/assignments/726075)

Student Resources for Support and Learning

Many [resources \(https://canvas.ucsd.edu/courses/51874/pages/student-resources-for-support-and-learning\)](https://canvas.ucsd.edu/courses/51874/pages/student-resources-for-support-and-learning) on campus are directed at supporting your intellectual development. Do not be shy to make the most of these resources.

Grades

Grades will be based on your percentage in the course shown below. 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.

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	

Technical Support

For help with accounts, network, and technical issues: <https://acms.ucsd.edu/contact/index.html>
(<https://acms.ucsd.edu/contact/index.html>)

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

<https://library.ucsd.edu/computing-and-technology/connect-from-off-campus/>
(<https://library.ucsd.edu/computing-and-technology/connect-from-off-campus/>)

Academic integrity (<https://students.ucsd.edu/academics/academic-integrity/index.html>
(<https://students.ucsd.edu/academics/academic-integrity/index.html>))

The 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 (including plagiarizing lab reports, cheating on a test, or changing an answer for a re-grade) will be reported to the Academic Integrity Office and points will be taken off plagiarized work.

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 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 (<http://disabilities.ucsd.edu>) | <http://disabilities.ucsd.edu> (<http://disabilities.ucsd.edu>) | osd@ucsd.edu (<mailto:osd@ucsd.edu>) |

Office of Equity, Diversity, and Inclusion:

858.822.3542 | diversity@ucsd.edu (<mailto:diversity@ucsd.edu>) | <https://diversity.ucsd.edu/> (<https://diversity.ucsd.edu/>)

<https://students.ucsd.edu/student-life/diversity/index.html> (<https://students.ucsd.edu/student-life/diversity/index.html>)

Discrimination and Harrassment

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/> (<https://ophd.ucsd.edu/>), or <http://ophd.ucsd.edu/report-bias/index.html> (<http://ophd.ucsd.edu/report-bias/index.html>)








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 (<mailto:sarc@ucsd.edu>) | <https://care.ucsd.edu> (<https://care.ucsd.edu>)

Counseling and Psychological Services (CAPS): 858.534.3755 | <https://caps.ucsd.edu> (<https://caps.ucsd.edu>)

Course Summary:

Date	Details	Due
Wed Jan 10, 2024	 Lab 1 (https://canvas.ucsd.edu/calendar?event_id=996861&include_contexts=course_51874)	9:30am to 1:30pm
	 Mol Bio Review (https://canvas.ucsd.edu/courses/51874/assignments/726086)	due by 11:59pm
Sat Jan 13, 2024	 Week 1 Lab Notebook submission to Canvas (https://canvas.ucsd.edu/courses/51874/assignments/732036)	due by 1pm
Sun Jan 14, 2024	 Syllabus and Studying Techniques Quiz (https://canvas.ucsd.edu/courses/51874/assignments/726059)	due by 11:59pm
	 Week 1 Quiz - Dilutions, Prokaryotes vs Eukaryotes, AGE (https://canvas.ucsd.edu/courses/51874/assignments/726064)	due by 11:59pm
	 Week 1 Survey: Getting to Know You - #FinAid (https://canvas.ucsd.edu/courses/51874/assignments/726067)	due by 11:59pm
Sat Jan 20, 2024	 Week 2 Lab Notebook submission to Canvas	due by 1pm

Date	Details	Due
	(https://canvas.ucsd.edu/courses/51874/assignments/732039)	
Sun Jan 21, 2024	 Week 2 Quiz - CRISPR, ADE2 gene, Experimental Design (https://canvas.ucsd.edu/courses/51874/assignments/726066)	due by 11:59pm
Sat Jan 27, 2024	 Week 3 Lab Notebook submission to Canvas (https://canvas.ucsd.edu/courses/51874/assignments/732040)	due by 1pm
Sun Jan 28, 2024	 Week 3 Quiz - gRNA and HDR design; plasmids (https://canvas.ucsd.edu/courses/51874/assignments/726058)	due by 11:59pm
Sat Feb 3, 2024	 Week 4 Lab Notebook submission to Canvas (https://canvas.ucsd.edu/courses/51874/assignments/732041)	due by 1pm
Sat Feb 10, 2024	 Week 5 Lab Notebook submission to Canvas (https://canvas.ucsd.edu/courses/51874/assignments/732042)	due by 1pm
Thu Feb 15, 2024	 Midterm (https://canvas.ucsd.edu/courses/51874/assignments/726085)	due by 8am
Sat Feb 17, 2024	 Week 6 Lab Notebook submission to Canvas (https://canvas.ucsd.edu/courses/51874/assignments/732043)	due by 1pm
Sat Feb 24, 2024	 Week 7 Lab Notebook submission to Canvas (https://canvas.ucsd.edu/courses/51874/assignments/732044)	due by 1pm
Sat Mar 2, 2024	 Week 8 Lab Notebook submission to Canvas (https://canvas.ucsd.edu/courses/51874/assignments/732045)	due by 1pm
Wed Mar 6, 2024	 Happiness Lab Podcast Extra Credit Option (https://canvas.ucsd.edu/courses/51874/assignments/726075)	due by 11:59pm
Sat Mar 9, 2024	 Week 9 Lab Notebook submission to Canvas	due by 1pm

Date	Details	Due
	(https://canvas.ucsd.edu/courses/51874/assignments/732047)	
	 Lab notebook grading #1 (https://canvas.ucsd.edu/courses/51874/assignments/726077)	due by 11:59pm
	 Lab notebook grading #2 (https://canvas.ucsd.edu/courses/51874/assignments/726078)	due by 11:59pm
	 Lab notebook grading #3 (https://canvas.ucsd.edu/courses/51874/assignments/726079)	due by 11:59pm
	 Lab notebook grading #4 (https://canvas.ucsd.edu/courses/51874/assignments/726080)	due by 11:59pm
Fri Mar 29, 2024	 Lab notebook grading #5 (https://canvas.ucsd.edu/courses/51874/assignments/726081)	due by 11:59pm
	 Lab notebook grading #6 (https://canvas.ucsd.edu/courses/51874/assignments/726082)	due by 11:59pm
	 Lab notebook grading #7 (https://canvas.ucsd.edu/courses/51874/assignments/726083)	due by 11:59pm
	 Lab notebook grading #8 (https://canvas.ucsd.edu/courses/51874/assignments/726084)	due by 11:59pm
	 Final Exam (https://canvas.ucsd.edu/courses/51874/assignments/726073)	
	 Professionalism (https://canvas.ucsd.edu/courses/51874/assignments/726087)	